Religion and Science

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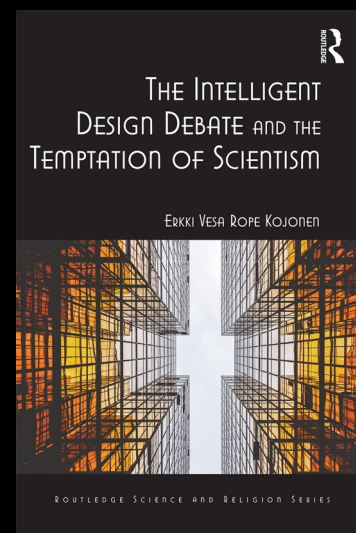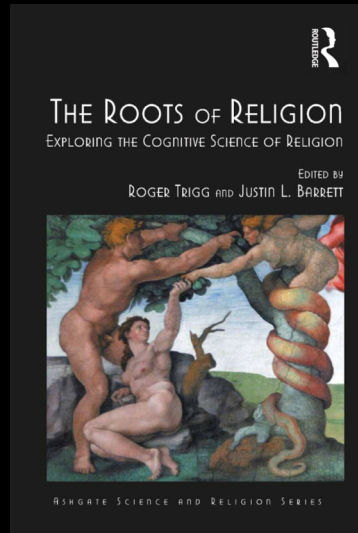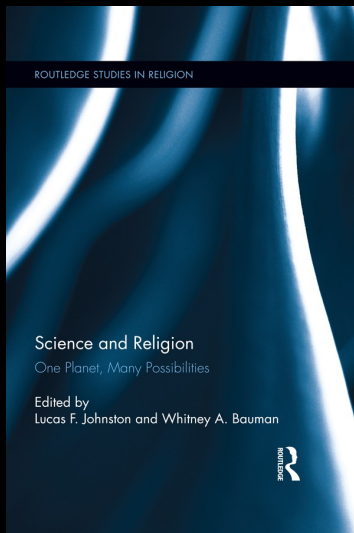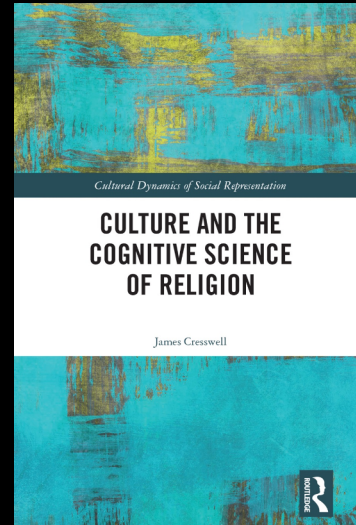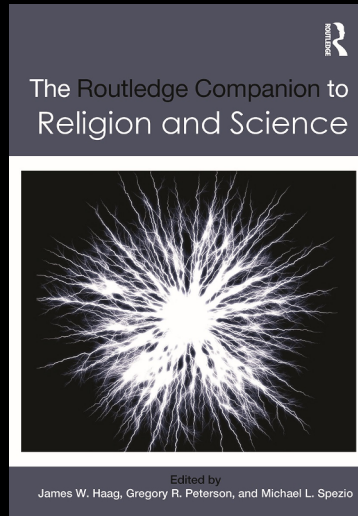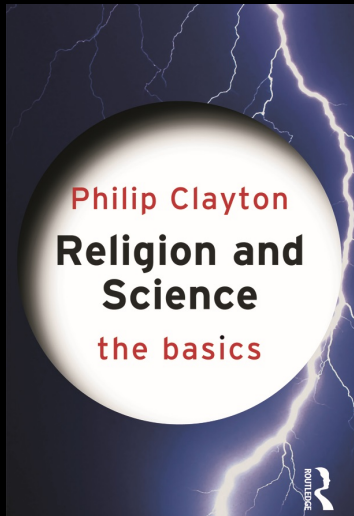
Philip Clayton
Religion and Science
the basics

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THE BASIC QUESTION

SCIENCE OR RELIGION, OR SCIENCE AND RELIGION

This chapter is excerpted from
Religion and Science: The Basics
by Phillip Clayton.

Learn more

THE BASIC QUESTION
SCIENCE OR RELIGION, OR SCIENCE AND RELIGION

Excerpted from *Religion and Science: The Basics*

THE DEBATE THAT NO ONE CAN AVOID

It is hard to imagine any institutions in human culture and existence today with deeper roots than religion and science. Religion is so basic to human history that the human species has been called *homo religiosus*, the religious animal. Indeed, some scholars even connect the origins of our species, *Homo sapiens sapiens*, to the first archeological signs of religious rituals and practices. A huge proportion of the world's population today is identified with at least one of the major religious traditions of the world.

It is equally impossible to imagine humanity without science. By 1900, about three centuries after the dawn of modern science, it was clear that this new means of studying the natural world and organizing our beliefs about it was transforming humanity more than perhaps any other development in the history of our species. By the end of World War II, when much of Europe had been reduced to rubble and Hiroshima to an atomic fall-out zone, science had changed the face of the planet for ever. Today there is virtually no aspect of human existence that does not depend in some way upon scientific results and technological inventions. From immunizations to heart surgery, from fertilizer to genetically modified crops, from our cell phones to our computers, from roads to airplanes, from the bananas on our table to our 'cash' in the bank, existence without science has become inconceivable.

As we will see in the following pages, the impact of science is not only limited to its products. The scientific mindset has transformed humanity's views of what knowledge is, how it is obtained, and how knowledge claims are evaluated. Even people whose central moral and religious beliefs are not determined by science are still impacted by the growth of science, since *others* will judge their knowledge claims in light of their agreement with

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or divergence from scientific results.

Science and religion: compatibility or conflict? Should we talk about 'science and religion,' or should it be 'science *versus* religion'? By the time you finish this book, you will have a good sense of the whole range of answers that have been given to this question and the best arguments that are being made on both sides. This should give you enough information to make up your own mind and to defend your own positions in each of the major areas of the debate.

Certainly the dominant message in our culture today is that science and religion stand in deep tension. Nowhere is this message clearer than in the debate between naturalism and theism. *Naturalism* is the view that all that exists are natural objects within the universe – the combinations of physical mass and energy that make up planets and stars, oceans and mountains, microbes and humans. In normal usage, naturalism usually implies the claim that real knowledge of these natural objects comes through, or is at least controlled by, the results of scientific inquiry. Cognate terms are *materialism* and *physicalism*. The former has traditionally meant 'all is matter'; the latter technically means reducible to the laws, particles, and forms of energy that physicists study.

Theism is the belief in the existence of God, an ultimate reality that transcends the universe as a whole. Passing over a few exceptions, Jews, Christians, Muslims, and Hindus are theists. When the term is used broadly, it includes pantheists, panentheists ('the world is in God'), and polytheists – hence most of the native African religions and the world's indigenous or tribal religions. Typically God is described as a personal being, often with the qualities of omniscience (all-knowing), omnipotence (all-powerful), and omnibenevolence (all-good).
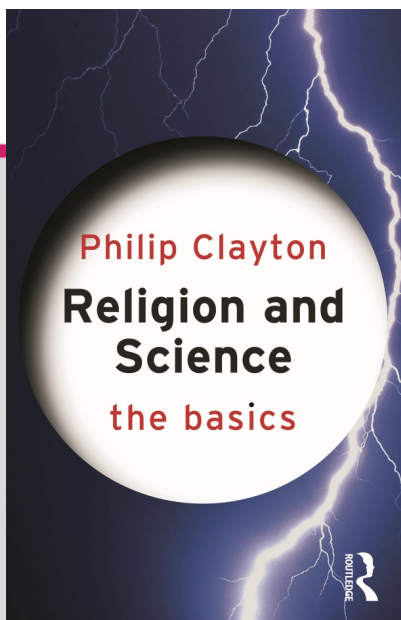
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Based on the sacred scriptures of their particular tradition (the Bible, the Qur'an, the Upanishads), theists often ascribe other qualities to God, such as consciousness, love, justice, and righteousness.

Theists usually defend specific ways of knowing, distinct from science, through which humans are able to know something of God and God's nature. Traditionally, they have believed that God created the world, providentially guides it, and reveals God's self in it. This means that God does things in the world ('divine action'), carrying out actions that are either consistent with natural law or that involve setting natural regularities aside (miracles).

At first blush, theism and naturalism appear to be incompatible positions. Naturalists affirm that all that exists is the universe (or multiverse) and the objects within it, whereas theists claim that something transcends the universe. Naturalists generally use science as their primary standard for what humans know, whereas theists defend other ways of knowing as well, such as intuition or religious experience.

So let us explore. Are the two positions incompatible? Or, when one probes deeper, can one detect any deeper compatibilities? The best way to find out is to arrange a debate between a knowledgeable representative from each side and then to see what emerges. As you know, good debates between naturalists and theists in real life are hard to find; they often deteriorate into name-calling and shouting matches. Fortunately, in a book it is possible to imagine a calm and civil discussion between defenders of the two positions:

A NATURALIST AND A THEIST IN DEBATE

Host: The definitions of your positions have already been presented. So let me ask each of you to give a basic defense of your position. Let us start with the theist.

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Theist: Religion is one of the oldest and most notable features of humanity. Some of the greatest wisdom and some of the most ennobling ethical ideals are contained in the world's religious traditions. These ideals are intrinsically linked to metaphysical beliefs, beliefs about the nature of ultimate reality. In my particular case, for example, I believe that an infinite personal being exists, one who is the Creator and ultimate ground of all finite things.

Naturalist: I don't dispute the role that religions played in the childhood and youth of our species. Indeed, although much evil has been done in the name of religion, I concede that it has sometimes also brought some good. But humanity in its maturity has invented science and begun to guide its decision-making by scientific results. If religion is to play any positive role today – and at least some of my naturalist friends believe it still can – it must function in whatever spaces are left over by the results of the various sciences.

T: There is no reason to think that the advent of science spells the death of religion. I advocate a more complex worldview, in which *both* serve important functions. I agree that religion should not compete with science in science's own proper domain, but many of the most important human questions lie outside the sphere of scientific competence.

Host: Thanks for those opening statements. Here's our next question. Are there areas of human experience, outside the domain of science, where religion provides knowledge?

T: Science describes what is but cannot tell us how we ought to act. Hence, ethics and morality lie outside its sphere. Science can tell us about the laws of nature and can explain the motion of physical bodies in the universe, but it cannot tell us what came before the universe or why it was created. Yet for many of us the meaning of

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human life turns on questions like these, questions about the ultimate nature of reality. Religion provides knowledge in these spheres.

N: You wrongly set limits on science, for example, by claiming that it has no moral implications. For example, there are values that arise in the process of doing science, and these provide good models for human interactions, for institutions, and for politics. To know what kind of animal we have evolved to be tells us something about how we should live if we are to be happy and successful.

Hence science does provide some guidance for how humans ought to live. Of course, many human decisions are not dictated by physics or biology. In cases where there is great variability across cultures and moral systems, and where the beliefs in question do no damage, we can be relativists, allowing each person to choose for himself or herself. Religion falls in this category. And on the meaning question: I find meaning in the pursuit of knowledge about the world, as well as in my family, friends, and hobbies. What more meaning do I need?

Host: Okay, next question. Does anything exist beyond the natural world taken as a whole?

N: I think such questions are meaningless. We can observe empirical objects; we can measure them and make predictions about their causal interactions with each other. Why would we want to make truth claims about the existence of anything else? I tend to think that all such metaphysical language is literally meaningless – sort of like the famous poem from Lewis Carroll's *Alice in Wonderland*: ' 'Twas brillig and the slithy toves did gyre and gimble in the wabe . . .'

T: I think I can show that it's impossible to argue against

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metaphysics (in this case, belief in God) without *doing* metaphysics, and therefore contradicting oneself. I also think that a number of positive arguments can be given for affirming the existence of God. I don't actually share the view of a school called 'Intelligent Design,' which claims that these arguments are scientific arguments and can win in a head-to- head competition with contemporary scientific accounts of the world. They are to me instead *philosophical* arguments. But I think they are compelling nonetheless. I affirm the classical proofs for the existence of God: the ontological, cosmological, and teleological arguments. They do not *force* belief in the existence of God, but they at least show that it's not unreasonable to believe in God.

N: Those classic arguments are no longer persuasive in the scientific age. Some of them make assumptions about nature that we no longer hold today. For example, the teleological argument, the so-called argument from design, is no longer valid after Darwin. It argues that God exists based on the fact that animals and plants are matched to their environments; otherwise, it says, it would be impossible to explain why organisms are so perfectly suited to their surroundings. But Darwinism as a whole explains evolution and adaptation in scientific terms.

T: I agree that modern biology has rendered certain forms of the argument from design unconvincing. So let me give two arguments drawn from the context of modern science, which I think are still persuasive. The first is the 'fine-tuning' argument. We now know that the fundamental physical variables had to fall within a very narrow range for life to be possible, and in fact they do. This suggests that we live in an 'anthropic' universe – a universe designed for life, or at least the only kind of universe in which life could arise. As the cosmologist Edward Harrison writes somewhere, 'Here is the cosmological proof of the existence of God. The

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fine tuning of the universe provides *prima facie* evidence of deistic design. Take your choice: blind chance that requires multitudes of universes, or design that requires only one.'

My second argument moves from the existence of natural law to the existence of God. Natural laws are prior to the existence of physical states of affairs; they are the mathematical regularities that determine the motions of particles and specify the four fundamental forces in the universe. But if laws precede the existence of the universe, and laws are more mind-like than body-like, then *something like mind* is the more fundamental order of reality. This supports the idea that ultimate reality is God, not matter.

And some of the traditional arguments for the existence of God still remain valid in this age of science. One can only answer the question, 'Why is there something rather than nothing?' if there exists an ultimate reality that contains the reason for its existence within itself. God is such a being; therefore God exists (the cosmological proof). The existence of values and of our awareness of moral obligation proves that there must be a highest good, which is God or is grounded in God (the axiological proof). Finally, religious experience provides some evidence of the existence of God (the argument from mysticism or religious experience).

N: I know that nothing would please you more than to draw me into the morasses of your metaphysical debates. In truth, I find that whole way of speaking a throw-back to a bygone era. You know the standard criticisms of these arguments as well as I do. We could debate the issues until we're blue in the face, but there just isn't enough empirical evidence to decide the issue one way or the other. These are the kind of old-style metaphysical disputes that my friends and I are trying to break away from.

Let's take your last comment about religious experience. In a

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scientific age, shouldn't we try to learn as much as we can from the empirical study of religion? I don't need to argue that all of your sentences are literally meaningless, like the logical positivists once did, but I do want to encourage you and your co-religionists to learn everything that you can about religion by scientific means. Did religious beliefs and practices help human beings in their various clans and tribes to survive in hostile environments? If so, how did this happen? Did religion increase group cohesion and motivate people to obey the social mores necessary for their survival? If so, you and I can agree that religion helped people to adapt, at least in the earlier stages of human evolution.

Then we can discuss whether it is still adaptive today. If religion no longer is, why do people continue to believe? Perhaps religious belief is a by-product of mental and cognitive human traits that *are* adaptive – perhaps it's something that our brains produce when they are running in neutral, as it were. The brain's large prefrontal cortex functions to support generalizations and abstract reasoning. Maybe when it has no sense data to work with, it naturally produces the idea of God. Finally, can we agree that there are contexts in which religion is *maladaptive*, cases where religious practices decrease the fitness of a group? That question, too, could be studied empirically.

Such questions are only the start. Scientists are now studying how human biology shapes human feelings and desires (evolutionary psychology). There are biological explanations for why human beings believe certain things and disbelieve others. By studying evolutionary history, we can reconstruct the 'cognitive modules' around which human cognition is built. The cognitive study of religion today is beginning to identify the 'commonsense physics' and 'commonsense biology' that evolution has produced, as well as why it's intuitive for humans to detect agency in the world . . . and in the heavens.

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If we did turn to metaphysics, however, I would side with Richard Dawkins in *The God Delusion*. Evolution shows more complex organisms arising out of simpler states of affairs. This pattern suggests that the origin of all things was maximally simple. Theism, by contrast, begins with a maximally complex being, God, who then creates relatively simple processes. To my mind that puts theists at a disadvantage when it comes to the evidence.

T: I am interested in the empirical evidence as much as you are, but we interpret it very differently. If God exists, as I believe, is it surprising that our brains would be naturally wired to produce the idea of God? Wouldn't we also expect that groups that are bonded together by their belief in God would do better on this planet than non-religious groups? Also, you should know that traditional theism affirmed the doctrine of divine simplicity. So we are not at all disturbed by Richard Dawkins' argument; it merely asks us for what we already affirm.

Host: Thanks for that exchange; that was very helpful. What do the two of you believe about the nature of humanity?

T: Everything that exists is God's creation. We share many qualities with the animals as a result. Still, humans uniquely reflect the 'image of God.' Some people read Genesis in a literal way; they believe that God created humans as a 'special creation,' separate from God's creation of the animals. But others, like me, do not read the Hebrew Bible as a literal guide to scientific matters. We are happy to say that there was just the one creation of 'the heavens and the earth' and that humans evolved from animals. Still, I affirm that some unique human qualities have evolved through and out of this process. They include the ability to consciously know God and God's self-revelation, to know that we are morally responsible before others, to recognize our need for salvation and relationship with God, and to commit our lives to God's service. There is

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evidence that science is now helping to establish how unique many of the human capacities are.

N: Obviously I don't share your views on God, but in general, would say, naturalists are more skeptical about claims for human uniqueness than you are. Evolution involves a process of many small (and some larger) mutations to a genome, which lead to differential survival rates of the offspring. It's true that new abilities evolve over time: the ability to move, sexual reproduction, the emergence of a brain and central nervous system, the ability to form mental representations of one's environment, culture and social bonding, and eventually the use of symbolic language. But it is a mistake to use any of these emergent properties as grounds for drawing an ontological divide and separating organisms into fundamentally different kinds of living beings.

Host: Next question. Is religion necessary for making life meaningful? Can religion alone produce the sense that we are 'at home in the universe'?

T: Here I think I am on especially strong ground. Science leads to nihilism, the sense that the world is ultimately meaningless or even absurd. On the assumption of naturalism, there is no purpose to our lives, no final direction to cosmic history. Science also cannot serve as the ground for values. One might *choose* to be moral, but one is not really obligated to do so. By contrast, if the world is created by a personal God who is good and who cares for creation, it's a very different picture. One gives alternate answers to the core questions of existence. Now there is meaning, purpose, directionality, and a real basis for distinguishing right from wrong.

N: Interestingly, I think I am on equally strong ground in answering our host's question. If physics were the only science, one might well conclude that all that exists is 'matter (and energy) in motion'

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as Thomas Hobbes wrote in the seventeenth century. But biology studies organisms, and every organism has at least one purpose in the world: to survive and reproduce. Some things are naturally more valuable to a given organism given its biology and (in some cases) culture.

T: But that's hardly a robust defense of values! If the fundamental value of nature is 'the survival of the fittest,' as Darwin wrote, then – to also quote Thomas Hobbes – the final state of man would be 'nasty, brutish, and short.' You might be able to show that treating your genetic relatives is biologically good, as is doing nice things for friends in the hope that they will reciprocate, but you could never ground a universal altruism – the call to love one's enemies, for example – on the basis of biology alone.

N: That's right; the call to universal love can be a cultural value, but it can't be derived from biology alone. But on the more general point, you and I disagree. Biology gives rise to culture, with its complex languages and symbol systems. The stories and the values we live by are among these cultural products. As a naturalist, I don't have to reduce everything in the natural world to genes or to the struggle for survival alone. I love my family and friends, pursue projects for the good of society, and hope for world peace just as much as you do; my values are as deeply embedded in who I am as yours are in you. It's just that I don't think they need any grounding outside of the natural and cultural worlds.

Host: Do miracles exist? Are the laws of nature ever suspended?

N: That one's easy: no! As the Scottish philosopher David Hume showed in his famous *Dialogues concerning Natural Religion* in the eighteenth century, the reasons against believing that a miracle has occurred, that natural laws have been suspended, will always be massively greater than the reasons for affirming one. Not only

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that; even the *possibility* of miracles occurring would make science as we know it impossible. Imagine that a scientist would have to say when she encountered an anomaly: 'Well, either my data is bad, or my theories are incomplete – or perhaps God has simply set aside a few natural laws here in order to actualize some goals in the world.' No science could be done in such a context. But since there is no scientific evidence that miracles have ever occurred, I rest easy on this one.

T: I think things are more complex than my friend describes. God could easily be influencing the world in myriad forms without being detected by microscopes or Geiger counters. Over the eons God could have guided the course of evolution in many ways. Even for those who don't believe that God directly brings about physical changes in the world, it is possible for God to subtly influence human thought (and perhaps animals too), allowing them to carry out God's will. For me the most important point is that God is *able* to work miracles in the world if and when God wishes. This possibility follows directly from God having created the finite world in the first place. The naturalist and I also disagree on the empirical question of whether miraculous things have happened. Haven't most of us heard stories and testimonies about some pretty miraculous events happening? Isn't it possible that they have? In the end, then, the most important thing for me is God's *ability* to act in the world.

Host: Our time is running out, and we must draw to a close. For the last question, let me ask you if you think that science and religion represent two opposing worldviews, or could they offer two complementary ways of construing the one reality?

T: Some of my Jewish, Christian, and Muslim friends think that their theism is incompatible with science; but I disagree, as you've heard. It's also true that many scientists tend to confuse the

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scientific data and theories themselves with their own anti-religious prejudices and secular worldview. When this occurs, they confuse science with atheism. When religious people hear scholars identifying science with atheism, is it surprising that they conclude that they have to be anti-scientific?

Still, I personally am not convinced that science and religion exclude each other. Accurate scientific knowledge of the natural world does not exclude the existence of a supernatural God. In my view, supernatural explanations *supplement* naturalistic ones. There is no ultimate inconsistency. How could there be, if God is the Creator of the heavens and the earth?

N: I too have many friends more radical than myself who affirm a complete incompatibility between science and all forms of religious belief. The media seems to love reporting on their views, and pays less attention to more moderate naturalists such as myself. I wouldn't want to say that science excludes *all religious belief whatsoever*. But I do think that my theist friend here, with his robust supernaturalist claims, is going to have a harder time reconciling his theology with science than, say, a Buddhist would have.

Nevertheless, the theist shouldn't derive too much comfort from my willingness to admit a compatibility-in-principle between science and religion. When it comes to concrete knowledge claims about God, I think there simply isn't enough empirical evidence to warrant your doctrines. If you want to affirm 'ultimate mystery' or stress the importance of living a 'spiritual' life, I can hardly complain. But as soon as you begin making any more concrete claims about God, I think you step beyond the empirical evidence.

T: I appreciate your open-mindedness. But your criterion, empirical evidence, begs the question against my position. If a God exists who is pure Spirit, then God will never be detected by the empirical

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means that you employ. God can only be known through metaphysical arguments, through the history of revelation (or scripture), through the sense of moral obligation, or through religious experience. If you rule out all four of those means in advance, of course it becomes impossible for me to defend my beliefs. If you include the appropriate paths to knowledge, then I maintain that there is ample evidence that God exists. When one looks across the world's religions and considers how deeply rooted religion is in human life, one realizes that there are some rather significant grounds for religious belief.

N: Actually, I think that the different religious traditions offer *very different* views of ultimate reality.

Host: That sounds like a great topic for us to come back to in later chapters of this book. For now, thanks for agreeing to appear in this book and to defend your views in such a clear and civil manner.

TAKING STOCK

What can we learn from this debate? First, it breaks at least one widespread stereotype: the tendency to associate all naturalists with science and all theists with an anti-scientific attitude. This is the first assumption many make in any discussion of science and religion; it is also one that is widely popularized in the media and in large-market books. Many people tend to identify science with an ultimate or 'metaphysical' naturalism; they then associate belief in God with an anti-scientific attitude.

Yet our short debate has already shown that such easy identifications are too simplistic. Our theist, at any rate, was interested in the results of science. He accepted evolution and incorporated it as part of his understanding of life on earth and of human beings. He grounded his arguments for the existence of God in data about the origin of the universe and its laws (cosmology).

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His understanding of God and the created world drew significantly from scientific results. Clearly, he saw science and religion as compatible, though not identical.

