RELIGION MADE FLESH: MODERNITY, IDEOLOGY, AND THE NEW SCIENCES OF THE BRAIN

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A dissertation submitted to the faculty of the University of North Carolina at Chapel Hill in partial fulfillment of the requirements for the degree of Doctor of Philosophy in the Department of Religious Studies in the College of Arts and Sciences.

Chapel Hill
2017

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ABSTRACT

Andrew Ali Aghapour: Religion Made Flesh: Modernity, Ideology, and the New Sciences of the Brain
(Under the direction of Randall Styers)

Since the turn of the twenty-first century, the human brain has become a unique and popular explanatory object. Drawing on concepts from the recent boom of the neurosciences, scholars and popular writers have sought to explain various cultural phenomena—including gender, politics, and religion—as the products of underlying cognitive processes. The human brain represents a unique rhetorical device because it serves as a bridge, in such explanations, between human culture and the seemingly objective laws of nature.

This dissertation analyzes brain-based explanations of religion, with a focus on the recent research program known as the cognitive science of religion. It frames the cognitive science of religion as the most recent in a series of historical attempts to essentialize religion, or explain the fundamental truth of religion by identifying a single element that transcends the local specificities of language, culture, and history. Through a series of close readings, this dissertation demonstrates how cognitive theories of religion posit a cognitive fundament where the absolute truth of religion might reside.

The central argument of the dissertation is that it is categorically impossible to essentialize religion as an inherently cognitive phenomenon. This dissertation responds to contemporary reformers of religious studies including Ann Taves, Edward Slingerland, and Robert McCauley. Drawing on concepts including neuroplasticity, morphospace, and dynamic systems theory, it argues for a pluralistic epistemological approach to the study of religion.

To my parents, who have never stopped giving.

ACKNOWLEDGEMENTS

This dissertation project grew out of questions that I first asked as an undergraduate at the College of Charleston explored at Cambridge University and UNC-Chapel Hill. Luckily, over these ten years I've discovered more questions than answers, more friendships than arguments, and more laughter than I could have ever anticipated. I could not have written this dissertation without the training, support, and friendship that I have received from a remarkable group of people.

First and foremost, I would like to thank my doctoral advisor, Randall Styers, for his selfless support and guidance over the last eight years. To this day I am still amazed that such a remarkable thinker and writer could be so generous a mentor (and, frankly, so good a cook). Randall, you are the best of us. Thank you for giving me more than I could ever hope to give back.

This dissertation was written for a group of scholars who have both trained and inspired me: Randall Styers, Lauren Leve, Todd Ochoa, Mary-Jane Rubenstein and Barry Saunders. Thank you all for serving on my committee and providing me with your insights, questions, and feedback. Each of you will forever represent for me a model of intellectual excellence. Sitting among you at the same table was, and always will be, an honor.

Thank you to all of my teachers. I am especially thankful to a group of professors at the College of Charleston who went out of their way to support me as a thinker, writer, and teacher. I was first welcomed to Religious Studies by Meg Cormack and John Huddlestun, and then awestruck by the wisdom of Lee Irwin. Zeff Bjerken met a hotshot college sophomore and

turned him into careful thinker. Thank you, Zeff, for giving me more opportunities—and glorious meals—than I can count, though I must insist that the next one is on me. Elijah Siegler drove me to my first academic conference and is now a favorite friend to see each year at the AAR. I was also supported at the college and over the years by philosophers Sheridan Hough, Christian Coseru, and Todd Grantham. I will always remember Glebe Street fondly.

I would like to express my deep gratitude to the Religious Studies program at UNC-Chapel Hill. The faculty of the department have been very kind to me over the years. I will miss my hallway chats with Yaakov Ariel, Brandon Bayne, Jess Boon, Jonathan Boyarin, Carl Ernst, Juliane Hammer, Jodi Magness, and Brendan Thornton. I would have been lost in many a bureaucratic labyrinth without the assistance and patience of Hope Toscher, Myra Quick, Cathy Ashworth, and Tracey Cave. Thank you to the Perry family for their generous travel award given through the department, and to the University of North Carolina at Chapel Hill its financial support, especially in my final year. Special thanks to Brenda Denzler, whose copyediting and moral support helped bring this to the finish line.

I would also like to thank a number of graduate students at UNC-Chapel Hill whose friendships have been dear to me: Ilyse and Kevin Morgenstein Fuerst, Stephanie Gaskill, Matthew Hotham, Sam Kessler, Lenny Lowe, Helen Orr, Travis Proctor, Kenny Richards, Shannon Schorey, Jenna and David Supp-Montgomerie, Stan Thayne, and Brook Wilenksy-Lanford. I am especially thankful to my dear friend Leif Tornquist, who was the first to welcome me to North Carolina and has been a pillar of support ever since.