Nor did the naturalist fit the stereotype of a scientific naturalist, just as many scientists don't fit the stereotype either. She was not inherently antagonistic to religion or to broader metaphysical positions. Of course, she did greatly value empirical data and would not endorse any position that made the doing of science impossible. She also tended to be skeptical about metaphysical claims and did not herself believe in the existence of God or a higher power. But she manifested a sort of healthy agnosticism about such questions, rather than a virulent hostility toward them. She might even have said, 'Whatever religious or spiritual beliefs I end up affirming, I am concerned that they should not be in conflict with empirical results, for I want to learn as much as possible from scientific inquiry.'

Even this brief debate provides some sense of the range of possible positions. As we will soon see, the range only increases as we consider the vast differences between the world's major religious traditions. Some theists are deeply antagonistic toward all science, and some scientists are hostile toward all religion. We will look at the reasons that these two groups give for their views in the next chapter. But sometimes the roles are reversed. Many theists build the core ideas of their theism out of science. If this is true for theists, it holds all the more for non-theistic traditions such as Buddhism, as we will see in Chapter 3. Likewise, devotion to the practice of science need not make one anti-religious. Many scientists have pursued the practice of science out of deeply religious ends.

It will be our goal in the following chapters to explore the intricacy of the questions and the main answers that are being given to them today – to take this opening debate deeper, as it

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were. Instead of black and white connections, we will find a world of complex interconnections, of similarities and differences, of shared partnerships and sometimes conflicting projects. Readers will be encouraged to take their own positions on the various debates and to construct the best arguments they are able to construct. Sometimes you will resonate strongly with one or more of the existing positions in a given debate. At other times you may find yourself formulating and defending positions that no one has ever advanced before. Like all philosophical topics, this one admits of many different possible responses, which – ideally – will lead to ever deeper and more adequate answers.

But first, before the wider plains of discourse open up, we must cross the high mountains of the contemporary warfare between science and religion. One battle so powerfully exemplifies the two-sided case for the final incompatibility between science and religion, and continues to receive so much media attention, that it deserves a chapter of its own. I refer, of course, to the dramatic duel between 'intelligent design' theorists and the 'new atheists.'

QUESTIONS FOR REFLECTION AND DISCUSSION

1. Who do you think won this debate? Why?

2. If there was not a black and white winner, what do you think was the best argument that the theist brought? The best argument by the naturalist?

3. Were there any points in the debate where their beliefs were simply incommensurable – points at which they really could find no common ground on which to argue? See if you can identify two or three of these points.

4. Clearly, this naturalist and this theist were working with some

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conflicting assumptions. Can you identify some of these deeper-level assumptions? If the discussion partners brought them to the surface, do you think they could give reasons to support their own assumptions as more adequate than their opponent's assumptions? Can you state their assumptions and then come up with some reasons of your own for or against their assumptions?

5. This was a remarkably civil debate: there was no name-calling, and both speakers stayed beautifully on topic. Are debates between naturalists and theists usually like this? If not, why not? What are some of the factors that helped to keep the conversation productive? To what extent are these factors present in 'real-life' debates between science and religion? How could the real-life debates be improved?

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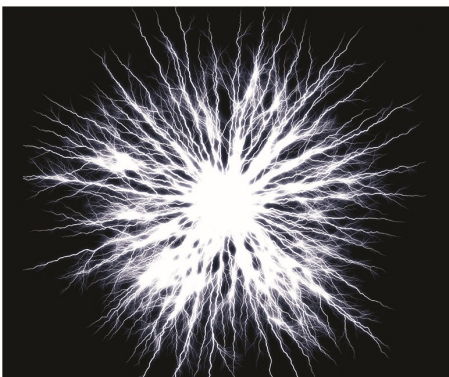
The Routledge Companion to
Religion and Science

This chapter is excerpted from

The Routledge Companion to Religion and Science

edited by James W. Haag, Gregory R. Peterson and Michael L. Spezio.

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In studying the relation between science and religion in the greater Middle East and the Islamic World, using the traditional Eurocentric division of science and religion, which was formulated in the European Renaissance and Enlightenment, cannot yield accurate conclusions and often leads to anachronistic or Eurocentric analyses. Here we look at different scientific, philosophical, and religious disciplines, discourses, and paradigms as integral parts of a socio-intellectual environment, where different methods, ideas, theories, and discursive strategies are exchanged, debated, and developed in conjunction, while keeping an eye on debates on sources of knowledge and on epistemic authority of scholars, ideas, and methodologies. Moreover, analysis should pay close attention to political and socio-intellectual debates of legitimacy, which constitute particular dynamic distributions of social and intellectual capital.

Themes of analysis

At the core of the debates between scholars of science, religion, and philosophy, a number of themes are important in order to analyze these debates without essentializing different disciplines or focusing on the most violent or heated episodes of these intellectual exchanges.

Perceptions of science and religion

Here we look at science not only as the product of the laboratory, but rather as a social and intellectual practice, the position, intellectual authority, and boundaries of which are defined organically within the contemporaneous intellectual sphere. Similarly, different social changes affect the perception of religion and its role in society. Although the religious discourse depends on a number of quasi-permanent texts, the understanding, interpretation, and perception of these texts effectively change the

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meaning and significance of religion.

The analysis of the perception of science and religion involves investigating debates on the meaning of knowledge, its different sources, and their degree of legitimacy.

The scientific and religious processes

As processes of intellectual production, both scientific and religious practices formulate their own rules and methods, which help grant them epistemic authority, social legitimacy, and intellectual influence. However, these rules (such as the scientific method of thinking and the rules of interpretation of religious texts) are not permanent, but rather are organically connected to the social and intellectual scene. As these rules and strategies change, the perception of the discipline, whether scientific or religious, changes, and their place in society and their intellectual interactions change as well.

Epistemic authority and the socio-intellectual space

The socio-intellectual and political space available for different disciplines and agents influences how they develop their discourses, communicate their narratives, and formulate their arguments. In turn, this affects their epistemic authority, leading to organic changes in the entire intellectual scene. This space depends on factors such as patronage, methods of communication, socio-intellectual capital, and political and socio-economic context.

From the "Classical Age" to the early modern period

This period is conventionally considered to have started with the translation movement under the Abbasid Caliphate and ended with the destruction of Baghdad by the Mongols.

Early translation movement

Throughout the eighth century, many scholars took to translating

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various Greek, Persian, and Indian writings into Arabic, making these works accessible to a larger group of students and scholars. The Academy of Gundeshapur, which was established under the Sassinid rule in the end of the fifth century,flourished under Chosroes, and gave refuge to many Greek Nestorian scholars who fled the Byzantine persecution and played a significant role in leading this early translation movement and scientific debate.

In 813, al-Ma'mun became the Abbasid Caliph following the regicide of his brother al-Amin. Under al-Ma'mun, the House of Wisdom, which was established by his father al-Rashid, expanded rapidly to become a huge library and school, and the center of a rapid and expansive translation movement. This movement was led by people such Hunayn ibn Ishaq, a Nestorian physician, translator, and philosopher, and al-Kindi, a philosopher and mathematician (Rosenthal 1975).

The translations allowed for the rapid circulation of ancient works, aided by a fertile environment of theological and philosophical debates, where Muslim scholars debated with Christian and Jewish scholars, establishing the foundations of a new Muslim theology or Kalam. The Mutazilites, who emerged as a theological school in the eighth century, developed their arguments using logic, Aristotelian, and neoplatonic ideas, and were able to recruit al-Ma'mun himself in becoming the most important school of theology (Hourani 1976).

Mihna

Under various socio-political and intellectual influences, al-Ma'mun proclaimed the Mutazilite theology to be the official theology of the Islamic Caliphate, and instituted a series of trials where scholars of religion and of religious law were examined and required to profess the new theology. This series of trials extended over fifteen years, under two other caliphs after al-Ma'mun's two

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successors. The main points of debate concerned the Mutazilite belief in absolute monotheism, which necessitated the finiteness of the universe, the argument that the Scripture is created and finite as well, and the rejection of anthropomorphic descriptions of God.

The finiteness of the universe went against Aristotelian cosmology, which was espoused by many philosophers and scientists. Aristotelians believed in the infiniteness of the universe, the permanence of cosmic movements, and the existence of God outside the universe.

The creation of the Scripture caused most of the uproar. The theological counterargument was largely an argument of methodology and of sources of knowledge. While Mutazilites proclaimed the creation of the Scripture based on logical and philosophical theorizations, the opposing theological views, led by scholars of prophetic traditions and headed by Ahmad ibn Hanbal, refused to answer the question and argued that there was no clear answer for it in the Scripture, which was the only legitimate source of knowledge for them. Moreover, Mutazilites sought to interpret the anthropomorphic descriptions of God in the Scripture, arguing that they logically cannot be literal, while traditionists argued for limited or no interpretation of the Scripture, and that the conclusions of intellectual theorization are only secondary to what was mentioned in the Scripture.

On this methodological level, peripatetic philosophers and scientists and Mutazilite theologians were closer in position, as they agreed on the meaning and sources of knowledge and were able to hold more productive debates, which contributed to the maturation of these disciplines. On the other hand, the popular conviction of the traditionist, more orthodox theological position put enormous pressure on Mutazilite theologians and philosophers and contributed to the development of new schools of theology.

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The Mihna/trial was terminated in 848 with an apparent victory of the traditionist views, but with dissemination of the debate to the far-reaching corners of the empire. This debate contributed to shaping scientific theories and religious doctrines over the following three centuries.

Maturation of science, philosophy, and theology

The late ninth to early tenth centuries witnessed the rapid weakening of the Abbasid central authority in Baghdad and the establishment of numerous kingdoms and principalities in the east of the empire, which owed only nominal loyalty to the Abbasid Caliph and competed together for more influence. In the west, a Shiite Caliphate was established in 909 in North Africa and consolidated its empire in 969 by occupying Egypt and establishing Cairo as the capital. Soon after, they controlled Arabia and the Levant, threatening nominal Abbasid control over the region of Iraq.

The political decline of the central authority allowed for the existence of multiple centers and metropoles, where sovereigns patronized scientific and philosophical inquiries and where different theological views developed under the protection of sympathetic rulers. Meanwhile, the travel culture, seasonal religious travels, and the Arabic language facilitated the movement of scientific, philosophical, and theological productions across these political borders.

Rapid progress in scientific inquiry and discovery took place in various courts spearheaded by the likes of Rhazes (medicine), Sijzi (astronomy), and Khawarizimi (mathematics), who worked for different courts and rulers in Persia and Iraq. Al-Farabi, a student of al-Kindi, developed Aristotelian and neoplatonic philosophical inquiry.

Brethren of Purity, a secret society of philosophers and

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scientists, appeared on the intellectual scene during the tenth century and espoused Shiite theology as based on Pythagorean philosophy and cosmology. In their collection of fifty-two treatises, they theorized for the Isma'ili Shiite theology adopted by the Fatimids, whom they supported and to whom they paved the road intellectually. Abu Hayyan al-Tawhidi, who admired the work of the Brethren of Purity, developed neoplatonic philosophy and introduced aesthetics to Islamic theology and science. In 972, al-Azhar mosque was inaugurated in Fatimid Cairo and became the beacon of Isma'ili Shiite theology. The Fatimids established another "House of Wisdom" in Cairo in 1004; a huge library that hosted many scholars in various disciplines, paralleling the Abbasid establishment.

In 912, a new school of theology broke off from the Mutazilite school under the guidance of Al-Ash'ari. The Asharites drew their positions between those of the Mutazilites and those of the traditionists, claiming the supreme authority of the Scripture but allowing for limited interpretations. Asharites were occasionalist theologians, who rejected Aristoltelian physics and cosmology, which are based on inherent movements, infinity, and absolute regularity of the universe, and argued for continuous creation and the role of divine providence in maintaining the universe (Halevi 2002). This theology gave impetus to the work of physicists and astronomers such as al-Biruni (973–1048), who was involved with his famous contemporary Avicenna (980–1073), the spearhead of Aristotelian philosophy and science, in numerous debates, argued for the movement of the Earth, and was sympathetic to heliocentric cosmology. One of Biruni's most significant discoveries was the calculation of the diameter of the Earth, which was 16 kilometers less than modern calculations.

The Asharite theology supported and was inspired by atomist physics, which developed Epicurean views and argued that matter

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is made of small particles, which moved freely and randomly and coalesced to form different earthly and cosmic bodies. To the Asharites, this view allowed for the continuous creation and divine will holding the universe from disintegration. Al-Ghazali (1058–1111), who was a prominent Asharite theologian, wrote"The Incoherence of Philosophers,"attacking peripatetic philosophers such as Avicenna and al-Farabi and arguing for limited interpretation of the Scripture.

Mongolian invasion, Sunni revivalism

Through the twelfth and thirteenth centuries, Crusaders attacked the Levant contributing to the fall of the Fatimid caliphate and the establishment of the Sunni revivalist Ayyubid states in Egypt and the Levant. In Andalusia and Northern Africa, the Almoravids and Almohads, which espoused the Sunni doctrine and Ashari theology, controlled the region and sponsored the exile of many scholars and philosophers, and the persecution and conversion of many non-Muslim scholars, many of whom fled to the East. The wars of the Reconquista forced many Jewish scholars to flee and threatened the intellectual environment of Andalusia. In the East, the Mongolian invasion in the thirteenth century put an end to the Abbasid Caliphate in Baghdad and destroyed the House of Wisdom.

The economic decline, the political instability, and the destruction of many centers of scientific inquiry affected the intellectual environment severely. However, scholars such as Averroes (1126–98) and Maimonides (d. 1204) continued to add to philosophical, scientific, and theological inquiry. Averroes argued against Al-Ghazali's "Incoherence"and theorized for the interdependence of philosophy, science, and theology. Maimonides' "Guide for the Perplexed"was widely read and studied in different scholarly circles throughout the Middle East.

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The post-classical period

With the establishment of new, strong empires such as the Mamluk empire in Egypt and the Levant and the Illikhanid empire in Iraq, Persia and central Asia, another era of socio-economic prosperity and relative political stability began. The socio-economic and political development allowed for more codification of the rules governing different scientific practices and legal proceedings in search of more predictability and a more institutionalized intellectual environment. In the Mamluk empire, the appointment of four chief judges representing the four schools of law limited the space for free legal interpretation to serve the rapidly growing commercial and social structures. Also, the establishment of large state- or elite-sponsored madrasas gave certain theological views precedence over others and allowed for more uniformity of jurisprudence and theology. The huge hospitals run by the court physicians; the observatories run by court-appointed astronomers; building projects funded by the state and the elites; and the chairs for teaching medicine, philosophy, mathematics, and logic, sponsored in the different madrasas by the courts and political and military elites, led to more standardization and to the production and propagation of certain ideas at the expense of others (Rapoport 2003). However, none of these institutions acquired an irrevocable legitimacy or an unquestionable authority, and the debates on authority and legitimacy remained active throughout the medieval and early modern period.

The educational institutions and structures were required to produce efficient employees to fill the ranks of the bureaucracy, the judiciary, the hospitals, and the madrasas. Under this pressure, more people were educated, but towards more practical concerns of daily functioning of the empire and the society, and less attention was given to methodological debates or ground-breaking

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discoveries. The old debates continued, but to a lesser extent, and gave way to a more homogeneous intellectual environment focusing on direct and practical concerns in philosophy, theology, and law, and on application and practice in the sciences (Makdisi 1961).

Epidemics, famines, wars, and economic decline after the discovery of new trade routes changed the intellectual environment. The relation between science and religion changed as well, with scientific disciplines spearheaded by "crafts" such as medicine and astronomy, while more theoretical endeavors fell to the background; and with religious studies centered around the law and jurisprudence, with less interest in the bigger questions that had occupied the intellectual space before.

As the balance of power changed in Europe to the detriment of the Ottoman empire, political and financial elites in the Middle East became interested in sponsoring scholars and scientists from Europe, who traveled across the Ottoman empire in the seventeenth and eighteenth centuries, working as physicians, geographers, botanists, and instructors of the elite's children. Furthermore, the development of expatriate European communities in the Middle East, with their schools and missionaries, allowed for the movement of new European sciences to the Middle East. The new scientific practices, many of which had strong connections to some medieval theories, moved smoothly within the Middle Eastern intellectual environment, and there seemed to be little intellectual friction between the old and new scientific practices on the one hand, and the large religious educational and intellectual institutions on the other.

Debates in pre-modern scientific disciplines

Physics

Aristotelian physics was the most prominent and widely accepted

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view on matter and the material world. This theory relied on the presence of four main elements, which constituted the entire material universe in the sub-lunar sphere. Outside the sub-lunar sphere, celestial bodies were formed of a different, more superior element, and moved in perfect circles around the Earth. This theory, as espoused and developed by many Islamic philosophers, such as Avicenna and Averroes, implied the eternity of the universe and that the entire cosmological formation has existed since eternity and is infinite in nature (Averroes 2001).

Coming into contact with the religious notions of instantaneous creation, philosophers and scientists were inspired to develop the Aristotelian principles and the theological doctrines in different directions. Averroes, who was a judge, a physician, and a philosopher, argued that instantaneous creation contradicts the main tenets of Islamic creed, as it implies a change in the will of God, who is unchanging and permanent. Some Mutazilite theologians argued that instantaneous creation is necessary to ensure the uniqueness of the Deity and argued, still in line with Aristotelian theory, that this theory does not imply the eternity of the universe by necessity.

Al-Ghazali found the Epicurean atomist theory to provide a more plausible understanding of the world. According to the ancient and medieval atomist theory, all beings are made of infinitely small indivisible particles called atoms, which coalesce to form different beings. Muslim Epicurean physicists believed that these atoms have an inherent continuous random movement, which would not allow them to stay in form save for the will of God, who can keep bodies intact. This view was adopted by schools of occasionalist theology, which also claimed a continuous act of creation by God in the form of preserving bodies from inevitable disintegration. On the other hand, other Epicurean scientists, along with many theologians and religious scholars, such as Imam Fakhr

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al-Din al-Razi, argued for a single moment of instantaneous creation, where bodies were formed and where a continuous progressive process of disintegration begins, leading to the eventual end of the world.

Medicine

Unlike other fields, where multiple theories competed, medicine remained largely dependent on the humoral theory founded by Hippocrates and Galen, and its development at the hands of Rhazes, Avicenna, Maimonides, Ibn al-Nafis, and others.

The intellectual authority of this theory proposed a considerable challenge to a certain corpus of prophetic traditions, where Muhammad suggested some remedies and behaviors concerning plague, leprosy, and other diseases.

Ibn Qayyim al-Jawziyah, a famous scholar of prophetic traditions and of jurisprudence who believed in "non-interpretation," showed such confidence in the Galenic tradition that he presented compelling interpretations of "medical" prophetic traditions so that they correspond to the rules and conclusions of the humoral theory. He argued that Muhammad's "medical" commandments are not transcendent and are based on his specific experience in the deserts of Arabia. People of the cities, like Cairo and Damascus, should devise their own medicine along Galenic principles.

The religious perception of the purity of the soul inspired Ibn al-Nafis to question Galenic anatomy, which presumed that the right and left halves of the heart are connected through minute perforations. Starting from Galen's assumption that the soul lies in the left half of the heart, Ibn al-Nafis argued that polluted blood cannot be mixed with the soul and that a separate circulation must exist involving the right side of the heart to purify the blood in the lungs before it reaches the left side and mixes with the soul. This

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theory was the precursor for the discovery of the pulmonary circulation.

Astronomy

In the introduction of his"Incoherence,"al-Ghazali addressed a certain disagreement around the phenomena of lunar and solar eclipses, which were explained by the regular movement of the Moon and the Sun around the Earth. In one of his famous traditions, Muhammad advised his followers to pray to God at the moment of eclipse. This tradition was seen as a sign of direct divine intervention leading to eclipses, which require or recommend prayers. Al-Ghazali accepted the astronomical explanation and warned against rejecting these findings. He refuted the conclusions based on Muhammad's tradition and considered the command for prayer unrelated to the nature of the event, arguing that Islam ordered people to pray at noon and at dusk; none of which is out of the ordinary or cannot be explained by astronomy.

The circular movement of the planets described by astronomers inspired a number of mystic and Sufipractices and doctrines, such as the Mavlavi Sufism, which viewed the eternal circular movement as a sign of perfection and full devotion to the Lord. Religious stories about prophets, who were chosen by God to travel to the heavens, such as Idris/Enoch, were reconsidered in view of the astronomical findings, and some religious scholars located the different sites of heaven in relation to the planetary positions. Also, planets, their movements and size inspired other similes, which compared particular planets with the most prominent angels.

On the other hand, the rejection of astrology by some religious scholars gave impetus to some astronomers'rejection of astrology. In fact, the religious and legal debate around the legitimacy and permissibility of astrology fueled and reflected a

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scientific debate in astronomy and physics, where some Aristotelian astronomers rejected astrology based on the different nature of bodies in the celestial and sublunar spheres, which renders any interactions between them illogical. Brethren of Purity, who espoused Pythagorean theological views, rejected Aristotelian physics relying on the validity of astrology, which implies that all bodies are made of the same elements.

As shown previously, the relations between different scientific and religious disciplines in the medieval and early modern period cannot be described along a strict division of science and religion. Instead, different religious and scientific practices engaged in common debates and inquiries, and provided mutual inspiration leading to changes in the entire intellectual sphere, reformulating their own identities, authorities, and roles in society.

From the nineteenth-century Nahda to the contemporary period

The arrival of the French expedition on Egyptian shores represented one of the first and most violent assaults on the heart of the Ottoman Middle East, and was considered by many scholars to be a turning point in the modern history of the Middle East, signaling the beginning of a new era in the region. Peter Gran, among others, argued that the Ottoman Middle East witnessed a vibrant intellectual life during the eighteenth century, which preceded the changes happening in the aftermath of the French expedition. At the intellectual level, the French expedition led to two main effects, which cannot be fully understood through the prism of East–West encounters.

In a trial to legitimize the presence of French troops and to lessen public disdain, Bonaparte assembled a council of the most prominent sheikhs of the country to aid the French authorities in running the affairs of the region. This change in social and political

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role gave al-Azhar, the most prominent religious university in the region, a leading place and allowed its scholars to attain higher positions in the state apparatus, and to claim the respect and the deference of the political power due to their religious authority.

The second important effect of the French expedition was the attempt of the colonial power to impress the local population through a public display of technology, which had a major impact on the intellectual environment in the region, and would play a significant role in the perception of science in the Middle East. The interactions between science and religion in the Middle East in the modern and contemporary periods can be traced through the following main stages.

The Nahda/awakening period (nineteenth century)

The Nahda signifies the period of rapid state-sponsored modernization in the Middle East, which took place variably throughout the nineteenth century. In Istanbul, long-standing imperial bureaucratic and technical elites were responsible for the introduction of European science, technology, and educational system without much contact with the standing religious elites, which were not an influential part of the imperial administration and played an increasingly marginalized role throughout the nineteenth century. In Cairo, on the other hand, the religious scholarly elite was the only educated elite to be trusted by the modernizing authorities. Aided by European residents of the region, these scholars, who graduated in al-Azhar, were responsible for founding the new educational system, and for the introduction of modern science and technology. Here the interactions between modern scientific and religious discourses were far more pronounced at the socio-political level (Findley 1980).

Rifa'ah Rafi'al-Tahtawi, who was a graduate of al-Azhar and appointed by Muhammad Ali to accompany the first mission of

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young cadets training in Paris, represents an interesting and pivotal position in this debate. Al-Tahtawi learned principles of mathematics, astronomy, and natural philosophy from a number of French professors and tutors, and engaged in translating a large number of books while in Paris. On his return, he led the translation of dozens more books, established a school of translators under the auspices of the ruler, and became the spearhead of an educational reform.

Al-Tahtawi insisted on linking modern science to the Islamic Middle Ages, highlighting the role played by Muslim scientists in the European Renaissance. In this manner, al-Tahtawi was presenting a genealogical identity for modern science, which enhances its connections to the Islamic heritage not from an intellectual point of view but from an identity perspective. In this sense, introducing modern sciences from Europe at the hands of European technicians and scientists was integrated in a historical tradition and was, in fact, a return to what is originally Islamic. Similarly, the translated text books of the new Egyptian technical schools, such as the schools of medicine and engineering, presented the process of modernization as a revival of Islamic sciences at the hands of enlightened rulers (Livingston 1996).

On the other hand, al-Tahtawi and his colleagues perceived/presented science not as an *episteme* but as a *techne* through highlighting the significance of technological achievements and improvements in daily life, regardless of the theoretical and paradigmatic traditions underlying these technological achievements. Science was perceived as a neutral technical practice, which was coincidentally attached to certain intellectual and social practices in Europe. While these practices contradicted contemporaneous religious views, technical knowledge was instrumental to a powerful nation and was viewed as perfectly separable from its ideological and theoretical

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underpinnings.

Early twentieth century and the popularization of science

During this period, the intellectual elite changed radically in its identity, training, and aptitude. The new elite was formed of graduates of European-style schools, missionary schools, as well as universities in the main European intellectual centers. This allowed for the appearance of many journals, magazines, and newspapers, which engaged in the popularization of sciences. Many of these publications addressed direct technical needs of their readerships, such as methods to manufacture glue, or to treat acne. Other magazines specialized in a particular kind of technical knowledge, such as the famous "mamlakat al-Nahal/The Kingdom of Bees," which presented the reader with scientific methods in apiculture (Elshakry 2008).

At the same time, *al-Azhar Magazine* (1929), along with other publications, featured the writings of a number of religious scholars and scientists of religious background, who insisted on the genealogical connection of modern science to the Islamic middle ages. Writings on the scientific interpretation of sacred texts gained popularity, where religious scholars argued that the Quran should be viewed as a book of nature as well as of religion, and that it contains, albeit in hidden and cryptic language, references to modern scientific facts, which prove the divine nature of the text.

The religious intellectual elites of the period encountered evolution, which constituted a scientific theory and a socio-political discourse, as Darwin and Huxley's writings were translated to Arabic. Religious authors argued that Darwinism was not based on scientific facts and that it was refuted by most scientists in Europe, and evolution was portrayed as a political ideology that was forced on science. In that sense, evolution was rejected by many religious scholars through emphasizing a

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particular perception of science and technology, only enhancing and solidifying the authority and legitimacy of science in society. Science and its technical products became an essential part of intellectual life, and debates on the origin of science and the compatibility of Western sciences with Islam gave place to questions about what is scientific and what is political (Atighetchi 2007).

The 1950s and 1960s and the nationalist projects

The middle decades of the twentieth century witnessed the rise of nationalist and pan-Arabist projects. With an agenda of national independence, nationalist projects espoused a second renaissance whereby the Arab center of the Middle East would use modern science to overcome the setbacks suffered during the Ottoman period. This approach led to massive increases in the number of college graduates and massive propaganda about the importance of modern science and technology in achieving the main national projects. At the same time, the rapidly decreasing margin of free press and the nationalization of many print houses dramatically reduced the number of journals and publications, which had formerly contributed to the popularization of science (Aishima and Salvatore 2009).

In 1961, Nasser added new scientific faculties to al-Azhar, where curricula of religious sciences were added to the curricula taught in similar faculties in other universities. This project emphasized the view of science as a technology, which is completely devoid of any ideological meaning or intellectual attachment, and is totally compatible with religious belief. Curricula of medicine, biology, and physics were stripped from evolution, taxonomy, and the Big Bang theory, which were deemed either non-scientific or unnecessary for the development of science as technical knowledge.

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Throughout the 1950s, Sayyid Qutb, who would become an inspiration for many Islamist movements, argued in his exegesis, entitled "In the Shades of the Qur'an," for the necessity of perfecting the use of modern technology for the benefit of the nation, and assured that the Islamic spiritual life as described in the Qur'an is the guarantee for a balanced society, where science would truly blossom without the destructive influences of materialist politics, morality, and ideology. Qutb argued strongly against the scientific interpretation of the Qur'an, then not in vogue, because it strips the sacred text from its true meaning and puts it in danger by comparing it with ever-changing scientific production (Nettler 1994).

The 1980s and the rise of contemporary Islamist projects

The rise of Islamism in the 1980s and 1990s has been analyzed by many scholars, who present different theories explaining its reasons, mechanisms, and development. In the matter of science, this period did not present new ideas or conceptions as to the interactions of science and religion. Instead, it accentuated the previously described phenomena.

At the socio-intellectual level, this period allowed for a larger sphere of communication for different religious scholars and intellectuals, which benefited from a tolerant/supportive state policy, and led to the further spread of particular interpretations of religion and perceptions of science.

The technical dimension of science was emphasized along with stressing the importance of the identity of the practitioner, who was increasingly classified according to his/her religion and religiosity. The literature on scientific interpretation and on prophetic medicine spread widely and became a staple of popular culture, taking the form of prime-time TV shows and extensive publications. Medicine occupied the center of the science–religion

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interactions, owing to its direct and plausible utility and its engagement with the personal choice of the patient, where religiosity plays a significant role (Salvatore 2000, Ragab 2012).

At the same time, the importance of religious law, even if not applied by the state, but rather at individual level, increased dramatically. Religious authorities were sought to legalize and agree on different new technologies such as in vitro fertilization (IVF), organ transplantation, blood transfusion, cloning, stem-cell research, etc. This led to a further increase in the importance of medicine and biology in this debate, as most of these fatwas or legal opinions were related to medical and biological technology (Atighetchi 2007).

The new discourse relied mainly on two main notions: the benefit of the nation, and the preservation of religious morality. The benefit/*manfa'ah* of a particular technology was the main reason for its legality and acceptance, while its connection with, or facilitation of, the spread of "Western moral decadence" was the main reason for its refusal. In this context, organ transplantation was accepted by most scholars on the basis of its benefit for Muslims, while IVF was heavily criticized and viewed as a possible threat to tracing ancestry, before it was finally believed that its benefits outweighed its risks.

As above, the perception of science as a technical practice, unconnected to any intellectual structure, helped its rapid introduction and acceptance and shaped the debates around science and religion from the early nineteenth century. With this perception, intellectual society was able to produce a new scientific discourse, which is stripped of any controversy, and can even acquire an Islamic identity based on the religion of the practitioner. This perception gave science an uncontested legitimacy and promoted re-reading the religious texts in quest of interpretations that will accommodate modern technologies. With

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a rapidly developing communication space, this new sciento-religious discourse gained popularity and played a role in shaping the intellectual make-up of new scientists and practitioners of science, who became more dependent on the opinions of religious scholars, and played a role in enhancing the position of religious legal opinion in legitimizing modern technology.
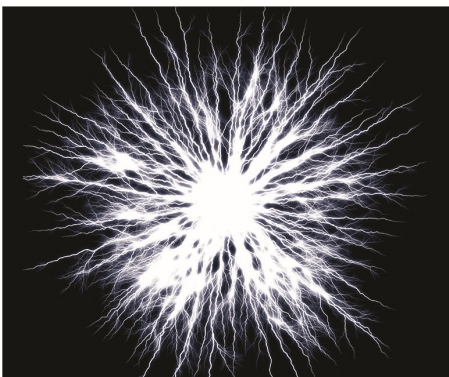
THE COGNITIVE SCIENCES

A BRIEF INTRODUCTION FOR SCIENCE AND RELIGION

The Routledge Companion to
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A BRIEF INTRODUCTION FOR SCIENCE AND RELIGION

Cognitive science for science and religion: a way in

The core focus of cognitive science is to relate the activities of mind, which are never directly observable from a third-person perspective, to those measures that are directly observable, measurable, and sometimes quantifiable from the crucial third-person perspective. Because the activities of mind either exist for us only as traditional language needing replacement (Churchland and Churchland 1998) or as influential, albeit invisible, perhaps emergent, transformations of information (O'Connor 2000; Clayton 2004), cognitive science begins by acknowledging the inferential nature of its work.

Cognitive science, comprised of psychology, neuroscience, computer science, linguistics, anthropology, and philosophy (Miller 2003), is thus central to future interdisciplinary scholarship and decision-making around science and religion, for two primary reasons. First, any perspectives from within religious communities, religious studies, and philosophy that would turn toward public or private decision-making about moral action, education, the environment, the law, and medicine must have a conception of human nature and/or human agency, which necessarily includes the mind. Second, cognitive science is *the* science that seeks to relate the psychological functions of information processing (in thought, emotion, intention, volition, valuation, agency) to the physically measurable signals from the human body (measures from the brain, heart, skin, eyes, breath, bodily posture, bodily movements). Without implying any reduction of psychology to biology or to computer science, cognitive science is *the* science concerned with testing hypotheses about the invisible processes of mind using the visible measures of the body, whether that body is organic and alive, or manufactured and computerized. Indeed, cognitive science is itself an interdisciplinary science because it is

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not only concerned with associating measurable internal processes in a carbon or silicon body with behavior, but it is centrally concerned with how the mind links these two. This concern with the mind is why experimental psychology is a core part of cognitive science. It is not true, as many students and even some psychologists say, that psychology is the science of behavior. As Noam Chomsky stated at the beginning of the cognitive turn in psychology, saying that psychology is the science of behavior is like saying that"physics is the science of meter reading"(quoted in Miller 2003). Cognitive science is impossible to do in any complete fashion without models of mental processes, since without such models, the measurables (such as brain activity and behavior) have no meaning.

What follows takes up the views of cognition in cognitive science and the methods of cognitive science, prior to turning toward a brief introduction of major loci in cognitive science. Throughout, there is a heavy influence of experimental fields, particularly cognitive psychology, social psychology, information-processing models of mind, and experimental cognitive, affective, and social neuroscience. Less attention will be given to cognitive linguistics, anthropology, and phenomenology (see especially Zahavi 2001; Thompson 2007; Gallagher and Zahavi 2008), not because they are less important, but because of space limitations.

Cognition and cognitive science

The information-processing topics actively engaged by cognitive science are: sensation, perception, attention, memory, language, emotion, intuition, problem-solving, expertise, reasoning, decision-making, and social judgment and interaction. Cognition in these areas, according to current frameworks in experimental cognitive science, is best described as the functions, or processes,

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or systems of the mind (Anderson 2010: 1–3). Thus cognition includes both explicit (conscious, aware) processing, and implicit (subconscious, subliminal) processing, and all mental aspects of emotion, feeling, etc. To say that a process is a "cognitive" process does not mean, then, that one is aware of, or conscious of, the thoughts involved in that process. Cognitive processes can be, and most of the time are, implicit and unconscious, and the term "cognitive" can apply to emotions just as well as to language, since both involve information processing.

Until recently, however, emotion was often spoken of as opposed to cognition. This is no longer recommended practice, since cognitive science has recognized the critical information content in emotional processing (Davidson 2003; Adolphs and Spezio 2007; Goldstein 2011: 300: 13–15). While it may be true that not all cognition involves emotion, it is also true that not all cognition involves, say, language. Thus it makes as little sense to speak in terms of cognition versus emotion as it does to speak in terms of cognition versus language. Emotion, as understood in cognitive science, is a cognitive process because it involves mental processes, functions, and transformations. These mental processes include activation of organized conceptual schemas in the mind. "Feelings" are different from emotions, since they are the conscious awareness of emotions. "Affect" refers to bodily responses that are part of emotion. When the phrase "cognition and emotion" is used in cognitive science, it can mean both a cognitive scientific approach to emotion and a joining of cognition and affect (Oatley 1999: xvii–xviii). These understandings fall under an embodied or "grounded" cognition framework, most recently championed by Barsalou and coworkers (Barsalou 2008). In this way, cognitive science seeks to avoid conflict between "head and heart," and increasingly recognizes two characteristics of information processing in mind: (1) information processing that is

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ostensibly non-emotional may in fact have implicit emotional attributes, and carry implicit representations of goals and motivations; and (2) information processing is often strongly influenced by the embodied, enacted experiences by which the information was first learned, in each specific modality (vision, hearing, touch, taste, language, etc.) (ibid.: 618–19).

Another area of potential confusion relates to the terms"top-down"and "bottom-up"processes in mind. Top-down processes are those that formed during evolution or learning and that link stimulus processing to context, whereas bottom up processes are those that depend primarily or wholly on basic stimulus properties, ignoring context (Anderson 2010: 56–57; Goldstein 2011: 300: 61–64). Consider the paradigmatic example of Pavlov's dogs (Pavlov 1927). When the dogs salivate upon smelling or seeing the food, it is a bottom-up response. However, when, after the dogs learn that the sound of a bell accompanies the presentation of their food, they salivate to the sound of the bell alone, it is a top-down response. Top-down processing is either explicit (conscious) or implicit (unconscious), controlled or automatic. Bottom-up processing is generally unconscious and automatic. Top-down processing, understood as linking stimulus processing to context, occurs in the cerebral cortex of the brain, but it also occurs in the amygdala, the hippocampus, and other subcortical regions of the brain. There are other uses of the terms bottom-up and top-down in the literature, such as when top-down is identified with conscious processing, and bottom-up is identified with unconscious processing; or when top-down is identified with processing in the cerebral cortex of the brain, and bottom-up is identified with processing in"lower,"subcortical regions; or when top-down is identified with controlled processing, and bottom-up is identified with automatic processing. However, when considered in light of how the terms are used in relation to their original

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meanings for mental processing, these additional uses tend to create confusion.

It is critically important for the interdisciplinary scholar to keep in mind that implicit top-down processing and explicit, conscious top-down processing are known to interact, albeit in complex ways not yet understood. Implicit top-down processing is highly influential in a wide range of human behavior thought to be under strong conscious control (Hassin *et al.* 2005), from stereotyping others (Olsson *et al.* 2005), to deciding who to vote for (Todorovet al. 2005; Spezio *et al.* 2008), to judging what is or is not moral (Greene 2007; Murphy and Brown 2007; Woodward and Allman 2007). Similarly, conscious control processes can act as gates for implicit processes (Ochsner and Gross 2005; Wageret al. 2008) and can integrate them for adaptive behaviors (Coanet al. 2006; Slagteret al. 2007; Lutzet al. 2009b).

Cognitive science, admittedly, has specialized uses of "cognition" and "cognitive" that often differ from the way these terms are used in philosophy (e.g. cognitive versus non-cognitive theories of morality), theology, and religious studies. Several of those uses and their meanings have been explored in this section. Another aspect of the specialized use of cognition in cognitive science is that any claim regarding cognition should be testable via experimentation or observation. The next section reviews several methods used in such testing.

Method in cognitive science

To test the claims made by theories and models in cognitive science, complex concepts, such as memory, attention, reasoning, emotion, etc., require "operationalization." To operationalize generally means to define a concept in a way that can be quantified. So cognitive scientists proceed from a given model of mental processing to predictions about behavior that follow from

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the model, to an experimental test to determine if the predictions are in fact observed. Most cognitive scientific approaches use (1) measures of behavior, including performance accuracy, reaction time, and self-report questionnaires; (2) measures of physiological responses, such as heart rate or skin conductance; and (3) measures of brain response. In addition to these measures, cognitive scientists also combine behavioral measures with interventions into neural or physiological systems. One example is the use of transcranial magnetic stimulation (TMS) to temporarily impair the processing in a given brain area, followed by measuring the behavioral changes, if any, that result (for detailed introductions to these methods see Huettel *et al.* 2008; Purves *et al.* 2008).

A brief introduction to functional magnetic resonance imaging (fMRI) is helpful for the interdisciplinary scholar, since so much of what is claimed in the popular literature is based on fMRI data or related techniques. The physiological signal measured by fMRI has complex relationship with the neural information-processing signals in the brain. The physiological measure yielded by fMRI is the blood oxygenation level-dependent (BOLD) signal, which varies with the amount of deoxygenated blood in a brain region. Yet information processing in the brain, according to prevailing theories in cognitive science, occurs in terms of electrical signals from cells called neurons, and assemblies of neurons, not in terms of bloodflow.

Until very recently, neuroscience lacked a good understanding of which neural signals most closely corresponded to the BOLD signal. Recently, Nikos Logothetis (2003; see also Logothetis and Wandell 2004) and Martin Lauritzen (Lauritzen 2001; Caesar *et al.* 2003) showed that the BOLD signal is caused not by action potentials of neurons, but by smaller electrical potentials at the junctures, called synapses, between neurons in

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the brain. This means that the BOLD signal can differ depending only on differences in circuit organization, even for circuits in the same general area of the brain and under circumstances that yield identical numbers of action potentials.

Another aspect of brain-activity measurement by fMRI is that measured BOLD signal changes due to cognitive processing are of the order of 0.1 to 1 per cent of the total measured signal (Raichle 2003). Thus one must always keep in mind that the BOLD signal is generally a contrast in signal between two or more measurements, each conducted under some set of defined conditions. What this means is that reported fMRI activations, or areas where the brain looks to be "lit up" by bright spots, are not the result of the neural circuitry in those areas going from an "off" state to an "on" state. Rather, activations are typically the result of a brain area going from giving a signal of, say, 10 to a signal of 10.05, in a statistically significant manner. BOLD activations are almost always *differential* activations between conditions. This means that the given region may have been activated in all conditions, but more so in some than in others.

When inferring the information processing that associates with a given brain area's activation, it is important to keep in mind that whether or not a brain area is activated during a given information-processing condition does not by itself establish that the brain area is, or is not, required for the information processing function under investigation (Cacioppo *et al.* 2003). Observed brain activation could be (1) due to a failure to control for all key contextual variables in contrasting task conditions; or (2) the result of activity in another circuit in another area entirely, which actually carries out the information-processing function. Conversely, failure to observe brain activation could arise even in the presence of differences in neural activity, if the differences are in different neural circuits that differ substantially in synaptic organization

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(Logothetis and Wandell 2004). Activation maps resulting from fMRI experiments reported in any one paper are best interpreted as hypothetical associations between information processing and brain activity. These hypotheses require corroboration using other methods.

Finally, one should avoid *reverse inference* when interpreting neuroimaging results. Reverse inference is bad logic, and it is practiced when one assigns a cognitive role to a given brain activation in experiment A based wholly on evidence from experiment B, where experiments A and B are unrelated and used unrelated behavioral tasks. For example, if a number of experiments with fear-related stimuli (such as pictures of snakes or spiders) show activation in the amygdala in response to those stimuli, and in my experiment I see activation in the amygdala to images of puppy dogs, I would be using reverse inference if I inferred from this that puppy dogs caused my participants to be afraid. It would be like saying: fear stimuli activate the amygdala; puppy dog images activate the amygdala; therefore puppy dog images are frightening. It may be that my participants find puppies frightening, but I would need more data to support it, such as participant self-report of puppy fear, or puppy-induced fear-potentiated startle (Davis 5. 1993), for example.

It should be emphasized that this account of fMRI methodology in no way undermines its usefulness, when handled appropriately, as a central method in formulating models in cognitive science. The fact is that fMRI allows what was once thought to be impossible: a non-invasive view into brain processing during complex behavior in human participants. Its limitations do not call into question the fMRI neuroimaging literature in general. Indeed, it should be obvious that any scientific methodology will have limits, and that such limits should be acknowledged. Similar issues exist for other methods in

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cognitive science (electroencephalography, TMS, the lesion/deficit method, computational modeling, etc.).

Cognitive science and religious experience

Having an introduction to the theoretical and methodological considerations of cognitive science allows a more careful assessment of how cognitive science may illuminate understandings of religious experience. For a more in-depth introduction to the context and careful thought required for relating religious concepts and cognitive science, see Peterson (2003).

Research into the experimental cognitive science of meditation and contemplative practice, mystical experience, and religiosity has been increasing. This area can be divided into studies that investigate (1) mystical, or peak, experiences; (2) the effects of meditation in typical participants; (3) the effects of long-term contemplative practice and extreme expertise in meditation (Barinaga 2003); and (4) the sources of religious belief and religiosity. This latter category currently has a limited number of peer-reviewed publications relating to experimental cognitive science (Harriset al. 2009; Kapogiannis *et al.* 2009), and tends to downplay the importance of established methodology and conceptual frameworks in the psychology of religion (Emmons and Paloutzian 2003), and the richfield studies by scholars in religious studies.

Two of the major laboratories conducting studies of mystical, peak experiences are led by Andrew Newberg at the University of Pennsylvania and Mario Beauregard at the University of Montreal. Newberg was among the first researchers to use neuroimaging methods to investigate peak experiences, or what he and Eugene d'Aquili termed"absolute unitary being"(d'Aquili and Newberg 1999). Newberg and his group have published several papers

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about this unique religious experience, implicating the functional disconnection between the superior parietal cortex and those cortical areas involved in perception and spatial orienting (Newberg *et al.* 2001, 2003). Due to the lack of spatial and temporal resolution, and to the caveats regarding the interpretation of bloodflow measures already described, this interpretation requires caution (see the extended discussion in Runehov 2007: 137–200). What is beyond doubt is that those who report engaging in meditative practices and experiencing peak moments show differential activation of specific brain regions, when compared with rest.

More recently, Beauregard's group reported results with a rare group of cloistered Carmelite nuns, who nonetheless visited the laboratory for an MRI scanning study. The most prominent finding from this work is that Beauregard observed differentially higher activation in brain regions associated with social and emotional processing, and significantly different patterns of activation in these areas, when comparing recall of intense spiritual intimacy with God ("mystical union"according to the reports) with recall of intense personal intimacy with a friend or family member (Beauregard and Paquette 2006). This finding should put to rest any notion that the spiritual union reported by the nuns is reported out of social conformity or a desire to appear more spiritual than one actually is. More importantly, the findings suggest that the nuns'experience was not simply an increase in social intimacy, or simply a more intense recruitment of networks for social intimacy. The differential patterns of activation suggest non-overlapping neural networks involved in spiritual union and personal intimacy in this group of cloistered nuns.

This may differ from the pattern observed in everyday religious practitioners, as suggested by the work of Schjoedt and co-workers (Schjoedt *et al.* 2009). They claimed, using data from an

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fMRI experiment, that when a group of young lay Christians engaged in free, personal prayer (compared with when they silently expressed wishes to Santa Claus), prayer simply activated networks comparable with a "normal" (their term) interpersonal interaction. However, the authors' interpretation relies in part on reverse inference. In Schjoedt *et al.* (2009), personal, free prayer elicited greater activation in areas such as the temporoparietal junction, that have in past experiments been associated with tasks requiring active thought about another person's mind (Saxe and Kanwisher 2003; Bedny *et al.* 2009). However, there is no way to be sure that the activations seen in Schjoedt *et al.* (2009) were the result of information processing about another person's mind, because that experiment did not directly test whether the participants did this.

In another investigation comparing neural activations during ritualized prayer (e.g. the Lord's Prayer) with those occurring while expressing wishes to Santa Claus, Schjoedt *et al.* (2008) found activation of the caudate head, a major subcortical brain area strongly associated with learning, specifically with prediction errors relating to reward. That is, the caudate head generally shows increased activation when the actual reward delivered is higher than the expected reward (Bray and O'Doherty 2007; O'Doherty *et al.* 2007; Valentin and O'Doherty 2009). Yet, while Schjoedt *et al.* (2008) concluded that prayers are rewarding, based on the activation they saw in the caudate, the authors did not explicitly test whether the prayers were rewarding to their participants. Further, they did not suggest an explanation of exactly what kind of prediction error elicited the activation. The key question is, what kind of reward could the participants have been receiving, throughout their prayers, that constantly differed from what they expected? Additionally, the caudate is known to show some sensitivity to the type of reward (Valentin and O'Doherty 2009),

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which was not addressed at all by the authors. So the brain activations seen when contrasting prayer and wishes to Santa Claus might have arisen for other reasons,including reasons pertaining to whether the participants actually believed they were engaged with the presence of another person, or not. This interpretation would indicate an effect of belief, not reward.

In another study by Schjoedt *et al.* (2010), in which they focus on the sources of religious belief and religiosity, charismatic Christian and secular participants were asked to listen to short intercessory prayers for healing, spoken by persons described to the participants as"non-Christian," "Christian,"or"Christian known for healing powers."In fact, all the prayers were spoken by non-charismatic Christians. The main reported finding involved brain activations from the Christian group that resulted from a contrast between listening to the non-Christian speaker versus the Christian known for healing powers. There was a widespread increase in brain activation when listening to the non-Christian, relative to listening to the Christian with healing powers, including in areas that other, unrelated experiments have associated with"executive control,"or a system involved in managing cognitive conflict and critical thinking. Again, there was no direct test of critical thinking among participants in the experiment. Yet the authors interpreted these activations as arising due to the"power of charisma"to reduce processing involved in critical thinking among charismatic Christians who believe they are listening to a charismatic healer. An equally parsimonious interpretation is that charismatic Christian participants engaged in increased critical thinking when trying to understand why a person described as non-Christian would give an impassioned intercessory prayer in exactly the same fashion as the"Christian with healing powers."That is, the"control"condition in this experiment actually involved a significant contextual conflict to which Christian

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participants may have been especially sensitive.

In sum, these studies report brain regions being activated during a religiously relevant task, and quickly conclude that the task involves exactly the same cognitive processing that unrelated experiments associate with that brain region, under very different cognitive conditions (also see Harris *et al.* 2009 on"the"neural correlates of religious beliefs). These interpretations depend in part on reverse inference, which is problematic, although the data are quite interesting.

By far the most peer-reviewed work applying cognitive science to the study of meditation and contemplative practice has focused on the efficacy of such practice on health outcomes (Kabat-Zinn *et al.* 1992; Kabat-Zinn *et al.* 1998; Davidson *et al.* 2003), mental processing ability (Lutz *et al.* 2009b; Slagter *et al.* 2009), and compassion (Lutz *et al.* 2009a), both in relatively inexperienced and in expert meditators. In this sustained research effort, consistent findings show that meditation enhances attentional performance through what is thought to be an increased ability to disengage attention from task-irrelevant stimuli, memories, emotions, and processes (Lutz *et al.* 2008; Slagter *et al.* 2009). Importantly, the effort here is motivated primarily not by the discovery of ultimate states or mystical experiences, but by a focus on (1) discovering practices that facilitate mental and physical well-being; and (2) working using the expertise of contemplative adepts to discover new properties of consciousness. This latter project rests on claims from extremely experienced contemplative practitioners, generally those with Eastern practices, that Western notions of consciousness as fleeting or unstable are wrong, and that, within meditation, conscious states, including qualia, can be held for minutes or hours. If such claims are replicable in the laboratory, it would enable a new way to study the neural contributions to consciousness.

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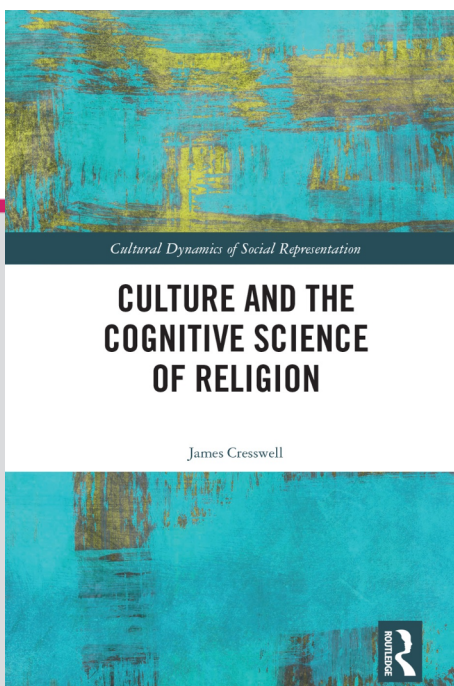
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Culture and the Cognitive Science of Religion
by James Cresswell

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Abstract

This introductory chapter discusses the phenomena that preoccupies this book: religious belief taken for granted as self-evident truisms. A challenge to studying these phenomena is that researchers are "speaking a different language" than the participants in the studies. There seems to be an impasse, and this chapter is about looking to William James as inspiration for how to overcome it. James was against an abstract notion of belief where something can be separated from a belief about the thing. Belief is misunderstood when we separate it from a thing that we have a belief about because belief necessarily involves knowledge about something. He was also against a disembodied notion of belief. Experience includes how our senses entwine with happenings in life. The flow of human experience includes continual relation among ideas and the body, which means that it does not make sense to abstract belief from the concrete materiality of the world. This chapter outlines how an impasse between researchers and participants emerges because the former take an abstract and disembodied approach to belief. The quarrel with research is not with the dismissal of religious belief as an accident, but the underlying presuppositions of what religious belief is. This chapter thereby outlines how the impasse emerged and presents what we can do to move forward.

Introduction

Blake Wenner was a student for whom I supervised a research project on the topic of religious doubt. He was interested in examining how Christian believers developed and reconciled doubts. His desire to do this research came from his own experience where he saw belief held together by dubious rationalizations and thinly veiled self-interest. He recruited and interviewed participants who were Christian believers and what

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they said, for him, was disappointing. Instead of participants explaining their rationale for reconciling doubts to fortify beliefs, they often had no clear rationale as to how religious belief was sustained. The participants talked about the dealing with religious doubt as a simple act of belief that just fit with life. For example:

Interview one, page 28[2]

Turn	Speaker	
I	Blake	yeah, so um. . . . in light of your questioning of your beliefs and things such as where has Jesus' body gone and, um the ascension of things that aren't quite clear, how are how are these uhm beliefs clarified like how have you resolved. . .
2	Participant I	I don't worry about em
3	Blake	you don't worry about em
4	Participant I	no.
5	Blake	so um, you would you would say you wouldn't. . .
6	Participant I	I trust.
7	Blake	you trust. So rationale, you wouldn't put rationale at the forefront of picking apart those issues
8	Participant I	oh, I guess I trust that God if he created the world (laughs) then he knows what he's doing

---

Participants described belief, but they did not spend a lot of time wondering why they believed. They illustrated how belief, like in this quote above, is a simple thing that becomes a matter of trust and not one worthy of preoccupation. It was just taken for granted as a truism, and participants did not know why they believed per se because they simply trusted. Blake did not get what he was looking for, and the question is, "Why?"

Blake is typical of researchers in a way that helps us understand why he did not get what he was looking for. It was like he was speaking a different language than his participants. He was talking about beliefs grounded in careful rationale, and they just didn't talk in these terms. They were talking about a life that imply included belief. While Blake's engagement was kindly agnostic,

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there are similar instances of researchers or academics whose tone is not so nice. Some academics shout at religious people that they are irrational and ignore evidence (e.g., Dawkins, 2006; Dennet, 2006). Religious people shout back that a researcher just does not "get it." Researchers and believers can come from such different perspectives that they are living in different realities. It is as if the two parties are in different worlds, and my point is that this divergence is the central problem.

This book is about this impasse and how to overcome it by expanding the way we approach the psychology of religion. While there are many kinds of psychological research, I am going to focus in on just one: the cognitive science of religion (CSR; Barrett, 2007). CSR is a field within psychology, but its impact is far ranging as it informs a substantial amount of public and academic discussion (e.g., Ball, 2012; Krakovsky, 2012). CSR is a good approach to engage because it represents the discipline of psychology well as cognition has been identified as central to the discipline of psychology (e.g., Thagard, 2005). As such, I seek to explicate an approach that accommodates both religious believers and psychologists by way of a provocative discussion of CSR. To identify and move beyond this impasse, I am going to look to the past by discussing one of the founders of modern psychology: William James. He had a vision for psychological research that is quite different from CSR, and looking back to him reveals a way of approaching the psychology of religion that can surmount the impasse (see Cresswell et al., 2017). This introductory chapter outlines James' ideas and serves as the context for the remainder of the book. It will first address belief as James described it and then show how it is bypassed in CSR. From there, I will return to James and discuss truth as a springboard for the rest of the book.

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William James and the bypass of belief

René Descartes has arguably been one of the most influential thinkers who has shaped our understanding of what things like belief mean. He influenced Immanuel Kant such that they both shared very similar ideas about things like belief (for a sustained discussion see Taylor, 1989). Both Kant and Descartes have left us with a heritage that treats belief as *abstract* and *disembodied* (see Harré, 2002). To refer to belief as abstract is to say that it is not necessarily tied to what is happening in life because it is an ethereal mental property. It involves conceiving of belief as not necessarily tied to the actual happenings of life because it belongs to the realm of subjective mind. To say that belief is disembodied refers to Descartes' famous split between the mind and body. He treated the mind as abstract in its ethereal nature, and this abstractness meant that is was not necessarily tied to the body or anything physical. The body is not tied to belief because it is abstracted from it. William James took a contrary approach.

Belief in relation to something: against abstract belief

James was critical of the notion of an abstract belief (James, 1996/1912). An abstract and disembodied approach to belief involves a separation of something from a belief about the thing. He was against the idea that we can sensibly talk about belief being separate from something in the way that an abstract and disembodied approach implies. Belief is misunderstood when we separate it from a thing that we have a belief about because belief necessarily involves knowledge about something. That is, belief involves knowing about something because we cannot have a belief *about* nothing. The *about* is crucial if we want to understand how belief works in life. Consider the following conversational excerpt as an illustration.

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Turn	Speaker	
	Interview 1, page 15	
1	Participant 1	and I I've can't think that you know when you pray, help me to forgive this person
2	Blake	Yeah
3	Participant 1	and love this person, that's so very important
4	Blake	yeah
5	Participant 1	and I have I don't feel that I have a problem with forgiving because I know that there is a god out there that will help me

This is a discussion where a participant talked about a belief that one should pray for someone when that person bothers one. The first use of knowledge shows up in "you know," and this is a common conversation filler (turn 1; ten Have, 2002). Grammatically, it imputes knowledge to Blake and implies something about which there is shared knowledge. When participant 1 says "you know," it is about something, and this thing is the act of praying for someone. The action and potential someone to "pray for" are absolutely necessary or the belief to make sense. Without connection to this wider context, Blake would have no sense of what the participant means. This word "know" is refined in turn 5 to show us how believing in praying to forgive someone involves knowledge *about* God. Turn 5 shows us how belief works in life as connected to a thing "out there" beyond one's own thoughts: God. As we can see in the example above, belief shows up in life in a way that involves knowledge about something "out there" beyond one's own subjective thoughts. James' argument extends to religious belief and shows us how, without something tied to it, religious belief is not sensible. The sophistication of his point lies in how he is not offering apologetics but a way to approach religious belief.

James (1981/1907, 1956/1897, 1996/1912) considered how

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belief functions in life to show how our religious beliefs are about something. He highlighted how belief is about relationships in the sense that one can have knowledge about another thought or another thing, but it always involves a relation to another thing. All things that fall under the banner of belief involve relationships so that we do not have any element of belief that is isolated and on its own. That is, every belief is related to something else, and it simply does not make sense to talk about a belief that stands as a subjective isomorphic proposition. Belief is a kind of knowledge in relation to something else, and so we always have religious belief in relation to another thing.

This approach to belief is what enables James to break us out of the abstract approach we get from Kant and Descartes, which is important because abstract conceptions of belief simply miss the phenomenon. This position has a huge implication for how we think of ideas like subjective mind and objective reality. James wrote:

> Just so, I maintain, does a given undivided portion of experience, taken in one context of associates, play the part of the knower, of a state of mind, of 'consciousness'; while in a different context the same undivided bit of experience plays the part of the thing known, of an 'objective' content . . . since it can figure in both groups simultaneously we have every right to speak of it as subjective and objective both at once.

(James, 1996/1912, p. 10)

To many people, speaking in terms of belief being both objective and subjective seems strange, but it provides a very helpful idea. A belief in another belief can be subjective, but the web of relations involved in belief never stops there in self-contained subjectivity. All belief eventually comes into relation with something in the

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Excerpted from *Culutre and the Cognitive Science of Religion*

world we share with others. Eventually, we come to a relation to something that is not just inside our heads and is necessarily never abstract. Take a close look at the following illustrative conversation.

Interview 2, page 21		
Turn	Speaker	
I	Blake	. . . do you find that questions are resolved by way of moments of rational clarity
2	Participant 2	are resolved by way of moments of rational clarity did you say
3	Blake	yeah
4	Participant 2	gosh I wish something was totally clear all the time, it'd be nice you know rational clarity to me is easier to see than spiritual clarity and so again sometime although deep down in the bottom of my heart I'm doing something just because it feels right. But again if it does feel right and I have these two equal things I'll go down with what I think is right or what I feel is right I just try to do the right thing
5	Blake	but but
6	Participant 2	and so, and the question about if you give a man a fish he will eat for the day then starve, if you teach him how to fish then he'll live all day but if a guy's hungry I'm gonna give him some fish you know later on I'll teach him how to fish but you know but if he's hungry to me the right thing is to give him some food at that moment. Is it enabling I don't know but it just feels right to me to help somebody

If we look at the structure of this conversation, we see how the participant articulates his belief. Turn 4 involves discussing how something just "feels right," and so it would seem to contradict James by not leading to something outside the participant's head. It reads like a description of a deep solipsistic experience. In turn 6, however, the participant transitions to talking about *doing* the right thing. In the way the participant talks, we see how religious belief ties to an actual activity like helping someone. The structure of the answer reveals a belief in relation to an objective action in the

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world. It is insufficient to say that the belief is just subjective because it always points beyond an individual to something outside. To paraphrase James (1981/1907), if one dies and stops believing in something, the object does not disappear, and it continues on without any single individual: ". . . I could perfectly well define [belief], what the knowing actually and practically amounts to – leading towards, namely, and terminating in percepts, through a series of transitional experiences *which the world supplies*" (James, 1996/1912, p. 25). Take the example of Participant 1 knowing that there is a God "out there." Obviously, it may seem like God is a subjective thing because we cannot find a conclusive empirical case for its existence. If Participant 1 dies, however, the notion of God is not going to die with him, and so it is not properly subjective. James, contra Descartes, realized that belief does not fit with the subjective-objective dualism that people tend to take for granted.

Belief in relation to something: against disembodied belief

Religious belief, then, is not simply dismissible as a subjective thing, and it is not simply an objective thing. If belief were purely separate from the world and not in relation to something, then we could say that it is abstract. We cannot say so about belief, and so it is not abstract. What about the notion of being disembodied?

Experience involves the body, and so addressing this question involves a discussion of experience (Baerveldt & Voestermans, 2005; Cresswell, 2012; Thompson, 2007). What James (1981/1907, 1996/1912) meant by experience can be understood if we start from basic experience and then work to the more complex notion of religious belief. James goes as far as to claim that belief is best characterized in terms of pure experience, which is the name for a collection of "sensible natures" (1996/1912, p. 27). Experience, at its most basic level, includes

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how our senses entwine with happenings in life. When one looks out at the environment in which one is reading, for example, light rays stimulate cells on the retina, and the activity of cells happens in relation to what is in life. This is a simplistic example of experience and highlights how experience involves a flow of sensory stimulation occurring in relation to the world. We move through life with our bodies responding in relation to things, and so one experience passes into another in a constant flow.

The constant flow of experience involves more complexity than merely being stimulated by an environment. If one were to sit and read in a café, one could look around and see the stimuli in terms of coherent and meaningful unities like "tables" and "chairs." Previous flows of experience such as learning the names for such things in childhood bleeds into the current flow to give sensory stimulation shape. Included in the previous experiences that are brought into the present are emotions and personal histories. A café may *feel* a certain way because of previous experiences like, for example, spending time with a caregiver at cafés that gives the tables and chairs emotional valence. James (1996/1912) pointed out that experience includes a constant flow of stimuli in relation to one another and in relation to psychological phenomena like concepts and emotions. He pointed out how experience involves an inseparable relation between psychological phenomena and physiological ones. The flow of human experience includes continual relations among a range of elements, and so it does not make sense to abstract conscious phenomena like belief from the concrete materiality of the world. Hence, he argued against the idea that that the "thought-of [an] object is hid away inside the thinking subject" (1996/1909, p. 19) because the past can impact us directly to shape what is experienced as real. Belief is something that is experienced in the flow of the life that we live and experience as real. It is part of the

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reality that humans experience.

Religious belief is thereby entwined with physical life. Beliefs relate to all other experiences insofar as they are in relation to concrete particulars like light and touch. They involve a complete way of relating to the world that shapes reality that feels objective. James thereby described belief as part of an interconnected web of past and present experiences shaping a reality that includes belief. When someone is faced with a situation, beliefs come to bear in their experiential sense and shape immediate bodily dispositions. Instead of deciding about what to do in life on intellectual (i.e., abstract and disembodied) grounds, we "find ourselves believing, we hardly know how or why" (James, 1956/1897, p. 9).

The question I raise is an important one: Do psychologists, and those involved in CSR in particular, address belief as it shows up in life, in its non-abstract and embodied quality? I don't think so. Blake, for example, was looking for abstract and disembodied rationale for belief that does not include belief as a whole way of experiencing the world. It is an important question to decide if Blake is typical because, if psychologists are giving back to the community like good citizens do, then we ought to have something to say about the actual phenomena of belief as it shows up in life. The next few pages propose why the answer to the question above is partly no.

Psychology of religion: cognitive science of religion and bypassing belief

Dennet's (2006) *Breaking the Spell: Religion as Natural Phenomenon* describes religion as being the accidental result of a "hyperactive agency detection device." "Device" refers to an automatic mechanism that operates in the mind. Humans are supposedly endowed with a mechanism for detecting agency in the world

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around us. It is "hyperactive" insofar as it kicks into gear and processes all sorts of events as if they were caused by agents. The result is a supposed mechanism that tends to overproduce the perception of agency lying behind natural happenings in the world. The wind rattles a shrub as we walk past and jump back as if there is a nefarious thing intentionally prompting such happenings (see Dennet, 1996).

Other researchers were picked up by the popular media with the claim that "Analytic Thinking Promotes Disbelief" (Gervais & Norenzayan, 2012). Titles like this betray a claim that religion is a product of mechanisms like the hyperactive agency detection device, but controlled rational thinking overriding such intuitive mechanisms leads away from religious belief. People can supposedly override these primal leftovers of the mind when they think more carefully and analytically. The implications of such ideas can be seen in the work of well-known critics of religion like Richard Dawkins: "[t]he general theory of religion as an accidental by-product – a misfiring of something useful – is the one I wish to advocate" (2006, p. 188).

The quarrel with this view is not to quarrel with the dismissal of religious belief as an accident, but the underlying presuppositions of what religious belief is. There is good reason to suspect that this approach, while offering valuable insights in its own right, bypasses religious belief as it plays a role in life. This reason has to do with the way that psychologists have generally approached religion. Usually, they advocate an agnostic approach to religion that considers the topic from a "rigorously" scientific perspective (Argyle, 2000).

At a general level, such a perspective is hard to maintain because studying religion is not an easy task. Hall et al. (2008) pointed out how this challenge is attested to the availability of over 100 instruments attempting to measure religion or aspects

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thereof. They noted that the challenge is compounded with how the definition as to what even counts as religious shifts with the researchers. In some cases, studies are about religious behaviors such as going to attend a service. Others involve an attempt to measure behaviors and/or more ethereal-experiential aspects of religious experience (see also Kapuscinski & Masters, 2010). These efforts reflect an attempt to get at a sense of connectedness associated with spirituality as opposed to institutional religious behavior or ascent to dogma (see Meezenbroek et al., 2012). What Hall et al. (2008) note is that authors often overstate their conclusions about religion in general when there is so much disagreement as to what the phenomenon is and how it is being measured. Researchers seem to continually cling to the notion that some sort of religion in general must underlie all of this diversity:

> Although the empirical stream of religious measurement has developed and supported a multi-dimensional model of religiousness that resists global assessments, much of the research on religion . . . assumes that "religiousness-in-general" actually exists. As such, it attempts to measure the intensity of religiousness (belief, experience, strength, value, etc.) in order to locate people on a continuum between "very religious" and "not religious" . . .

(Hall et al., 2008, p. 154)

Despite imprecise concepts and a need for contextual social/theological informed research, a context-free approach to religion continues to be popular. It is in this vein that authors such as Underwood (2011) argue that religion and spirituality are multidimensional constructs with many features reflective of a single underlying factor. Developments such as the Daily Spiritual Experience Scale are designed to assess such variability while being opaque enough to even work with people who would not call

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themselves religions. Measuring experience instead of beliefs is taken to get at this underlying construct (see also Underwood & Teresi, 2002).

The literature points to a recognition that it is difficult to access underlying unified constructs, yet such covering laws must nevertheless be present. Chirkov (2016) notes that this paradigm is one where researchers search for natural laws underlying behavior. That is, researchers are interested in uncovering the truth about reality in a way that has been referred to as naturalism (see Reber, 2006; Brown & Stenner, 2009). Naturalism involves trying to understand the truth of reality by uncovering the laws by which the natural world works. This approach is that one has found truth when one finds the mechanical laws by which the world works.

In the early 1960s, psychologists began to speculate on how the mind worked in order to uncover the naturalist laws of mental operations. Alan Turing – one of the widely accepted forerunners of the cognitive revolution that shapes contemporary psychology (see Dawson, 2001) – developed the idea that humans operated on computational principles, where computation was defined as algorithms or rules (Boden, 2006, p. 173). This person-as-computer perspective put forward by Turing was that the computer observed symbols, processed such symbols according to a set of rules, and then responded on the basis of the outcome of those rules. One author writes that "[c]ognitive skills are realized by production rules" where "[p]roduction rules are if-then or condition-action plans. The if, or condition, part specifies the circumstance under which the rule will apply. The then, or action, part of the rule specifies what to do in that circumstance" (Anderson, 1998, pp. 59, 63).

It is on this heritage that much of contemporary psychology is built (see Thagard, 2005). When authors argue for an agnostic scientific approach, they mean a science that uncovers natural laws

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about mental computation and outputs. It involves seeking to explicate psychology in terms of natural mechanical laws of human functioning. The result is an approach to religious belief shaped to fit a naturalistic bias. The rigorous scientific approach is a form of naturalism that shows up in in the psychology of religion as a concern with computational processing laws. Discovering naturalist predictors and processing outcomes associated with religiosity reflects a concern with what psychology is taken to be about. This kind of approach is what is embodied in a "rigorously" scientific perspective. Nowhere is this heritage clearer than in CSR. The sort of production-rule-based naturalism manifests in the CSR, and writing about practices in this field can be generalized back to the psychology of religion in general. CSR, for example, underlies the work on the Hyper-Active Agency Detection Device that I discussed above (e.g., Guthrie, 1993; Whitehouse, 2004).

This kind of naturalism bypasses the phenomena of belief as it was outlined above in our discussion of James. An approach that is scientific via a naturalist fixation can come at the expense of everyday life (James, 1981/1907). Consider as an example how some authors of the naturalist ilk have explicitly stated that they are not interested in what belief is about because this is simply not a relevant focus (e.g., Pyysiäinen, 2002; Guthrie, 2002). That is, belief as a non-abstract and embodied phenomenon is not a concern. Religious belief, as it shows up in life, is part of the reality humans experience and is not lived as a cognitive mechanism. Consider an illustration from Blake's interviews.

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Interview 5, page 20

Turn	Speaker	
1	Blake	yeah, uhm. so why would you say just expanding on that, that you rely more on your feelings or intuition
2	Participant 5	uhm, . . . well, it's not, for me it's not fleeting, it's not uhm, wispy or insubstantially. That stuff comes off really powerfully
3	Blake	Mhmm
4	Participant 5	with me and part of that's being so harmed when I was a child, those intuitive things go way up
5	Blake	Mhmm
6	Participant 5	it's like God somehow uses your brain, to pay attention in ways when you've been harmed, that doesn't happen with other people and probably has to do with you know brain development
7	Blake	yeah
8	Participant 5	it's the stuff that's I think of it now. So it's not wispy it's not insubstantial it's really powerful

This quote would seem to support the idea that a cognitive mechanism is at stake with the mention of brain development. This participant, however, is talking about the experiential power of belief. God is described as part of reality by the implicit presupposition that God uses one's brain. A proponent of CSR would say that this experience is irrelevant because it only matters what happens underneath in the realm of naturalist mechanisms. This position is fine for cognitive scientists who believe – in the full sense of the term – in naturalist laws.

Belief, on a naturalist CSR approach, is abstract in the sense that the specifics that belief is about are simply not addressed. The hyper-active agency detection device, for example, allows for any kind of super-agent to fall into the scope of the mechanism's operation but a belief is rarely about a non-specific super-agent. For example:

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Interview 2, page 8		
Turn	**Speaker**	
I	Participant 2	so now and at this one point yes I believe in a virgin no I don't no I didn't yes I do no I don't. I think that my faith is now at the point that if there was something that came along that proved scientifically that Jesus was conceived by Joseph that it wouldn't affect my faith at all because again all things are possible through Jesus . . . it just isn't that matter now that would be a serious problem for a lot of Christians to believe that Jesus wasn't from a virgin relationship but that wouldn't be a problem form me
Turn	**Speaker**	
2	Blake	Right
3	Participant 2	disproving the resurrection would be cause I think that's pretty essential

Interview 3, page 3		
I	Participant 3	there's an enormous amount of opportunity to think about the experience of Christ and his life with an accent on ah, his suffering and his role as the redeemer

In both of these examples, the beliefs are about specific features of the faith. What practically matters in life is what beliefs are specifically about. A general mechanistic rule is too abstract to grasp what this belief entails. The approach taken by CSR is also disembodied insofar as experience is bypassed. Moreover, a specific religious belief involves particular content that is integrated with emotional entanglement with the world. The abstract mechanisms bypass this integration and lose what it means to have the experience of religious belief.

For those outside of the CSR belief system, naturalistic laws of functioning are unhelpful because the psychological reality that matters in life is bypassed. When truth is defined as only finding natural mechanisms and processing rules, we actually bypass what

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religious belief is. The result is that belief, as it tends to be studied, substantially diverges from the way it shows up in life. It is here that we can see the impasse that Blake and other researchers reach. The dismissal of belief as a processing mechanism is met with a response that what is dismissed is what really matters.

Moving forward

James shows us how religious belief works in a way that is concrete and embodied. A related issue is that how we think of the scientific belief can be abstract and disembodied. Naturalism in CSR exemplifies this issue because a claim in CSR is taken to be true when it represents what natural mechanisms are at play. For example, if a researcher claims that the hyper-active agency detection device produces the ability to perceive a super-agent, a researcher is making the claim about a mechanism that plays a role in the production of religion (e.g., Boyer, 2001). It is taken to be a true claim because it represents a natural process that is really happening. CSR, for example, is abstract in the way that naturalism bypasses what belief is about. A super-agent and experience that a religious belief entails is treated as irrelevant when scientific truth is approached in this manner. It is disembodied in the sense the experience of life is little more than a source of stimulation. This bypass of belief comes from an approach to science where truth is abstract and disembodied. The truth claims in CSR are about general naturalistic mechanisms that don't bear much relevance to religious beliefs as they show up in life.

James (1981/1907, 2011/1909) was aware that holding only to a naturalist approach to belief means that it is often bypassed and addressing religious belief requires a broader approach to scientific truth. That is, instead of presuming natural cognitive mechanisms to be the only feature of belief that matters, we can return to James because he offers a direction that expands the

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notion of scientific truth. This section outlines a vision for CSR that sets the groundwork for the future steps proposed herein. For our purposes, I will outline three criteria for truth that enable this expansion.

First criterion for truth: fit in life

James (2011/1909) expanded the definition of truth by arguing that it is always inextricably bound to life because people do not use truth in an abstract and disembodied sense. This means that truth is not used in a vacuum because people use it in relation to all of the other aspects of life. For example, consider the following interview extract.

Interview 3, page 1		
Turn	Speaker	
1	Participant 3	where even when I was very young I was participating in a, one could say a special way and so my life was uhm . . . steeped in religion literally from morning to night. (laugh)
2	Blake	mmm I see
3	Participant 3	and then uhm, when I became an adult I changed dramatically I came back to the religious community fairly recently. so I would say most of my adult life I was not a practicing Christian

To understand the notion of truth in order to study religious belief, we need to look carefully at this conversational excerpt. This participant discusses leaving faith and coming back to it. Religious belief is discussed in turn 3 in terms of being a "practicing Christian": doing something in life. We see the theme of religious belief being tied to embodied doings and not a subjectivist ascent. It also refers to life being steeped in religion and coming back to a place where Christianity is considered true is coming back to *practice.* Here we see a discussion of the idea that religious belief is tied to practice, and what I want to add is that truth is tied to life outside of the mind.

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Consider this idea in light of the next illustrative comments.

This participant talks about belief in relation to aspects of life such as all of the vicissitudes of life growing up. Religious belief emerges in the interconnected milieu of life and so it must be part of life to be true. A religious belief is true in the context of interrelations among emotional valuations, ideas, things, and life with others. These interrelations all play a part in saying that a belief is true. Truth is not just separate from life in the abstract and disembodied sense, and a belief is true because of how it relates to emotional valuations, ideas, others, and things that people are engaged with. Namely, it has to fit together with the rest of life.

It is the interrelations among features of life that provide a criterion for how we can approach scientific truth. This criterion is that something is true when it resonates with the rest of life. We live in an interconnected experiential web of things and ideas (past, present, and anticipated) and this interconnectedness extends to a scientist. James' view of truth was that a scientific claim is true when it fits into the flow of life insofar as it fits into the complex web of interrelations constituting experience. There is a sense of satisfactory peace and rest when something fits with lived experience. For example, reconsider a quote that I presented earlier. Consider what we see in this participant and what it can tell us about the application of science in CSR.

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Interview 2, page 21

Turn	Speaker	
1	Blake	in light of your questioning your beliefs do you find that questions are resolved by way of moments of rational clarity
2	Participant 2	are resolved by way of moments of rational clarity did you say
3	Blake	yeah
4	Participant 2	gosh I wish something was totally clear all the time, it'd be nice you know rational clarity to me is easier to see than spiritual clarity and so again sometime although deep down in the bottom of my heart I'm doing something just because it feels right. But again if it does feel right and I have these two equal things I'll go down with what I think is right or what I feel is right I just try to do the right thing

Consider also:

Interview 5, pages 1–2

Turn	Speaker	
1	Participant 4	. . . my life was tough in that my mother died when I was seventeen, and there were money problems although my dad didn't talk about it much but, there wasn't much money. and uhm, managed to get an education at [university name] and uhm . . . my religious beliefs and practices . . . have arisen quite naturally out of the way a life develops

This quote illustrates how the truth of religious belief is substantiated when it "feels right" "deep down," and it illustrates a sense of peace and rest being a criterion for truth. A religious belief that seems disjointed from the aspects of life would not be true and satisfying because it simply does not fit with life. The same is true for a scientist who finds truth when it fits with life. It is the different realities lived by a religious believer and a scientist that provide different contexts enabling different claims to be true. A naturalist CSR approach may fit for those that believe in it, but it

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runs the risk of stopping there. A religious belief is taken as true when it fits with the experiences that are part of a different form of life, and we can see how a naturalist concern with mechanisms would not fit. At the moment that it fits the flow of experience, whether it be that of a believer or that of a scientist, belief is experienced as true. A claim is true for CSR researchers when it fits with a reality that includes naturalism. A claim made by a scientist in CSR gains the status of truth beyond the reality of scientists the moment that it falls into resonance with the reality of those to whom she is proclaiming a truth.

In the next chapter, I elaborate the forgoing to outline an approach to research that can get at religious belief in a way that fits with the world of religious believers. A problem raised above is that an abstract and disembodied approach to belief misses what belief is and the constitution of different realities entwined with it. One key to getting at what religious belief is about is to take seriously the role of culture because cultural narratives are often central to the constitution of such realities. CSR has yet to develop an account of culturally shaped religious belief because of its naturalist approach that is unconcerned with culturally specific beliefs (Cresswell, 2014). Culturally shaped beliefs can potentially – and inappropriately – be reduced to stored information, and experience is only understood as an accidental by-product of computation. Chapter 2 thereby addresses how culture is necessary for a discussion of belief if one is to find a fit with culturally shaped life: to truly understand belief is to grasp the culturally shaped stories that are tied to it.

Second criterion for truth: fit with a community

To get away from the problems associated with abstract and disembodied truth, it looks like objectivity is lost. This implication is correct, but a collapse into subjective fancy does not necessarily

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follow. James (1981, 2011) repeatedly argued that truth is not a matter of the mere proclivities of subjectivity. He did so in a way that points out how one's truth is only true when it resonates with life outside one's mind and so means that it resonates with others. He made the claim that standards of fit are socio-normative in quality and are integrally integrated with life with others. People's precepts are common and they are such within a community. The truth of something ". . . gives us an absolute phase of the universe. It is the personal experience of the most qualified in *our circle* of knowledge to have experience, to tell us what is" (James, 1981, p. 17). For James, the truth of belief is deeply entwined with living with others with whom we agree on what counts as true. For example, even when someone makes the claim that one must find one's own truth as in the following:

Interview 6, page 1		
Turn	Speaker	
1	Participant 6	. . . ah not so much any, you know really earth shattering event, just . . . just like as I grew up uhm, I just noticed ah the people I associated with and their lifestyle and how they were affecting me more than anything
2	Blake	mm
3	Participant 6	and there's no, no big light event or anything like that. . .

Participant 6 is talking about the impact of others and highlights how important others are for belief. There is not often a decontextualized moment of divine revelation that cannot be brought into context of relationships with others and the world. One cannot have a true belief on one's own. Beliefs have truth by virtue of fit and generativity within communities. While not objective, the truth of a belief is certainly not subjective because it cannot be reduced to an individual unit.

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In short, one cannot have a belief that is true on one's own because it must fit with communal standards. This idea can be extended to scientific truth as well. It is not necessarily objective, but it is certainly not subjective. A true belief is one that fits with the standards of a community, and because there are different communities in the world, there are different standards of truth. There is a long tradition of work showing how the standards of naturalist scientific truth are normatively grounded (see Danziger, 1990; Gergen, 1985; Stam, 2015a; Brown & Stenner, 2009). Consider a simplistic example from the history of psychology. During the Behaviorist era, standards of truth revolved around the study of behavior without reference to the mind. Standards of scientific truth then changed in the 1960s so that research excluding the happenings of internal mechanisms is now considered dubious. The truth about naturalist mechanisms in CSR now works for that community, and it is time for a broader approach that speaks to a community beyond its own.

Where Chapter 2 specifies how we can reconsider religious belief from within the purview of religious believers, Chapter 3 offers something palpable to researchers in CSR. It presents how child development involves learning to embody communal standards. Babies usually experience emotions as intense global emotional states that result in undifferentiated crying. Such dispositions are cultivated into normative signals as caregivers socialize children by their responses to children's emotions, enabling the transition from global catastrophic emotion (e.g., crying) to emotional signals (e.g., crying to obtain). Such interpersonal experiences become the bedrock of cognition where early childhood interactions are also sites of the development of socioculturally constituted cognition. This chapter thereby addresses how we can study the cultivation of cognition in infancy so as to show the development essential for religious belief and

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the meaningful experience it entails. Since such cultivation of cognition involves emotional signaling and the importance of interrelationships, it speaks to my goal of developing an approach to cognition that includes socially shaped religious belief. On the one hand, Chapter 3 continues with a discussion of the communal standards that constitute the truth of a religious belief. On the other hand, it outlines the kinds of changes necessary for researchers to broaden our science by providing an approach to cognition.

Third criterion for truth: generativity

Another criterion that establishes truth builds on previous ones insofar as fit with life is not just a static fit with other aspects of experience at one moment of time. Humans are always growing and changing in dynamic ways. We change and the world around us changes such that a true belief could be antiquated and irrelevant. A true belief, James (1981/1907, 2011/1909) argues, is one that fits the dynamics of life to do more. For a belief to remain true, it must generate something for us as we move forward such that it makes future activities smoother. Truth is "essentially bound up with the way in which one moment of our experience may lead us towards other moments which it will be worthwhile to have been lead to" (1981/1909, pp. 93–94). A true belief helps us succeed in life as opposed to creating friction and tension. Consider the following conversational illustration.

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Interview 2, page 29

Turn	Speaker	
1	Participant 2	I don't know (laugh)
2	Blake	hmm, so uhm if you guys were having a conversation it wouldn't really get anywhere like, because his beliefs are kinda there, and yours are kinda here
3	Participant 2	yeah I get the impression that we would have a very . . . I think I'd have a satisfying conversation I don't think he would bring me along or I would bring him along but I think we'd leave friends
4	Blake	yeah so its still
5	Participant 2	so
6	Blake	but you'd still be able to reconcile differences
7	Participant 2	yeah yeah, well there would still be differences and we'd just live with each other

This segment involves a description of a discussion Participant 2 had with someone that has a radically different perspective. Participant 2 and the conversational partner he describes do not resonate with each other in terms of the religious beliefs that each hold true. They cannot reconcile and cannot move forward into a new and deeper relationship, so it halts. When ideas or claims interrupt the flow of life, we then examine their truthfulness or we move to another group or context where beliefs allow us to move forward. A discontinuity between the two beliefs do not mutually work as true, and so the only option is to be pragmatic and move forward in different directions. Their beliefs would work with others that share the same suppositions, and so Participant 2 and this acquaintance must find others with whom their beliefs work if they want to move forward. Participant 2 doesn't examine the truthfulness of his own beliefs and so moves forward to deepen different relationships.

The same criterion can be applied to scientific truth insofar as it remains true when a claim helps people move forward in a

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Excerpted from *Culutre and the Cognitive Science of Religion*

more seamless manner. CSR researchers have been moving forward together insofar as their work has generated lots of ideas and discoveries. Unfortunately, there are times where religious believers and researchers have come to a place like Participant 2 and his friend: things aren't going anywhere, so we should "just live with it" by going down our own paths. The problem is that it has not been generative for religious believers due to abstract and disembodied naturalism. Chapter 2 shows how belief can be studied in a way that is generative for believers. If we stopped our discussion at the end of Chapter 2, we would be at an impasse that does not resonate with cognitive scientists. Consequently, Chapter 3 is about how CSR can be a more robust enterprise. The goal herein is to broaden the way we approach the study of religious belief so we can move forward in a broader range of circles. An approach to truth that can fit for religious believers by looking at belief as concrete and embodied moves us along.

A challenge lies in creating a point of generative interface between the strong cultural approach outlined in Chapter 2 and develop an approach to cognition that I initiate in Chapter 3. Chapter 4 further explores a unique approach to the evolution of human cognition with the aim of providing an approach that better includes the cultural quality of religious belief outlined in Chapter 2 and articulated in Chapter 3. Current work in CSR and evolutionary psychology is primarily concerned with genetic inheritance of mechanisms. Evan Thompson (2007) can aid this exploration because he presents a phenomenologically oriented view of the evolution of human cognition that is *fundamentally interdependent* with the surrounding socio-cultural milieu. This is a unique approach that treats religious belief in terms of the whole sensory-motor activity of the body as it extends beyond the brain into the whole environment. Rather than treating genes as the evolutionary unit of transmission, this vision of cognition sees the

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unit of evolution as the selection for and passing on of dynamic cultural belief systems, thereby enabling religious beliefs to be studied as relational phenomena. This work thereby expands our understanding of human evolution by highlighting how religious belief emerges in interdependent dynamic cultural systems. This is an approach to cognition that is not abstract and disembodied while being generative via its theory of cognition that can account for religious belief. As such, it helps to build a generative bridge between CSR and religious believers. Coupling this work with CSR enables a conception of the evolution of mind that accounts for the universal character of some cognitive capacities underlying religious experience without falling into a view that bypasses belief.

Wrapping up

The concluding Chapters 5 and 6 attempt to consolidate the forgoing. Chapter 5 outlines a vision for how psychologists ought to go about their research of cognition by discussing the notion of virtue. That is, a CSR that does not alienate itself from religious believers should include standards of good research. I will outline such through a discussion of virtues needed to be a good researcher. In terms of the concluding Chapter 6, the approach above does not legitimate authoritative belief taken as a transcendent universal truth because it cannot be determinately grounded in a transcendent being. I propose that this is not a problem insofar as a culturally informed CSR that speaks to both social scientists and religious practitioners is possible. I illustrate how the indeterminacy introduced by the forgoing is not threatening to religious experience. The kind of certainty that comes from appeal to metaphysics paradoxically deadens a believer's experience of God because it leads to faith and commitment to the authoritative rules instead of a living and

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dynamic engagement with God. The deconstruction of authoritative experience that is part of the proposed approach makes room for dynamic personal experiences.

RELIGIOUS POWER AND KNOWLEDGE

QUESTIONS RAISED ON THE PRESUPPOSITIONS OF "PERSPECTIVISM" AMONG INDIGENOUS PEOPLES

This chapter is excerpted from
Science and Religion: East and West
edited by Yitfach Fehige.

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Preface

In this article, I take a *holistic approach* to the various bodies of powerful knowledge guarded by religious specialists in Baniwa culture that can all be seen as interrelated. Based on my research, I show that Baniwa jaguar shamans are central figures in a nexus of religious knowledge and power in which healers, sorcerers, priestly chanters, and ceremonial dance-leaders share complementary functions, linking the living guardians of traditions with the deities and great spirits of the cosmos, the primordial and eternal "owners," "keepers" and generators of knowledge and power.

Throughout, I shall comment on the adequacy of the line of ethnology called "perspectivism" for the study of Baniwa cosmology and religious history. Thus it is first appropriate to outline briefl y the main presuppositions of perspectivism. An important feature of many indigenous cosmologies is the existence of multiple points of view about the nature of being held by different kinds of beings (humans, animals, fish, etc.). This perspectivism, a term that has been used by Eduardo Viveiros de Castro to characterize "Amerindian" modes of thought, is useful in understanding many Amerindian religious traditions, although it has not been shown to be a universal feature.The theory focuses on certain kinds of relations among beings— human and other-than-human—that are strongly influenced by the themes of predation (studied typically in rituals of cannibalism, warfare, sorcery and mortuary symbolism). It should be pointed out, however, that other forms of reciprocity—as in giving thanks, offerings to the Creator, expressions of the Creator's love for humans, and forms of divine sacrifice for the well-being of humanity—were not considered in the first versions of the perpectivist theory by Viveiros de Castro.

According to this theory, the way in which humans see

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animals and other subjective entities that populate the universe—gods, spirits, the dead, inhabitants of other levels of the cosmos, meteorological phenomena, and at times even objects and artifacts—is profoundly different from the way in which these beings see them and see themselves. Typically, humans see humans as humans, animals as animals and spirits as spirits; the animals (predators), however, and spirits see humans as animals (game), whereas game animals see humans as spirits or as predatory animals. Further, the animals and spirits see themselves as humans. This perspectivism has been influential in the way ethnologists have taken to writing ethnographies, as the theory provided a link to previous enthusiasm and aggregation around French structuralism, also an important source of models in Brazilian ethnology, to represent the ways in which indigenous peoples understand relatedness among the beings of the universe and its dynamics.

For Viveiros de Castro, perspectivism is thus:

a term for a set of ideas and practices found in many parts of indigenous America and to which we can refer as though it were a "cosmology." This cosmology imagines a universe peopled by different types of subjective agencies, human as well as non-human, each endowed with the same generic type of soul, i.e. the same set of cognitive and volitional capacities. The possession of a similar soul implies the possession of similar concepts, which determine that all subjects see things in the same way; in particular, individuals of the same species see each other (and each other only) as humans see themselves; that is, as beings endowed with human shape and habits, seeing their bodily and behavioral aspects in the form of human culture. What changes when passing from one species of subject to another is the

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"objective correlative," the referent of these concepts: what jaguars see as "manioc beer" (the proper drink of people, jaguar-type or otherwise), humans see as "blood"; where humans see a muddy salt-lick on a river bank, tapirs see their big ceremonial house, and so on. Such difference of perspective—*not a plurality of views of a single world, but a single view of different worlds*—cannot derive from the soul, because the latter is the common original ground of being; such difference is located in the bodily differences between species, for the body and its affections (in Spinoza's sense: its capacities to affect and be affected by other bodies) is the site and instrument of ontological differentiation and referential disjunction.

My particular position with regard to Viveiros de Castro's paradigm, based on the research over the past thirty years on and in the Northwest Amazon, focuses predominantly on the evidence from indigenous history, shamanism and cosmology, sacred narratives and oral histories, prophetic movements, and conversion to Christianity during the last two centuries of contact among the Baniwa peoples. The principal points where perspectivism, I believe, has fallen short of a model that would help to understand the epistemologies and metaphysics of Baniwa "history and religion" cluster around the following:

1. the theory does not help in an ethno-historical understanding of prophet movements, based on the stories the Baniwa tell of these people who sacrificed their lives for the betterment of their communities;

2. I argue that individual historic prophets have understood the *expectation of their own coming,* as told in the traditions, to be "protectors" f their people and not predators as is implied in perspectivist theory. These prophets have

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generally dedicated their lives to combating the rise of another form of knowledge, that of the predatory assault sorcerer, constantly threatening to eradicate communities and culture from within or from the peripheral regions of the cosmos;

3. nor does the theory go very far in an understanding of shamanic forms of knowledge and power, their basis in cosmology, their potentials for promoting change and ensuring cultural continuity, and their foundation in the politics of hidden meanings;

4. the theory is limited in its interpretation of cosmogony, in which, according to the Baniwa, distinct forms of knowledge and power were guarded by deities and demiurges who, as a whole, are engaged with humans through shamanic healers and chanters, assault sorcerers and ceremonial dance-owners;

5. this cosmogony is centrally concerned with the identity of the Baniwa universe and its reproduction, also a central theme in the oral histories, and a constant reference for the shamans in their interpretations of sickness. This paper discusses the multiple forms of knowledge and power relevant to the production and reproduction of society, aiming toward understanding "humanity" in primordial times and its relation to the animals, the other-than-human people that populated the earth at the beginning of time.

In addition to the critique leveled against notions of perspectivism, scientific knowledge—i.e., the knowledge attained by the Western paradigm of, e.g., biomedicine—is fundamentally different from indigenous metaphysics in several ways: its understanding of the body, its diagnosis of sickness, its methods

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of dealing with the pain of biological change, and its understanding of external pain. Science divests itself of any emotive qualities, felt experiences of suffering, and "mystery." Importantly, though, *mystery* is one of the critical elements of the Baniwa worldview. The true test of an adult person's resilience is whether he/she has the strength to withstand physical pain and hunger, whether people can fulfill their moral obligations to withhold consumption without allowing biological necessities to ruin their initiation into the mysteries of the world.

The Baniwa conceive of the body as a "suffering" body, one that experiences "pain" as a fundamental part of its identity. The historical prophets' messages convey the promise that sickness and pain brought by others (the White people) will come to an end; they are part of humanity's lot, but can be managed. The prophets are, as a whole, messengers of a critique of Western civilization, which says that it (Western civilization) has a peculiar kind of sorcery that puts indigenous people in debt, makes them suffer, can destroy indigenous traditions, afflicts them especially with respiratory and digestive ailments, yet the whites retain desirable objects and powers. The pain of historical suffering is physically and morally debilitating yet can be overcome by following the traditional ways. In doing so, followers will secure their autonomous identity, well-being and health in their traditional territory. This cosmovision is enacted, shaping the Baniwa experiential world. In short, it provides them with an epistemology, and an empirical sensibility, that is different from many of those who dwell in the industrialized global north. What follows is an explication of this alternative epistemology—a native view of science, if you will—that illustrates the ways in which cosmological narratives shape some perceptions of the world, and challenge others.

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Prophet Movements

Prophets emerge from a configuration of historical circumstances internal or external to society, such as outbreaks of witchcraft, or the dangerous accumulation of secular power. A brief review of key themes in prophetic movements in Northwest Amazonia reveals that most have been focused on the same questions that lie at the foundation of their traditions: how can the knowledge and a way of life (a *habitus,*if you will) be reproduced in the face of constant historical changes? How can humans secure what is most sacred to them in the face of potentially massive destruction and/or obliteration of their ancestral traditions?

To begin the discussion, common to many of the prophetic movements throughout Amazonian history is the search for a utopia, which can take one of two forms. The first is *spatial,*which can mean either a return—led by the prophet(s)—to a place of sacred origin in order to re-unite with the primordial and eternal people and divinities. This was a dominant theme in seven prophetic movements that took place within a relatively short period of time at the beginning of the twentieth century among the Ticuna of the upper Amazon River. Humanity, it was believed, had strayed too far from the morally correct ways of living, and the prophets, or "those who desire to be sacred" (young people in several cases), showed the way back to places at the headwaters of certain streams where *Yoi,*the Creator, and the primordial people were to be found.

Often, the search for a perfect place is something "foretold from old." That is, in the stories of creation and the first people, mention is made of ancient migrations to the perfect place, which only some attained, whereas the rest did not. The Apurina, Arawak-speaking people of the southern Amazon, tell the story of ancestral migrations to the perfect place in the north; half of

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humanity decided to stop in the middle of the journey, however, whereas the rest continued on. The "middle place" is called the "moribund place, the place where many deaths occur," and is unfortunately not what they had hoped to attain.

There are numerous Guarani in the south of Brazil who believe in the existence and attainability of a "land without evil" or *yvy maraey*"land which has not been touched," where "no constructions have been made," according to the first dictionary of Guarani/Spanish.6For many Guarani, that land lies in the east and so, when a person recognized as a*karai* (spiritual leader) receives inspiration to lead his people to that land, he or she would begin singing the "beautiful words" (divinely inspired chants). The words recall the Indians' longing for their primordial lands, where they can reunite with their deities, a land that the Indians will reach in migration without having to pass through the ordeal of death. Some picked up all their belongings and left on marches until they got to the ocean. Many of them stayed in little communities in the Atlantic Forest range, but some of them, tired of waiting, have either converted to evangelicalism or sought other ways to assert their divinely given rights to a vast territory throughout which they were accustomed to move freely long before the colonists arrived.

Whereas environmental factors are certainly critical to the religious history of native peoples, in other areas, somewhat different processes of change based on internal dynamics, or a combination of both environmental and politico-religious changes, occurred in pre-Columbian prophetic movements among the Tupian and Guarani-speaking peoples of the eastern coast of what is now Brazil and a vast area of the southern part of the continent.

By the 1500s, the Guarani had developed into a society where political and religious power was divided between powerful chiefs and shamans, and there are indications that the Guarani were on their way to developing centralized city-state formations

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like those of the Andean region with whom the Guarani maintained regular commercial relations. The tendency to centralization of power met resistance, however, from *karai* who disputed the power of the chiefs, gathering followers who believed in their extraordinary powers to lead people to places where they could gain access to an original state of perfection, where they would become immortal without having to pass through the ordeal of death.

There is evidence that cults developed around these prophetic leaders who lived a wandering life, visiting villages to announce their message that the time had come for people to renew their spiritual connections with their ancestors in places that had never before been inhabited (*yvy maraey* literally means "land on which nothing has been built or cultivated"; early missionaries interpreted this phrase to refer to the Christian paradise, a "land without evil").

The second form of prophetic movements emphasizes a *time* or moment of transformation, when the earth—considered to be irredeemably flawed with impurities, rotten with the corpses of so many dead, contaminated by sicknesses and toxicity, and plagued by dangerous and harmful creatures—will be purified by fire, then washed by water. After this, the survivors who managed to escape by having dug out a huge hole in the earth where they hid until the fire had passed, or had taken refuge by tying their canoes to the tops of trees, will re-appear to a new life, free of demons. The stories of creation of many peoples tell of a time when these events occurred. The prophets thus conjugate the logic of their sacred stories to the situational demands of contemporary action. The prophets are the emissaries of the divinities and thus are the only ones who should know when these things will take place and what people are to do about them. The critical factor here then is *temporality,* a time of salvation known only to the

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deities and communicated only to the savants.

Evidently, the prophets have earned their fame either through the resonance of their message with people's desires and hopes, but also from the histories of their acceptance as shamans and/or priests. The shaman who has extensive knowledge and direct experience of all levels of the cosmos, who has survived witch attacks and become even stronger, who understands and can explain the myths with coherence and depth, who has a demonstrated ability to divine, foresee, if not an extraordinary clairvoyance, and who was trained by a succession of powerful shamans before him, has all the makings of a prophet. Shamans, priests and prophets can be the same person at different stages of the person's career, culminating when the appeal of their messages becomes a universal message, the dominant theme most often having to do with moral reforms internal to society, or inversion of power relations between the whites and Indians. They are emissaries of the divinity and have an open line of communication with both the divinities and the souls of the deceased.

Ideologies of Baniwa Savants

Baniwa prophets, or religious savants*(kanhenkedali)* are those "jaguar shamans" who have not only reached the pinnacle of their spiritual powers but also are seen as the living *voices* of the divinities, guiding their followers through historical crises. According to oral traditions I have been working with since the 1970s, prophets seek to rid the world of sorcerers and install a regime of order, harmony and beauty. In the understanding of the elders today, there is still an expectation that a new wise person may emerge at a time of need to provide them with direction and counsel. Whoever the new candidate may be, they will have to be tested first. The Hohodene jaguar shaman Mandu da Silva, today in his eighties, and who is the focus of my 2013 book, is perhaps the

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last of these Baniwa savants.

The relations of the savants with the creator deity involve constant exchanges and communications, direct experiences of the deities, spirits and demiurges of the Other World, transcending the boundaries between present, primordial and eternal time. One demonstration of this belief is that the prophets' tombs on this earthly plane are still today sought by their descendants and kin (of the same peoples/sibs/phratries) for protection. While alive, they are considered by their following to be in constant communication with protector deities, the first shamans; they are like living deities themselves.

Why does perspectivism fall short in representing the historically meaningful statements made by the savants/prophets?

Firstly, the perspectivist approach refers to the body as "bundles of affects," which makes meaningful engagement with prophetic messages problematic, insofar as they are cosmopolitical responses to collective historical experiences of "suffering," together with blueprints for action grounded in the traditions, as well as struggles to keep the traditions alive.

The Baniwa prophets' messages have invariably dealt with human suffering from sorcerers seeking solutions to this problem. The questions they deal with are fundamentally moral, proposing ways to survive and at the same time fulfill one's obligations as a fully cultural being.*Thus, the notion of body is placed in the cosmopolitical arena—not a mere bundle of affects.*

When the Baniwa prophets speak of the "new condition" following a time of change to come, they refer to a number of different ideal conditions: a time when there will be no more sickness; the *end* of debt to the river merchants; the *end* of witchcraft; a time of social harmony, prosperity and abundance of food. And, most recently, they have urged their followers not

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to give up their old ways because if they do, then they will be overcome by the enemy (whomever that may be).

The narratives of *phratric ancestors* (that is, a group of clans interconnected through primordial kinship ties) can be seen in a similar light, as they focus on key decisions taken by the ancestors that resulted in *their autonomy from the whites,*survival from near total destruction at the hands of the enemies, and revitalization movements. Narratives of the (non-prophet) ancestors demonstrate how they sought to reproduce the prosperity of their lives and guarantee their autonomy. The prophets' messages, for their part, have consistently pointed to keeping the traditions alive, to the dangers of selling out to the whites, to the need for living in harmonious conviviality, to the need to eliminate sorcery, etc.

Even today, both shamans and ordinary people can communicate with the souls of these great seers at certain sites, such as at the Great Boulder of *Dzuliferi* (the great shaman deity), located right above Hipana waterfalls, where, cosmogony affirms, the ancestors of humanity emerged from the holes in the stones of the First World.There, people leave offerings and request help and protection from the shaman deity. This has been a region-wide practice noticed by outside travelers since the fi rst contacts in the eighteenth century. Tombs of the great wise people/savants of the past are likewise visited in Venezuela and Colombia, where followers still go to request from them protection or a cure. In numerous cases in the Americas and across the globe, those religious virtuosos considered as prophets are understood to be more like gods than humans.

What kinds of special knowledge do these prophets and jaguar shamans have that mark them off from the rest of the population? How does that knowledge find its basis in cosmological forces or powers that exclusively religious specialists can obtain? What is the *essence* of that power and knowledge?

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Knowledge and Powers of the Jaguar Shamans, *Dzaui Malinyai*

In order to pass on their knowledge to apprentices, the pajés (local term for shamans) transform their bodies into other-than-human beings of the natural world that periodically change their skins and regenerate at certain times of the annual cycle: cicadas, and a series of other insects and animals that periodically molt, slough off their old exoskeletons, re-emerging as totally new beings, in a time-bound cycle of death and rebirth. In the pajés' cycles of transformation, the months of June and July are said to be the times for taking pariká (the shamans' psychoactive snuff) daily, so that throughout the month of August, the pajé transforms into the cicada; pajés become one with the "universe people" as they transmit their knowledge and power to their apprentices.

In his/her apprenticeship, as the pajé's body fills up with medicines from the eternal Other World, he/she acquires an atemporal dimension that transcends human time and limitations. "He doesn't have anything more that is human," Mandu said, meaning that he "dies" (to his human existence),exchanges his life for that of the "jaguar shaman spirit other"*(Dzaui malinyai),* who obeys a radically different temporality and spatial orientation (or, *perspective*).

The pajé, in fact, is one who is constantly in the process of becoming other, so it seems not to make much sense to talk about his "being" in terms of fixed forms. It makes more sense to speak of the shaman as, citing C. Fausto's apt phrase, "a multiplicity of intentionalities," or a series of selves with, in the case of the Baniwa, distinct body-shadows like the spirits and deities, constantly transforming.7We may add that the Baniwa shamans consider their *instruments* included among their multiple selves (rattles, stones, crystals), as these have the power of agency and action.

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Excerpted from *Science and Religion*

A NEXUS OF RELIGIOUS KNOWLEDGE AND POWER

The four principal owners of [spiritual] power and knowledge are:

1. the *pajés,*who heal and protect their communities, the highest grade of which is the true pajé or jaguar shaman. Apprentices acquire their power and knowledge at a certain phase of the life cycle: a young adult, male or female, may begin training to become a healer and may either complete the full ten years required to become a real pajé, or interrupt training at the end of the first major stage and remain a "half-pajé" with limited powers to cure.

2. the sorcerers who attack to destroy a victim or an entire family. These are also called *mantís,* a *lingua geral* term for assault sorcerers, and *dañeros,* a Spanish term. From the sorcerers' point of view, their actions are justified as redressing what they perceive to be an imbalance of power or a personal loss that they attribute to sorcery sent by pajés or other sorcerers.

Pajés and mantís are opposing forces at either end of a gradient that separates good people *(matchiaperi)* from the wicked*(maatchipem).* To understand the struggles between them, it is vital that we take into account the motives behind the sorcerers' actions. For example, external influences such as contacts with the whites, or exogenous diseases, on Baniwa society have resulted in extreme disruption and increases in assault sorcery attacks during their histories;

3. priestly chanters who "are guardians of " highly specialized chants called *kalidzamai,* performed during the all-important rites of passage in which they protect those undergoing life transitions from all potentially harmful places, spirits and animals in the world. As the priestly hanters minister to the

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ancestors, they also create the conditions by which new generations are produced. They thus embody the critical theme of death and regeneration that is at the heart of so many native religious traditions. Only the senior elderly men and women of the grandparent generation can learn these chants, which require great stamina, memory, exact knowledge of places in the world, and knowledge of the poetic spirit names*(naakuna)* of all living beings. There is also less chance that these very elderly specialists are embroiled in any of the struggles that involve shamans and sorcerers, which would detract from the great responsibility and the strenuous spiritual work involved in the transmission of culture through their chanting;

4. the dance leaders *(mandero)* who lead the dance lines with the correct patterns for each type of dance, upholding the collective, aesthetic virtues of beauty, symmetry and form. Whereas the dance leaders have been treated in the literature as owners of a kind of secular knowledge, the term used for their knowledge is *manderokai,* the suffix -*kai* again referring to the power they have to make the dances effective instruments of sociality. Dance leaders acquire their knowledge from within their own consanguineal kinship groups.

The true sorcerers are those whose intentions have become so dominated by the desire to kill as to use poison against everyone whom she or he considers an enemy. As Mandu stated, "Their only thought is to kill"*(manhene kada lima).*The word for poison (the plant substance), poisoning (the act itself of putting the poison in the victim's drink or food), and the lethal sickness resulting from the poison are all known by the word *manhene.* This word is particularly important for understanding the kind of spiritual

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knowledge that the sorcerer also has. The translation of *manhene* is: **one does not know.** This can be understood in several senses, depending on the speaker: (1) one doesn't know who the sorcerer is; (2) the poison, which is always hidden away and (3) the victim who—as a result of the poisoning—is brutally robbed of his/her knowledge and consciousness. This demands vengeance for the loss of a person. The whole process is of course very hidden and secretive until it becomes a memory and people can talk about it in the open.

The jaguar shaman is a high-level pajé whose power *(malikai)* is considered to have been directly transmitted over a long genealogical line from the original creative powers of the universe, especially the deity *Dzuliferi,* the ancient shaman deity. The jaguar shaman is a true pajé, considered to know everything about the world, and is said to be able to attain a place next to the creator deity, *Nhiãperikuli.* She or he is the only native healer who is believed to be capable of curing victims of assault sorcery-by-poisoning.

The *sábios* (wise men or women, *kanhenkedali tapame*) are religious leaders who provide moral guidance to their followers, who include peoples of different ethnic groups spread out over a large geographical area in the Northwest Amazon on three sides of the international borders; who maintain constant communication with the creator deities; and who perform cures or feats that are considered to be extraordinary or miraculous. The *sábios* combine most of the above named functions into one integrated knowledge and power. Yet, rather than keeping that power centralized in their person, they use their wisdom to protect and benefit the people of their community. In that sense, they are guardians of multiple communities located throughout a wide geographical area and of multiple linguistic groups, demonstrating qualities that are characteristic of the deities *Nhiãperikuli* and *Dzuliferi* (the

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sun deity and the primal shaman, respectively).

In summary, the ethnohistories of the Baniwa of the Içana and Aiary and, to a certain extent, the upper Rio Negro or Guainia, amply testify to the importance of a tradition of "wise men and women" who have interpreted the signs of their historical situations—mostly characterized by poverty, oppression and violence at the hands of the whites. The prophets turned to the knowledge and powers of their own deities, particularly the shamanic powers, in order to find answers to the existential questions concerning their survival. The following section characterizes the powers and attributes of the principal deities in the Baniwa pantheon.

The Other Worldly Keepers of the Sacred Knowledge and Power

In the Other World of the great spirits, the shamans differentiate the "good people" from the "wicked people" of the universe. Among the wicked of the Other World are the being called *Kuwai,* also known as the "Keeper of sicknesses and sorcery" and his "secretary" the sloth *Tchitamali,* also an avatar for sickness. The jaguar shaman Mandu also characterized the "first person to die," as the unfortunate one, *maatchieneri,* for he was the primordial being who brought death into the world, although he has another image of himself, a kind of flip-side inverse signifying reversible death.

Many pajés evaluate the world of humans to be an evil place*(maatchikwe),* a place of rot*(ekukwe)*and pain*(kaiwikwe).*This point of view is *not consensual,*however, reflecting the differences of perspectives that are deliberately constructed in ongoing daily lives of dozens of communities over time. Nevertheless, the association of This World with pain, sorcery and rot means that, in the shamans' view, This World is in some way a manifestation of the Great Spirit of Sickness, *Kuwai,*the primordial source of sorcery,

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pain and death by sorcery.

In this way, witchcraft is perceived by many to be the greatest threat to ordered existence in this life. The prophet movements may be understood as vibrant historical struggles of indigenous peoples to come to terms with the internal dilemmas posed by their ontologies when articulated with historical circumstances. The white man, as an "other" type of being, is in Baniwa cosmology, either an ally or an enemy. As enemy, he brings sickness and disorder, accompanied by witchcraft or sorcery, and is a "boss," sometimes violent, sometimes feared and admired, always the subject of conversations. In their mythology, the "great anaconda" makes one appearance as the white man who has an amorous affair with the Creator's wife, which leads to her giving birth to the same anaconda, and the Creator's subsequent abandonment of the woman and anaconda-child back into the forest. Eventually, the woman, transformed into a fish, falls back into the river.

The most notable appearance of the white man imagery, however, is as *Kuwai* himself, who takes on the image to fool children at the age of initiation. As in the previous case, the outsider—here, *Kuwai*—is associated with material wealth, violence and the technology of destruction. Yet, when *Kuwai* finally completes his role as initiator, as priestly chanter, he is transformed by fire into the sacred flutes and trumpets that the men play today to initiate their children. An external, dangerous and treacherous being is nevertheless the owner of a powerful knowledge that humans wished for themselves. That knowledge is taught to humans at a certain moment in the story, precisely when *Kuwai* is burned by fire. It is said that, at that moment, *Kuwai* told the world about everything related to sickness and its cure. Then he departed, having instituted the first initiation rite, as well as

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the first whipping rite, their songs and dances, and above all, the great initiation chants, and the pepper chants where all spirit-knowledge can be found.

The Knowledge of the Universe Owners

The transformative power of the life-force elements that fl ow through the universe is intimately connected to the forms of knowledge *(ianheke)* that brought the universe into being and that has overcome all attempts by enemies to destroy it. It is critical to understand how the knowledge and power of each of the deities is distinct but complementary. The forms of knowledge each one owns or guards were transmitted from the original owners to their descendants, who then became guardians of that knowledge in This World.

In the undifferentiated Before-World of the deities and great spirits, one personage could assume the attributes and powers of another. In the Baniwa pantheon, there are connections among all major spirits/deities that demonstrate the nexus of religious power and knowledge and its replication among the principal religious specialists. They share in each other's powers and knowledge in some critical way. As in the Before-World, so in This World, the different keepers of knowledge can accumulate power, but only at their own risk, for the sorcerers are ever-present to provoke instability.

The vertical representation the Baniwa make of their cosmos might suggest a hierarchy of knowledge and power. I find it more productive to see that each of these deities represents a body of knowledge and power corresponding in This World with living specialists; thus the knowledge and power of the Other World is directly transposed onto and into This World via the shamans, dance-leaders, and priestly chanters. The relation between the Other World and This World comes alive through them: during

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cures, during ceremonial rites of passage, and in the day-to-day encounters of humans and other-than-human beings (forest spirits, water spirits, and spirits of the dead).

The Baniwa universe is centralized in the universe's "umbilical cord," from which all life begins and returns. Nevertheless, the peoples of the world, with their ancestral instruments and knowledge, are dispersed over a vast territory, which makes the centralization process emerge only when there are collective rituals, notably the rites of initiation, taught to humanity by *Kuwai.* Outside of this kind of supra-local centralization, each community has its own sacred flute or trumpet linking it to a particular place and ancestral identity. The point is that, whereas all identity derives from a single source, that knowledge has suffered great losses over time, and large portions of the Baniwa/Kuripako population sadly do not want to have anything to do with traditional ways. Thus, it cannot be assumed that each people has one perspective; for the Baniwa, the distribution of knowledge and the kinds of religious knowledge and power are quite uneven.

Among pajés, the accumulation of shamanic knowledge and power can certainly produce the wise men and women at the apex of this hierarchy. One of the principal objectives of the historical prophets, wise men and women, has been to control sorcery-by-poisoning by transforming the negativity that permeates villages where sorcery has become dominant into harmonious conviviality. If successful, the prophets' powers are considered to be greater, in the sense of morality, than the jaguar shamans'. The prophets resisted utilizing this power for secular purposes; the stories state that *they did not wish to become kings or presidents or powerful secular leaders.* Their stories show how much their families suffered from attack as a result of their spiritual leadership. Given the advanced age of these spiritual leaders, their

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spiritual weaponry seems helpless before an attack by sorcerers. Nevertheless, when they have important messages to deliver that offer divinely inspired guidance to their followers and all Baniwa communities, they carry through their mission until they no longer can, or until they are sacrificed by their ex-followers.

Only the prophets are the living voices of the deities and maintain an open line of communication with the Creator. Their campaigns to control sorcery in This World find numerous parallels in the sacred narratives and in the primordial inscriptions known as petroglyphs *(diakhe).* It is said that these were drawn *(idana)* by *Nhiãperikuli,* who wished to remember the outcome of a major battle against enemies by leaving traces on the rocks. Several of these sacred sites are extraordinarily complex configurations of the landscape, transforming it into a mythscape that tells several stories which occurred in one place.

Pajés say humans have made This World a bad place to live because they use sorcery to kill each other, which has left many rotting bodies in the earth. There is a never-ending struggle in This World between power and anti-power, as there was in the primordial world between the original agnatic (patrilineal) group of creator deities and the various animal-tribe affines who were at once in-laws and their enemies. Humans today are leading themselves to the brink of destruction, which, the sacred stories tell, occurred in the past, when the enemy tribes overcame humans.

In the holistic sense that I have shown of the Other World permeating This World, and with considerable historical depth and spatial extension evident in the sacred traditions, it seems ludicrous to assert that, underlying it all, all living beings with souls *think* in pretty much the same way, have similar *emotional* lives, and *remember* their actions through the *same representations.*

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Concluding, I hope to have shown the following points in this brief essay that have wider implications for the theme of religion and science: firstly, the important interdependence of cosmovisions, normative assumptions (ethics), and recapitulations of ancient practices and knowledges. A native people's cosmovision is at once perspectivist, but (1) predation is not a dominant theme, but rather the prophets are anti-predation, anti-sorcery; (2) suffering is a predominant theme stemming from historical oppression, and living in a hostile environment. The Amazon environment, according to their stories, is permeated with traps, hurdles, pain and sickness that lie around every corner. The Baniwa are particularly concerned with sorcery because sorcerers attack and destroy whole families; (3) the idea of the body can be understood as integrated on different levels of inclusion (Person, House, Community, Sib, Phratry, and Universe), while as opposed to the sick body, which the shaman has to treat, can't be so understood.

In relation to the central theme of this volume, religion and science, it goes without saying that neither of these areas easily apply to the Baniwa. Rather, we have focused on Baniwa spiritual relations to the environment, how they see and relate to other "peoples" (animals, insects, birds, etc.), for which we made extensive reference to their cosmogony, cosmology, eschatology and their understanding of the relations among beings of the same type and beings of different types (i.e., perspectivism). My own work shows how there exist bodies of knowledge and power, which are interrelated, that comprise a whole, and are reproductions of the original knowledge and power of the deities and great spirits of the cosmos.Thus, spiritual knowledge and power must be seen in this holistic way. The prophets are those who sacrifice their lives for the betterment of the community, especially moral betterment,
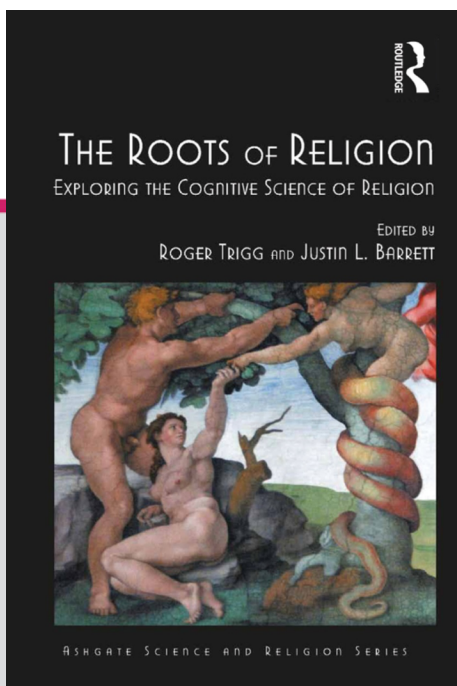
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because they are remembered for their anti-witchcraft campaigns. The Unknown leaves them in awe, fear, or minimally, an enormous curiosity. *This is the test of their strength to withstand—whether they can fulfill moral obligations, and bear the pain of suffering, without allowing bodily needs and desires to, so to speak, lead them to ruin.*Such knowledge complexes are not antagonistic toward Western science and healing arts, and indeed often work in concert with them. But they do represent alternative epistemologies, ontologies and experiential matrices, which thus lead them to perceive this one world in a culturally and historically specific way.

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THE ROOTS OF RELIGION
EXPLORING THE COGNITIVE SCIENCE OF RELIGION

EDITED BY
ROGER TRIGG AND JUSTIN L. BARRETT

ASHGATE SCIENCE AND RELIGION SERIES

This chapter is excerpted from

The Roots of Religion

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Belief in gods requires no special parts of the brain. Belief in gods requires no special mystical experiences, though it may be aided by such experiences. Belief in gods requires no coercion or brainwashing or special persuasive techniques. Rather, belief in gods arises because of the natural functioning of completely normal mental tools working in common natural and social contexts. (Barrett, 2004, p. 21)

Part I

Theism is no stranger to attack. In its long and checkered history it has faced a barrage of assaults on its veracity. Some of these challenges, like the problem of evil, remain unresolved. The scientific revolution marked the beginning of a particularly difficult period for theism, with these difficulties intensified by modern science. Today the science vs. theism debate is an industry of its own. In recent years a growing number of atheists have made recourse to some of the findings in contemporary cognitive science to formulate a novel challenge to theistic belief. According to several psychologists, anthropologists, evolutionary theorists, and cognitive scientists, the human mind evolved in such a way that it is naturally drawn towards belief in disembodied, supernatural agents, the God of monotheism being just one such agent. The belief that God exists, according to most defenders of this view, is an accidental byproduct of certain cognitive mechanisms that evolved for rather different adaptive purposes. Richard Dawkins (2006, pp. 200–22) and Daniel Dennett (2006), for example, make use of this research in their case against theism. While neither explicitly claims that in virtue of this research there is something epistemically suspect about the belief that God exists, the innuendo is obvious. Dawkins contends that these findings partly explain why it is that people acquire and maintain the delusion that God exists, while for Dennett, this research "breaks the spell" of

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religious belief.

Since no formal arguments are presented, it remains unclear how the research in the Cognitive Science of Religion (CSR) is alleged to undermine the positive epistemic status of the belief that God exists (hereafter, we shall call such attempts "the CSR objection"). Some (e.g., Murray, 2009; and Clark and Barrett, 2010; 2011) have taken up the challenge of proposing different ways in which such arguments could be formulated to the conclusion that religious beliefs are *irrational*. This chapter is a continuation of this line of work, but differs in two respects. First, we consider how the CSR objection might be understood in terms of Timothy Williamson's knowledge-first framework (Williamson, 2000). Second, in light of the significant role that testimony plays in the acquisition and transmission of religious belief, we consider the role that the epistemology of testimony could play in the CSR objection. Section 2 begins with a presentation of the relevant aspects of the CSR research. Thereafter follows a brief explanation of Williamson's claim that safe belief is a necessary condition for knowledge. A treatment of several epistemic terms of art concludes section 2. In section 3 we present two different ways in which the CSR objection can be formulated as an argument to the effect that the belief that God exists is unsafe. We argue that neither version works.

Part II

The Cognitive Science of Religion

Owing to differences in methodologies and research goals, there is no definitive statement of the cognitive and evolutionary psychology of religion. For our purposes it will suffice to draw attention to the work of Justin Barrett (2004; 2009), a dominant figure in the CSR literature. Here is a rough sketch of Barrett's theory.

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Excerpted from *The Roots of Religions*

Human beings are naturally prone to develop a certain class of concepts that Barrett labels"minimally counterintuitive concepts"(MCIs). An MCI is a standard concept that has been augmented in some rather unusual ways such that it becomes attention-grabbing, easy to understand and remember, and has the capacity to feature in the explanation of many events. A"talking shoe"or an "invisible dog"are examples of MCIs. It is not unusual to find disparate groups, in no contact with one another, having many MCIs in common. The concept of a"god"is an example of a common MCI, where a"god"is a disembodied, supernatural agent. Eventually the concept of God developed where that term denotes the God of monotheism.

The mental configuration of human beings also includes an Agency Detection Device (ADD) that disposes us to detect agency in our environment. Because ADD is sometimes triggered on the slenderest of bases (a rustle in the bush, a creaking of the floor), it has been called"hypersensitive."As such, the so-called Hypersensitive Agency Detection Device (HADD) often registers false positives. With respect to evolutionary psychology, possessing such a hypersensitive device has survival advantages, since the speedy and noninferential detection of an agent in the vicinity (a predator, say, or a potential mate) would have increased one's survival, thus leading to greater reproductive success. Once the presence of an agent is registered, a second mental tool kicks in. This tool, commonly termed"Theory of Mind"(ToM), attributes a mental life to the detected agent, where such attributions typically concern what beliefs, desires or intentions that agent might have vis-a-vis the subject.

At a point in our history some primitive peoples perceived a state of affairs that resulted in HADD triggering a belief in the presence of an agent. With the aid of ToM, the state of affairs made sense by virtue of an agent acting in a particular way with

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particular intentions. However, only agents with MCI concepts of god-like agents could explain what they had perceived, as no natural explanation adequately accounted for these circumstances. As a result, human beings came to believe that God exists. In some cases the order of explanation is in the reverse—the MCI "God" developed on its own apart from such inexplicable states of affairs. Only much later did certain human beings retroactively understand said states of affairs in terms of God's actions.

Knowledge as Safe Belief

Knowledge, for Williamson (2000), requires avoidance of error in similar cases. The basic idea is that S knows p only if S is safe from error, where being safe means that there must be no risk or danger that S falsely believes p in a relevantly similar case. Knowledge, then, permits just a small margin of error; that is, cases in which S knows p must be buffered by cases of true belief. The relevant modal notions of safety, risk, and danger are cashed out in terms of possible worlds such that a margin for error is created insofar as there is no close world in which S falls into error. Such worlds act as a "buffer zone" from error and thereby prevent the type of epistemic luck that characterize Gettier cases (Gettier, 1963; Shope, 1983). Here is one pertinent formulation of the safety condition:

> If in a case α one knows p on a basis B, then in any case close to α in which one believes a proposition p^* close to p on a basis $[B^*]$ close to B, then p^* is true.
>
> (Williamson, 2009, p. 325)

For example, S does not know that it is noon by looking at a broken clock that correctly reads noon, since there is a close world in which S falsely believes that it is noon, e.g., a world in which S looks at the broken clock at any time other than noon.

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Excerpted from *The Roots of Religions*

Unlike the aforementioned authors, we grapple with the CSR objection in terms of knowledge and not in terms of rationality. There are several reasons for this difference in strategy. First, since those putting forward the CSR objection do not explicitly state that religious beliefs are irrational by virtue of the finding in cognitive science and evolutionary psychology, there is no *prima facie* reason to interpret their challenge in terms of rationality instead of knowledge, especially if knowledge is the more primitive concept of the two. Given the current popularity of explications of knowledge in terms of safe belief, Williamson's safety condition is a natural choice, seeing that he is one of the more influential safety theorists.

Second, most agree that knowledge is non-accidentally true belief. However, there is no consensus to be found among those working on rationality. While some consider rationality to be tied to the degree to which evidence increases the probability of a belief's being true, others see it as a property that supervenes on the reliability of cognitive mechanisms, while yet others deem it to be a kind of self-reflective state. As such, some see rationality as being determined from an external point of view, while others view it from an internal point of view. The concepts of rationality that result from such divergent approaches can be radically different. By concentrating on knowledge as opposed to rationality, we avoid this murky and contested territory.

Third, given that the CSR research concerns the apparently accidental genesis of theistic belief, one natural concern would be that accidentally true theistic belief is unsafe. It would not make sense, then, to formulate arguments against theistic belief on the basis of the CSR research in terms of rationality, for on most accounts of rationality an agent *S* may be rational in believing *p* despite being lucky that *p* is true.

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Finally, there is good reason to think that the appropriate norm for assertion and practical reasoning is knowledge and not justified or rational belief (Williamson, 2000, pp. 238ff; Hawthorne and Stanley, 2008). Since theistic belief is often the subject of assertion and, more importantly, influences the way theists go about living their lives, it makes sense to worry about whether theists can know that God exists in light of the CSR research more than whether theists can rationally believe that God exists.

Before commencing our treatment of the CSR objection, two epistemic terms of art need to be addressed. First, there is a distinction between individual epistemology and social epistemology. The first makes normative assessments of a specific agent's beliefs, e.g., that an agent S's belief that p is warranted or rational or justified or known if and only if conditions $C1,..., Cn$ are satisfied. The second differs in that normative assessments are made about an entire community's belief(s). We understand the methodology of social epistemology to begin with an assessment of which method or cognitive process a group uses to produce a certain belief and then to judge the epistemic status of that belief, the judgment naturally applying to all agents in that community. An adequate treatment of the CSR objection must take into account this distinction for it is unclear whether CSR objectors have specific theists in mind or intend their remarks to apply to all theists.

Second, knowledge is factive—only true propositions can be known. Without thereby begging the question, it makes little sense for the CSR objection to be framed on the assumption that theism is false, for then it would be trivially true that theistic belief is unsafe. The CSR literature would then be irrelevant to the claim that theistic belief is unsafe. We therefore interpret the CSR objector as making the claim that despite it being true that God exists, one does not know that God exists. Given the conceptual dependence of assertion, practical reasoning, and evidence on

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knowledge in Williamson's framework (2000, pp. 184ff), such a challenge is a serious one indeed.

Part III

As adverted to earlier, we think that the CSR objection can be formulated into two different arguments to the conclusion that the belief that God exists is unsafe. An independent discussion of each objection follows.

The Counterfactual Argument

Recall that one does not know it is noon by looking at a broken clock that fortuitously just so happens to read noon correctly. That the agent would have believed it noon even if it were not noon is one way of explaining why agents who look at broken clocks fortuitously reading the correct time are denied knowledge. On similar grounds, the CSR objector might have the following

argument in mind:

1)   If God did not exist, human beings would still believe that God exists (given that humans are primed to believe in supernatural agents, independent of whether or not such agents exist).

2)   Therefore, the belief that God exists is unsafe.

The cogency of this argument turns on the first premise, which is expressed in the form of a counterfactual. There are three reasons why this argument fails. First, those familiar with accounts of knowledge in the post-Gettier period will recognize that the type of counterfactual expressed by (1) above corresponds to Robert Nozick's sensitivity condition for knowledge. According to Nozick (1981, p. 171), an agent S does not know p if it is the case that were p false, S would still believe p. It is now recognized that the

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sensitivity condition for knowledge is inadequate in several respects. That theistic belief fails to satisfy the sensitivity condition for knowledge in light of evolutionary cognitive science is therefore irrelevant.

Second, the Counterfactual Argument is invalid as it is not the case that if a belief fails the sensitivity condition, it is therefore unsafe; that is to say, a failure of sensitivity does not entail a lack of safety. For example, in some cases sensitivity is the more stringent condition, while in others safety is. The following two points of logic elicit the difference between the safety and sensitivity conditions. When it comes to cases concerning knowledge of the denial of skeptical hypotheses, the safety principle is less demanding than the sensitivity principle. The sensitivity principle requires that the agent not believe p in the nearest possible world in which p is false. As such, no agent can know the denial of skeptical hypotheses, e.g.,"I am not a brain in the vat,"by the sensitivity test because in the nearest possible world in which the agent *is* a brain in the vat, the agent continues to believe that he is not a brain in the vat.

The safety principle, however, permits knowing the denial of skeptical hypotheses. By the safety principle, I count as knowing the everyday proposition p"that I have hands"only if I safely believe p. It follows, then, that if I safely believe p, then there is no close world in which I am a brain in the vat and am led to falsely believe that I have hands. Consequently, if I know that I have hands and I know that that entails that I am not a brain in the vat, then I know that I am not a brain in the vat.

On the other hand, cases can be constructed in which safety is more demanding than sensitivity. Suppose S truly believes p in the actual world, but (i) in the *closest* world in which p is false S does *not* believe p, and (ii) there is *close* world in which S falsely believes p. In this case S satisfies the sensitivity condition, but fails

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to satisfy the safety condition. The following case illustrates this point. Unbeknown to Mary, the thermometer she has just purchased is defective and will always yield a reading of 39°C regardless of her temperature. Mary, who is running a fever of 39°C, then uses the thermometer to measure her temperature and it just so happens to correctly read her temperature of 39°C. However, in the nearest world in which her temperature is not 39°C and she uses this thermometer to take her temperature, she is distracted by her son and she doesn't form any belief about her temperature. She accordingly satisfies the sensitivity condition for knowledge. However, there happens to be a non-closest close world in which Mary, who is running a fever of 38.5°C, uses this thermometer to take her temperature and consequently forms the false belief that her temperature is 39°C. Mary thus fails to satisfy the safety condition.

In light of the complicated relationship between the sensitivity and safety conditions for knowledge, with respect to any belief *p*, it is not the case that failure of the sensitivity condition entails failure of the safety condition. The counterfactual argument is therefore invalid.

A third reason to discount the Counterfactual Argument is a semantic one. According to the standard Lewisian semantics for counterfactuals, acounterfactual with an impossible antecedent is vacuously true (Lewis, 1973, p. 24). For example, the counterfactual (F)"If frogs were numbers, then pigs would fly"is true, but vacuously so. As discussed earlier, we have interpreted the CSR objector as putting forward her objection on the assumption that God exists. On standard conceptions of God's existence, if God exists, he exists necessarily; that is to say, he exists in every possible world. Therefore, by the CSR objector's own lights the antecedent of (1) is impossible. Asserting (1)

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thus amounts to no more than asserting (F). As such, there is ample reason to discredit the Counterfactual Argument.

The Argument from Testimony Chains

Reliability, as a property of a belief-forming method, comes in different kinds, two of which are important for the purpose at hand—local and global. The latter refers to a method M's reliability in producing a range of token output beliefs in different propositions $P,Q,R,...$, etc. A method M is globally reliable if and only if it produces sufficiently more true beliefs than false beliefs in a range of different propositions. For example, M could be the visual process and P the proposition that there is a pencil on the desk, Q the proposition that there are clouds in the sky, and R the proposition that the bin is full. If a sufficiently high number of $P, Q, R,...$is true, then method M is globally reliable. A method M is locally reliable with respect to an individual target belief P if and only if M produces a sufficient ratio of more true beliefs than false beliefs in that very proposition P. Method M, e.g., the visual method, is locally reliable with respect to the belief P if and only if it produces a sufficiently high ratio of true beliefs about the presence of the pencil on the desk.

According to Williamson, for a belief to count as safe, it must, among other things, be the product of a globally reliable method or basis:"If in a case α one knows P on a basis B, then in any case close to α in which one believes a proposition P^* close to P on a basis close to B, P^* is true"(Williamson, 2009, p. 325). In light of these considerations, the CSR objector might have the following argument in mind:

3)   The basis on which the theist believes that God exists is globally unreliable.

4)   Therefore, the belief that God exists is unsafe.

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According to Barrett, theistic belief arose through the interaction of HADD, MCIs, and other mental tools, ToM in particular. For the sake of simplicity, let us call this set of mental tools HADD+. On the simplifying assumption that these constitute a singular basis of belief, HADD+, so the CSR objector argues, as globally unreliable, as HADD+ generates many false positives. Hence, the doxastic products of HADD+ are unsafe. If the above argument is valid, theistic belief is unsafe.

As discussed earlier, the distinction between individual and social epistemology must be kept in mind when assessing the CSR objection. It is unclear *who* the CSR objector has in mind with this argument. With respect to the contemporary theist, it is controversial whether: (i) said theists come to believe that God exists on the basis of HADD+; or (ii) whether HADD+ is globally unreliable. Concerning (i), some contemporary theists believe that God exists either via testimony or as the result of an argument, neither of which involves HADD+. With respect to (ii), even were the contemporary theist to believe that God exists on the basis of HADD+, HADD+ is, at least for us today, globally reliable; that is, we form more true than false beliefs about agents in our environments. So the above argument is irrelevant to at least some contemporary theists.

Suppose, however, we concede the truth of (3) for the earliest theists because they were using HADD+ in ways that generated many false positives; that is to say, for these very early theists, their HADD+ may have been globally unreliable. Therefore, with respect to these very early theists, the belief that God exists was unsafe. Given this supposition, the CSR objector might have the following argument in mind:

5)   On the basis of HADD+, some primordial human beings came to believe that God exists.

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6) In these primordial human beings HADD+ was a globally unreliable basis for belief.

7) Beliefs produced by globally unreliable methods do not constitute knowledge.

8) Therefore, these primordial human beings did not know that God exists.

9) Contemporary theists believe that God exists via testimony chains originating with these primordial human beings.

10) A testimony chain that does not begin with knowledge cannot yield knowledge to the recipient at the termination of that testimony chain.

11) Therefore, contemporary theists don't know that God exists via such testimony chains.

The Argument from Testimony Chains seeks to undermine the epistemic status of theistic belief by identifying its epistemically suspect causal origins.

As has been conceded, (5)–(8) may indeed be true. And given that many contemporary theists believe that God exists via testimony, (9) may be true as well. (10), however, is false. An agent $S2$ can safely believe a true proposition p via testimony from an agent $S1$ even if $S1$ does *not* safely believe p. Consider the following case from Lackey (2008, p. 48). It is plausible that a child knows that modern-day *Homo sapiens* evolved from *Homo erectus* when taught so by her teacher, even though her teacher is a religious fundamentalist who does not believe that evolution is true. In this case the child's belief is safe despite the teacher not believing that modern-day *Homo sapiens* evolved from *Homo erectus* and therefore not knowing as much (on the assumption that knowledge entails belief). Testimony can thus be an epistemically generative process—it may permit the hearer to gain something

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the speaker lacks.

So much for testimony from one person to another, but what about testimony chains? Might a testimony chain that originates with a person who does not safely believe *p* prevent the person at the termination of the chain from knowing *p*? An extrapolation of the foregoing case proves that safe belief is possible for an agent at the termination of such a chain. Suppose Billy, one of the children in the biology class, tells his best friend Jack that modern-day *Homo sapiens* evolved from *Homo erectus*. We take it that Jack also counts as safely believing that modern-day *Homo sapiens* evolved from *Homo erectus*. And so on. And surely the contemporary theist, relying on the testimony of her parents or community, counts as knowing that God exists even if that testimony chain originated in a primordial ancestor who did not know that God exists. The Argument from Testimony Chains is therefore unsound.

In light of these considerations, the CSR objector may concede that while (10) is not a universally true principle, there are cases in which it does hold and that the genesis of theistic belief according to CSR is just such a case. For example, if I truly believe that the train is about to depart on the basis of testimony from someone who read a departure schedule riddled with mistakes, it seems that my belief does not count as safe. The CSR objector might argue that the contemporary theist is in a similar position if she believes that God exists based on a testimony chain originating in an ancestor who came to believe that God exists on the basis of a globally unreliable method.

There is room to argue, however, that *exceptionally long* testimony chains with unsafe origins exhibit some unique epistemic features. A case can be made for there being a sense in which the primordial human ($S1$) is a reliable testifier and as such the contemporary theist (Sn) can safely believe that God exists

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from a testimony chain originating with *S1* even if *S1* used the globally unreliable HADD+ to arrive at theistic belief. For the sake of argument, consider a case in which *S1* holds a set of beliefs {*P,Q,R, ...*} and that many of these beliefs are generated by HADD+. *S1* testifies to others a great many of the beliefs she holds overall. Let us stipulate further that *P* is the belief that God exists and is one of the few true beliefs in the set {*P,Q,R, ...*}. According to the CSR objector *S1* is thus an unreliable testifier. Assume further, and not unreasonably, that as time passes, humans develop mentally. As they do, the testimony chains passing along beliefs *Q, R,*and the other false beliefs in the set"die out"or"dry up" because people come to realize that *Q,R*, etc. are false. We call this feature of long testimony chains *epistemic winnowing*; individuals and communities do not generally pass along information they deem false. And epistemic winnowing is something we expect others in our community to be committed to. By the time *Sn* receives the testimony that *P* from a testimony chain originating with *S1*, there are no false beliefs from *S1*'s mouth that are passed along anymore; if so, from *Sn*'s perspective, at least, *S1* is a reliable testifier.

One can explain this conclusion in terms of safety: there is no close world in which *Sn* falsely believes *P* or any other relevantly similar belief by way of a testimony chain originating with *S1*. It seems reasonable to us that the case of the contemporary theist who believes by way of such a long testimony chain is the beneficiary of epistemic winnowing. Therefore, even if the testimony chain by which a contemporary theist believes that God exists has an unsafe genesis, the belief held thereby is safe. The Argument from Testimony Chains is thus unsuccessful.

Part IV

We have presented two different ways in which CSR might be used

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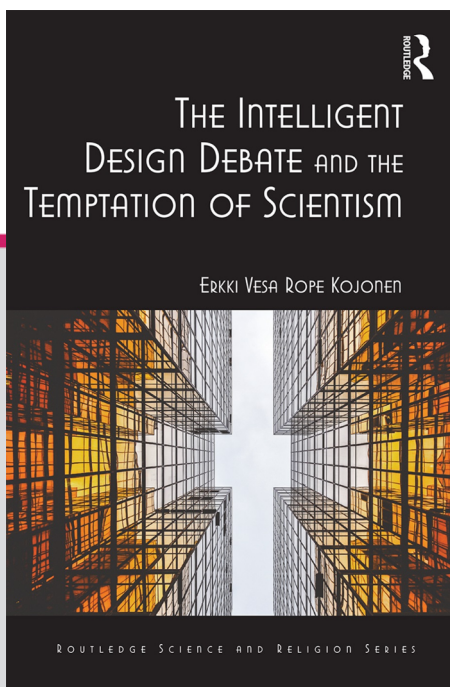
to generate an argument towards the conclusion that the belief that God exists is unsafe. For a number of reasons, each argument fails. This failure does not entail that belief in God is safe, however. That conclusion would require a separate consideration of its own.

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INTELLIGENT DESIGN DEBATE AS SCIENCE OR PSEUDOSCIENCE

In the discussion of cosmological and biological design arguments, one chief objection to ID's design-based explanations has been that they are not scientific. Much energy has been used to discuss criteria of science like methodological naturalism, testability, fruitfulness, detailed predictions and so on. In part, the prominence of the theme is based on the political situation and the debate over whether it is permissible to teach creationism or ID in public schools in the United States of America.

The legal strategy for combating the teaching of creationism in the United States was designed around methodological naturalism as a requirement of real science. Against the efforts of creationists to portray 'creation science' and evolution as competing scientific theories, it was argued that no theory which appeals to supernatural entities can possibly be science, already by definition. The definition of science has even been called 'the philosophical question' in the controversy over creation and evolution, implying that this question is philosophically more important than (for example) evaluating the merits of the design argument or understanding whether the fundamental character of reality is purposeful or purposeless.

Practical reasons also influence ID's insistence on the scientific nature of its design arguments. As noted, the movement desires cultural influence and public impact. The movement recognizes the immense cultural authority of 'science' and wants to reclaim it from naturalists. In challenging the sufficiency of the scientific theory of evolution and naturalistic philosophy in the public arena, they want to say that their critique and their alternative are also scientific. However, ID's main arguments against methodological naturalism are based on their understanding of the nature of science, and their belief that methodological naturalism unduly restricts science as a search for true explanations, rather than merely a search for naturalistic

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explanations.

In this chapter, I will analyse the controversy over ID and the definition of science. In the first section I will look at ID's critique of methodological naturalism and several ways in which methodological naturalism has been defended against this critique. I then move on to consider several possible defences and formulations of methodological naturalism. I argue that intellectually responsible defences of methodological naturalism will not allow us to dismiss the consideration of the more interesting questions in the debate, such as the evaluation of ID's arguments. In the third section of the chapter, I discuss other ways of differentiating between science and non-science, and argue that the definition of science is not the central philosophical question of the debate, unless we accept some kind of scientism – or unless we care most about influencing public education than the core philosophical questions of the debate.

Methodological naturalism and ID's critique

The historical background of methodological naturalism

Methodological naturalism has historical roots extending far beyond current political controversies. Methodologically naturalistic science can be broadly construed as a project of understanding the structure of the universe in terms of natural causes. It always looks for natural explanations, laws and mechanisms, rather than resorting to supernatural explanations of any phenomena. As Ronald Numbers argues, this broad approach has Christian and even medieval roots. Even in the middle ages, natural philosophy was guided by a 'preference for natural explanations over divine mysteries' when dealing with natural phenomena. It was thought that God had created a rational world, whose structure was pen to human investigation. Explaining things by reference to God's mysterious will was not the default position

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of the natural philosophers; rather, they wanted to understand the natural processes which God had created. Similarly, many contemporary theists also restrict natural science to the study of natural causes and adopt methodological naturalism.

The importance of methodological naturalism for the debate over ID is inherited from the discussion over whether creationism could qualify as part or science or not. In the 1987 trial over the teaching of creationism, five main criteria of science were defined: (1) science is guided by natural law; (2) it explains by reference to natural law; (3) it is testable against the empirical world; (4) its conclusions are tentative; and (5) it is falsifiable.3In defining science as restricted to non-supernatural factors, the courts followed the testimony of philosopher of science Michael Ruse, who had argued in his testimony that 'any reliance on a supernatural force, a Creator intervening in a natural world by supernatural process, is necessarily not science'.

After the trial, much critical discussion has ensued about these criteria, and some critics of creationism also argued that they were not philosophically rigorous, and that it is the definition of science as a complex philosophical question that cannot be decided by courts of law. Philosopher of science Larry Laudan in particular argued that though the banning of creationism was desirable, the criteria used to demarcate between science and pseudoscience in the trial were problematic. Laudan argued that scientific creationism contains much that is testable – and which has been tested and found false. Rather than being excluded from science *a priori*, creationism should rather be treated as a bad scientific theory, Laudan argued. However, this was not sufficient for the legal strategy against creationism or ID: in order for them to be barred from schools, ID and creationism have to be non-science, not merely bad science.

In the same collection of articles,*But Is It Science*, philosopher

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Philip Quinn even argues that while there are good arguments against creationism, these may be too complex, and so 'there may well be circumstances in which only the bad effective argument will work against them in the political or legal arenas. If there are, then I think, though I come to this conclusion reluctantly, it is morally permissible for us to use the bad effective argument'. As Bradley Monton has commented, this strategy is unfortunate. We should seek for the truth and reject bad arguments, even if they are expedient.To that end, I will go on to consider some critiques and defences of methodological naturalism.

ID's designer and the critique of methodological naturalism

Methodological naturalism was used as a weapon against creationism, and so it has also been used as an argument against understanding ID as part of the natural sciences. To defend the scientific nature of their argumentation, proponents of ID have responded by criticizing methodological naturalism. As I pointed out in Chapters 3 and 4, proponents of ID argue that cosmology and biology provide data which point to purposeful design as the explanation. The structure of the argument is often aimed to show that the design argument utilizes the best methods used in historical science, such as the inference to the best explanation. Proponents of ID argue that their design argument is analogous to forensic sciences, archaeology and the search for extraterrestrial intelligence (SETI), and as such should also be accepted as scientific.

It is somewhat curious why methodological naturalism should be an issue in the debate, since as noted, proponents of ID typically insist that their designer does not have to be supernatural. While Johnson's early argumentation in *Darwin on Trial* critiqued the way methodological naturalism bars supernatural design from science, later ID writings have

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emphasized that design can be detected without knowing anything about whether the designer is supernatural or not, and without reliance on prior religious beliefs. The idea that ID does not require supernaturalism is common in the ID literature. Dembski, Behe and Meyer all emphasize that ID does not violate the rule against supernatural agents, because ID's designer is not identified as supernatural, and indeed the question of the designer's identity cannot be settled by the scientific evidence.

One way in which methodological naturalism could be relevant is if it is very difficult to avoid the conclusion that the designer must be somehow supernatural. The question of the designer's identity arises immediately, and the religious interpretation is a plausible one. (I will come back to these issues in Chapter 6). But the ID movement insists that it is cogent to separate the design argument and the identification of the designer as a supernatural identity. The movement criticizes methodological naturalism rather because it understands the restriction to bar all kinds of intelligent causes from the natural sciences, not merely supernatural ones.

Proponents of ID even agree that the natural sciences are predominantly a search for natural causes. For example, Behe argues that even if supernatural designers were allowed in science, 'the fear of the supernatural popping up everywhere in science is vastly overblown. If my graduate student came into my office and said that the angel of death killed her bacterial culture, I would be disinclined to believe her'. According to Behe, belief in a rational, understandable, law-bound universe is not threatened by belief in a Creator, but is something that religion and science can agree on. However, Behe argues that science should be a search for truth, and it should also allow design as an explanation when that is warranted by the evidence: 'I count as "scientific" any conclusion that relies heavily and exclusively on detailed physical evidence,

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plus standard logic. No relying on holy books or prophetic dreams. Just the data about nature that is publicly available in journals and books, plus standard modes of reasoning'. For ID, the debate is about the freedom of science to follow the evidence, and methodological naturalism is understood to be an obstacle to the search for truth.

The freedom of science and the freedom of the creator

The critique of methodological naturalism has been a hallmark of ID's argumentation from the beginning. Johnson argued already in his *Darwin on Trial* that the naturalistic ground rules of science have led to a far too positive view of the powers of Darwinian evolution. According to Johnson, defenders of naturalism 'enforce rules of procedure that preclude opposing points of view'. Johnson argues that methodological naturalism actually assumes a philosophical, naturalistic understanding of the world. Science must be understood as a search for the truth. If methodologically naturalistic science only searches for natural explanations, then this must be because it is assumes that only naturalistic explanations are true. Otherwise it would make no sense to restrict the search for truth to merely naturalistic explanations, Johnson argues.

In this way, Johnson argues that methodological naturalism is not actually religiously neutral at all. In contrast to methodological naturalism, Johnson proposed an alternative 'theistic realist' framework for science. This theistic realism would be an open investigation of nature, allowing that God has created nature in an orderly fashion to be studied scientifically. In natural history, God could have used evolutionary mechanisms, or he could have acted miraculously. Johnson has a strong theological preference for any option which allows us to have evidence of divine action in history. However, neither evolution nor

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creationism is to be barred from science on *a priori* grounds (as Johnson believes is done in methodological naturalism), but only on the basis of empirical investigation.

Johnson's emphasis on the independence of God from the world and his ability to create any sort of world is reminiscent of the medieval debates on the logic of 'possible worlds'. Pierre Duhem dates the beginning of the scientific revolution as 7 March 1277, when a set of theses of Aristotelian physics was condemned as wrongfully imposing limits on God's omnipotence. Duhem argued that this led to the rise of empirical science, because now Christians could not discover how God had created the world based just on philosophical first principles but had to rely on empirical observations and experiments. This type of theistic background assumption can also be identified in many of the founders of modern science, such as Francis Bacon and Isaac Newton, and it is commonly referred to in the theology and science discussion. Johnson's novel argument is to apply this reasoning also to the creation/evolution debate.

Later proponents of ID typically do not emphasize the aforementioned theological framework in just the same way. Though the idea of theistic science has found other defenders, mostly the ID literature does not discuss theistic realism as the alternative framework to methodological naturalism. Rather, the proponents of ID generally argue only that the foundational assumptions of science do not require that no intelligent designers have acted in history. The assumption remains the same as in Johnson's argument: it could be that design is actually the true explanation of the development of biological species.

This is argued to be a serious possibility that should not be dismissed *a priori* from scientific consideration but should be allowed to compete with non-purposeful explanations. Suppose that the actions of an intelligent creator are in reality responsible

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for the origin of life and much of its development, and that there are real 'gaps' in the capabilities of natural processes nature. In this case, reliance purely on the results of methodologically naturalistic science would produce a false picture of the history of life, because it could not even in principle recognize this being's role and the really existing limits of naturalistic processes. In such a case, science would lead us away from the truth. Proponents of ID argue that this can be avoided by giving up methodological naturalism.

Defending methodological naturalism

The ID movement's critique of methodological naturalism generally assumes that methodological naturalism means an *a priori* restriction barring the use of supernatural or teleological explanations from the natural sciences. Proponents of ID generally also operate on the premise that methodological naturalism is not credible in any traditional theistic framework, because theism allows that God could have acted in natural history. However, in the literature responding to the ID movement, there are different strategies for defending methodological naturalism, not all of which are vulnerable to ID's critique.

Strong methodological naturalism

In its critiques of methodological naturalism, ID mainly criticizes methodological naturalism as an *a priori* restriction on what kinds of explanations are allowed in science. This kind of strong form of methodological naturalism does indeed exist, and it has indeed been a central part of the legal strategy against creationism and ID. For instance, Ruse, whose testimony was pivotal in the creationism trial of 1987, defines methodological naturalism as the claim that 'any reliance on a supernatural force, a Creator intervening in a natural world by supernatural process, is necessarily not science'. This means that excluding design from the natural sciences is not

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done only after evaluating the evidence, but based on the definition of science and based on logic. Sometimes critics of ID have stated this outright very strongly: 'even if all the data point to an intelligent designer, such an hypothesis is excluded from science because it is not naturalistic. Of course the scientist, as an individual, is free to embrace a reality that transcends naturalism'. On this understanding, science is simply by definition a search for natural explanations. Science is concerned with understanding the natural causal structure of the cosmos, and its methods are unsuited for discussing theological and philosophical questions, such as whether nature is ultimately purposeful or not.

Proponents of ID argue that this kind of strong methodological naturalism can only be defended if we assume that there are in reality no intelligent or supernatural causes acting in nature. Otherwise it would be misleading. This is indeed one possible way of defending strong methodological naturalism. If we assume that nature is all there is, or at least that God has no effect on the world, then there should not be any need to consider supernatural explanations within science (or anywhere else really). However, this cannot be the only way to defend methodological naturalism, since it was initially formulated in a theistic framework. Furthermore, philosophical naturalism or deism are not obviously true worldviews, nor are they universally accepted by scientists. So this kind of defence of methodological naturalism would not be persuasive for all. Furthermore, in order to defend philosophical naturalism in a dialogue with other views, the non-existence of a God who acts in history cannot be simply assumed, but must be argued. And part of this process should also involve the detailed examination of arguments for design, such as those presented in natural theology and ID.

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Theological defences of strong methodological naturalism

However, methodological naturalism can also be defended theologically. For example, John Haught argues that theologies of nature can incorporate the findings of natural science, but that it would be mistaken to use design as an explanation on the same level as natural science functions. According to Haught, theological accounts of nature are rather concerned with the ultimate character of reality, rather than operating on the level of scientific theories: 'theology would have the role of ultimate explanation in an extended hierarchy of explanations that includes, and does not in any way compete with, scientific accounts'. This type of hierarchical understanding of the relationship of different disciplines is very common in the theology and science community: each discipline is understood to have its own territory, to which its methods are best suited. While there can be overlap and dialogue between the disciplines, investigating questions of natural science with the methods of the humanities or theology is not likely to be fruitful. Rather, references to supernatural design should take place outside the sciences, in theology and philosophy. And so, methodological naturalism within the natural sciences could be quite justified also for theists.

Does this defence evade ID's critique of methodological naturalism? Suppose that it were indeed a true fact about the world that God created life through a miracle and that the origin of life would have been impossible otherwise. Suppose further that we can construct a good argument showing that design is the most credible explanation for the origin of life. Would it then be problematic to exclude design from science and instead say that some objectively very unlikely naturalistic hypothesis is the best scientific explanation for the origin of life? It could well be that the created reality does not respect the boundaries of scientific

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disciplines as they are understood in the theology and science community model.

In my judgement, the aforementioned form of methodological naturalism can avoid this criticism, as long as we do not adopt scientism. We do not have to assume that the general criteria for good explanations are exactly the same as the criteria for good scientific explanations. If we do not restrict rationality to the natural sciences, then it is completely fine that often the best explanation for some phenomenon will lie outside the range of the natural sciences. Psychological and theological explanations, for example, might be best studied by methods outside the natural sciences. If we respect the idea that there are valid disciplines other than the natural sciences, then each question should belong to the domain of the discipline that can best study the question, though often a question might require input from several different disciplines. On this kind of understanding, the inability of the natural sciences to refer to personal explanations is no more problematic than the inability of psychologists to study quantum mechanics.

However, one problem (or benefit, depending on your viewpoint) of this defence of methodological naturalism is that it does not allow us to bypass discussion of ID's arguments. This is because there is no *a priori* criterion for determining where the precise limits of the disciplines are and what kind of methods are best suited for studying which question. Rather, the boundaries of disciplines have been historically fluid and changing. The proper domains of each discipline have not been written for us in an infallible holy revelation, but must be decided as we go, based on our previous experience of what kinds of methods work in answering these particular kinds of questions. So, we could in principle discover that the origin of life, for example, is better explained when we use methods of design detection, such as those

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used in archaeology or SETI, rather than the methods we normally use in methodologically naturalistic biological research. So, even though this kind of methodological naturalism allows us to banish ID from the natural sciences, this does not mean stopping ID's arguments altogether.

Here the discussion comes down to how good the arguments for various views are, and in the end cannot be settled simply by reference to the traditional boundaries of disciplines (as valuable as these are). If we think that biological problems are properly a realm where strong methodological naturalism applies, we have to present arguments for why we think this is so. These arguments will have to show why it is likely that we will find naturalistic explanations for all biological problems, and why things like ID's critiques fail to overturn these naturalistic explanations. So, approaching some problem as an issue best suited to study by methodologically naturalistic natural sciences should not be a dogmatically held position, but a working assumption and the result of the evaluation of our knowledge of that problem.

The strong form of methodological naturalism outlined above holds that the natural sciences are by definition a search for natural causes. I have argued that this is not a problematic position, as long as it is not coupled with scientism, where rationality and the possibility for knowledge about the natural world are restricted to the natural sciences. Together with scientism, methodological naturalism would indeed be the kind of ideological position that ID proponents criticize, because this would mean that the entire possibility of design-like explanations is barred from consideration. In order to be defensible, methodologically naturalistic science must in principle be able to have boundaries, outside of which other methods and disciplines are the better source of true beliefs. If ID proponents were to adopt this understanding, they could well present ID more as a way of

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challenging the mainstream understanding of where these boundaries lie, rather than as a violation of methodological naturalism as such.

Moderate methodological naturalism

In the debate over ID, not all who defend methodological naturalism have understood it as an *a priori* restriction against intelligent causes in the natural sciences. Rather, some have argued that the natural sciences are in principle open to creationist and design-based explanations, if the evidence is good. On this understanding, methodological naturalism merely means a preference for natural, non-teleological explanations, rather than an absolute exclusion of them from the sciences. ID's exclusion from the natural sciences is based on the failure of its arguments, rather than on definitions. For example, Phillip Kitcher argues that ID does qualify as science, and that even methodologically naturalistic science can be open to evidence of design. However, he goes on to argue that ID is bad 18th-century science which has been superseded and refuted by the developments of science after that.[28]Niall Shanks similarly argues that 'the methodological naturalist will not simply rule hypotheses about supernatural causes out of court'.

Methodological naturalists of this type (which I will now term 'moderate methodological naturalism') can maintain a critical openness to design arguments within science, while nevertheless favouring natural explanations. This type of methodological naturalism avoids the central point of the ID's critique, because it does not rule out the question of design based purely on *a priori* criteria before considering the evidence and the quality of the arguments. Proponents of ID could also themselves be classified as moderate methodological naturalists, since they also believe that science is predominantly in the business of studying the operation

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of natural, unintelligent causes. Moderate methodological naturalism can allow for defending or rejecting ID based on what the evidence supports.

In contrast to proponents of ID, some adopt moderate methodological naturalism for the purpose of arguing against theological claims with the authority of science. If theological claims were a part of science, then scientific methods would be suitable for evaluating – and rejecting – theology. Thus ID critics Maarten Boudry, Stefaan Blancke and Johan Braeckman argue that there are many ideas about the supernatural that scientific results could in principle corroborate or contradict: 'not only in the life sciences, but also in other domains of inquiry, paranormal researchers and sceptics have investigated extraordinary claims which, if corroborated, would substantiate the existence of immaterial and supernatural entities' such as ghosts and extra-sensory perception. According to Boudry, Blancke and Braeckman, sceptics who restrict science from evaluating supernatural explanations give up their most powerful weapon in the fight against superstition and nonsense. It is important to be able to say that we can scientifically test and falsify some such claims. However, this also means admitting that science could in principle also corroborate them.

On the difficulties of defining science

Some problems of demarcation criteria

There have also been attempts to refer to criteria other than methodological naturalism in order to show that ID is not science. However, the question of demarcation is notoriously difficult and unsolved. As philosopher Yujin Nagasawa notes, 'it is much more difficult to show that intelligent design is not science as to show that it has not been established as a good viable scientific theory'. It is difficult to find a criterion which could be used to definitely

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rule out design-based explanation from biology. For example, suppose that only observable entities can be referenced in scientific theories. Because the 'intelligent designer' has not been observed, ID would then not be a part of science. But this is problematic, because the natural sciences typically allow for indirect observation and theories, which allows scientific status for the Big Bang theory, belief in electrons and so on. Or consider falsifiability as a criterion of science. One problem is that the core of theories can seldom be falsified directly: theories can often be amended to explain anomalies, and tests require the addition of auxiliary hypotheses to the theory. Ratzsch argues that even a hypothesis of supernatural design can have such testable parts, though the designer's existence cannot be falsified directly.

Discussion of various demarcation criteria has shown that it is very difficult to formulate a strict boundary between science and pseudoscience. However, this difficulty does not show that we cannot say anything about what makes the quality of a scientific theory good or bad. Evaluating the virtues of scientific explanations or the values of science instead of absolute criteria seems a more promising approach. Testability (including predictive power), coherence with existing scientific theory, fruitfulness in opening up further avenues of research, simplicity and other criteria allow us to judge the scientific quality of competing theories and research programs. Using scientific virtues as criteria of judging the best explanation, one could (for example) argue that naturalistic theories of natural history are scientifically more virtuous than the competing research program of ID. It is also possible to argue that though there are problems with naturalistic understandings of the world, ID represents a larger revision of science than these anomalies require. Thus, even if design were admitted as a possible part of science, one could continue to argue against it. In contrast, proponents of ID can claim that their design

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argument provides a more virtuous scientific explanation of the data than naturalistic explanations.

Personal explanations and science

Another fruitful way to evaluate ID's scientific status would be to ask what disciplines it has most analogies with. Is it with the natural sciences or perhaps more with the humanities, philosophy or theology? Even if drawing absolute boundaries between science and pseudoscience, or between various disciplines of science is difficult, we can still usually quite naturally think that some questions are more suited to the methods of the humanities and others more to the methods of the natural sciences. ID makes use of personal explanations, which are quite different from those typically used in the natural sciences. For example, Collins argues that scientific explanations typically possess *scientific tractability*: they are highly detailed, with references to laws, mechanisms and the minutest details of the systems being investigated. Science also does not provide explanations for everything – for example, it is difficult to specify a mechanism explaining why gravity works the way it does. However, in general, an attempt is made for investigating natural phenomena in detail.

By contrast, explanations by reference to intentionality do not include this level of mechanical detail. Theistic intentional explanations typically do not involve any specification about the mechanism by which God creates the laws of nature, for example. Indeed no such mechanism needs to be given, since according to the hypothesis God can bring about any result he chooses without any need for intermediate second causes. Both theistic natural theology and ID require that intentional activity as a cause itself possesses some explanatory power, even without specification of any particular mechanistic process the designer worked through.

Furthermore, while intentional explanations seem to work on

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a different level than mechanistic explanations, this does not mean that they have no explanatory power. Like natural theologians, ID proponent Meyer also references the example of human design as one basis of this claim. In the case of humans, we cannot yet specify how our consciousness and will influence the molecules of our bodies, but we nevertheless believe that our consciousness has an effect in the world, and that references to human design can be explanatory. In addition, we can typically detect that something is designed by humans without being able to specify how these humans do so. We could also state that in all explanations there comes a point where we reach the level of basic causal powers and are unable to specify further intermediate mechanisms.

This does show that design can be explanatory even without precise knowledge of mechanisms. However, in the case of human designers, we do typically have at least some idea of how the designed objects were produced (or how they could have been produced) in practice. The possibility to investigate such details further is a good thing for the hypothesis, though it is not unconceivable that a hypothesis could not have explanatory power even if further details about the cause cannot yet be investigated. If personal explanation is indeed explanatory, it is not necessarily a fatal flaw for it that personal explanations are different from mechanistic explanations. Even a vague hypothesis could in principle be the most plausible one and could provide us with valuable knowledge. Following Aristotle, it could be argued that there may be great value in even a glimpse of 'celestial things': 'half glimpse of persons we love is more delightful than an accurate view of other things'. But such glimpses are quite different from what are usually considered to be scientific theories. If ID were to be admitted as natural science, at least we would have to argue that this would be a quite different type of science, applying methods of design detection to subjects that

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have traditionally been the domain of the natural sciences.

Because of ID's combination of methods from the natural sciences and the humanities, it may be too restrictive to think of ID simply as either part of the natural sciences, or as pseudoscience. Rather, one could believe that part of ID's argument is part of the natural sciences, part some other kind of science and part that is better characterized as philosophical. For example, Collins argues that the difficulty of developing the basic idea of an intelligent designer into a detailed scientific theory makes it disanalogous with the best scientific theories. Thus it is better thought of as a philosophical idea than a scientific theory. However, Collins goes on to argue that the idea of a designer could still function as a background assumption of a 'metascientific' research program of intelligent design. This research program could then include many parts (for example, the question of the exact limits of Darwinian evolutionary mechanisms) which can be investigated scientifically and others which are better characterized as philosophical arguments (such as the design argument).

Words have socially agreed upon meanings. If the generally agreed on meaning of the words 'natural science' excludes design-based ideas, then that means that ID is not natural science as a semantic matter. However, socially agreed upon meanings do change over time and over cultures, and current meanings of the words have their own complex history. For example, continental Europeans usually also define the humanities as 'sciences', whereas Anglo-American thinkers are more likely to mean only the natural sciences with the term. In any case, definitions cannot settle the questions that form the more substantive content of the debate. If we were to accept scientism, then the definition of science would indeed be the central philosophical question of the discussion on ID. But we can recognize the immense success of the natural sciences without believing that science is the only reliable

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way to gain knowledge, or even that scientific theories are in every case better or more reliable than common experience, theology or philosophy. Because of this, the quality of the arguments for different points of view is the crucial thing to be analysed, rather than the status of these arguments as science or non-science.

Different reasons for rejecting ID

Related to the discussion on methodological naturalism, Gregory Dawes makes a useful distinction between 'in principle' and 'in practice' reasons for rejecting theistic explanations. 'In principle' reasons would be reasons for excluding theistic explanations from ever being good explanations (within science or otherwise) and 'in practice' reasons are based on the actual successfulness of theistic explanations. If theistic explanation and design can never be acceptable explanations, then natural explanations are the only acceptable game in town not only within science but also outside of science. However, if theistic explanations are good, then it can be rational to believe in them, whether they are scientific or not.

In my analysis of strong and moderate methodological naturalism, I have argued that defending methodological naturalism against ID's critique cannot be done in a way that allows us to bypass considering ID's arguments entirely. Under both strong and moderate forms of methodological naturalism, we need to be able to argue that phenomena like the origin and evolution of life are likely to be best explained on the level of the natural sciences without invoking designers.

This type of rejection of *a priori* arguments against ID is also implicit in all accounts in which the rise of Darwinian evolutionary theory is seen as the central reason why biological design arguments can now be rejected. For example, cosmologist Sean M. Carroll writes that 'A few centuries ago, for example, it would have been completely reasonable to observe the complexity and

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subtlety exhibited in the workings of biological creatures, and conclude that such intricacy could not possibly have arisen by chance, but must instead be attributed to the plan of the Creator. The advent of Darwin's theory of evolution, featuring descent with modification and natural selection, provided a mechanism by which such apparently improbable configurations could have arisen via innumerable gradual changes'. This implies that without Darwinian evolutionary biology, design would still be the best explanation for biological order. This assumes that design possesses at least some rationality as an explanation and cannot be dismissed on *a priori* grounds just by invoking the definition of science. At the very least, we need to argue that the generally agreed upon boundaries of scientific disciplines reflect the historical success of certain methods in answering certain types of questions.

Summary

In the debate over ID, much energy has been used to debate whether ID can qualify as natural science or not. I identified several different ways to exclude ID from science. Strong methodological naturalism requires that theistic explanations will in principle always lack some essential characteristic that is required of scientific explanations. Moderate methodological naturalists can admit that design-based explanations can in principle possess explanatory power even within issues normally studied by natural science, but argue that these cases are exceptional or non-existent. Defining 'natural science' in a universally valid way has proven to be a highly difficult philosophical problem. It is much easier to argue that an idea like ID is bad science than to argue that it is not science at all. Comparing ideas to other, readily accepted scientific theories can also help draw out some differences between ID and what is usually understood natural science.

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However, once we reject scientism, we should realize that there are also questions that are better studied by methods other than those typically used in the natural sciences. For example, methods of design detection are important in studying human culture and artefacts. The precise boundaries within disciplines are best based on our experience of what kinds of methods actually work in increasing understanding in each area. There is no *a priori* way to determine that methods of design detection could not in principle also provide the most understanding in problems like the origin of life. The superiority of methodologically naturalistic science in investigating these problems needs to be argued, rather than assumed *a priori*. Because of this, methodological naturalism will not ultimately allow us to avoid giving ID a hearing, if ID's arguments are otherwise good.

It is my belief that the overt focus on the demarcation question in the debate reflects the cultural influence of scientism. Science has enormous cultural authority, and proponents of ID wish to be able to claim it for their ideas. But in the long term, it would perhaps be more prudent to also question the undervaluing of non-scientific ideas in our broader culture. If the problematic nature of scientism became more widely known, perhaps proponents and critics of ID would feel less pressure to argue about the definition of science and could instead concentrate on more interesting questions, such as the evaluation of the arguments themselves. The quality of our arguments and the reliability of our conclusions is far more important than the labels we give them.