The writing of this dissertation was also sustained by deep friendships with Maria and Davis Tate, Amy Allen, Dan DeSalva, Brandon Holmes, and Alan Wilder. I will forever be thankful for Zach Ward and the community at the DSI Comedy Theater. I am also deeply

grateful to my friend Michael Schulson, whose seemingly limitless generosity over the years included a close reading of this dissertation's first chapter.

Finally, and most importantly, I would like to thank my family. My sister Gracie has been a kind ear, an inspiration, and model of how to be thoughtful about work. My mother, Diane, and my father, Shahram, have been supportive of my pursuits from day one, even when they knew that certain paths would lead to more brambles than treasure. Mom and Dad, this would not have been possible without your infinite love and support. I dedicate this to you. My wife Emmie has been so many people to me over the last eight years: a best friend, a confidant, a sympathetic listener, a patron, a writing coach, and the love of my life. Here's to this chapter ending so that the next may begin.

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INTRODUCTION

In the 2011 BBC documentary, *Secrets of the Superbrands*, presenter Alex Riley attended the opening of a London Apple store and observed a number of decidedly religious overtones.[1] Apple's blue-shirted employee "preachers," he reported, had whipped the "glassy-eyed" technology fans into an "evangelical frenzy." Riley suspected that there might be something deeply religious about Apple fandom, and with the help of modern neuroscience he was able to put this hypothesis to the test. Riley and his film crew found an Apple super-fan—*World of Apple* editor Alex Brooks—and enlisted a team of neuroscientists to study his brain. Brooks was placed into an MRI scanner and shown pictures of various mp3 players, computers, and technological gadgets. The goal of the experiment, Riley reported, was to determine whether Apple products uniquely activated specific parts of Brooks's brain that would indicate a religious dimension to his psychological devotion to the brand. According to the MRI images, Brooks was indeed "religious" about Apple fandom: his brain showed patterns of activity when viewing Apple products that were very similar to the brain activity of religious practitioners who were shown religious imagery. According to Dr. Gemma Calvert, the expert who led the experiment, technology brands "exploit the brain areas that have evolved to process religion."[2] But which "religious" part of Alex Brooks's brain was being exploited?

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[1] *Secrets of the Superbrands*, presented by Alex Riley (BBC Productions, 2011), accessed March 5, 2016, http://www.bbc.com/news/business-13416598.

[2] Ibid.

According to Calvert it was the visual cortex, the part of the brain that processes visual information. When Brooks was shown Apple products, Calvert reports in the BBC documentary, the MRI showed "much more activity in the visual cortex, [indicating] enhanced sort of visual attention."[3] In other words, Brooks focused more on pictures of Apple products than he did on other technological gadgets. Yet this should have come at no surprise. At the time of the MRI study, Alex Brooks was running an Apple news website, making a living tracking product releases, and trading rumors about upcoming designs. "Enhanced visual attention" should be expected in the brain of any expert who is engaged with an image related to his or her trade, whether he or she is a cell biologist, a fashion designer, or an airline pilot. Previous MRI research, in fact, had identified a specific "visual expertise" region of the visual cortex by scanning the brains of bird watchers and car experts. This specialized brain region responds to any sensory input that a person perceives as a distinct individual rather than as part of a general category—activating, for example, when a bird watcher is shown a bird but not when they are shown a car (unless they happen to be the rare double-enthusiast of both birds and cars).[4]

At most, then, Calvert's experiment would seem to indicate that *World of Apple* editor Alex Brooks was interested in Apple products. Why, then, did she and BBC presenter Alex Riley together conclude that Apple was exploiting parts of the brain that evolved to process religion? In a separate study, they argued, a similar pattern was found in "very religious" persons who were shown religious versus nonreligious images. Religious people, in other words, have a "visual expertise" region in their brains just like Brooks does. At face value, it is no surprise that these "very religious" persons would perceive certain religious images to be distinct and

[3] Ibid.

[4] Louise Barrett, Robin Dunbar, and John Lycett, *Human Evolutionary Psychology* (Princeton: Princeton University Press, 2002), 180.

significant. Calvert and Riley's discovery was not news. Yet, nonetheless, it went viral. In the weeks that followed the documentary's release, hundreds of news websites and blogs reported on the neuroscientific link between Apple fandom and religion. The story was both provocative and reassuring. Science, it seemed, had objectively verified a widespread suspicion about Apple enthusiasts. An MRI scan had peered into Brooks's innermost private thoughts and experiences and discovered religion, as if it had been lying there waiting in the back of his skull. This dissertation is about the twenty-first century quest to locate religion in the brain. It seeks to explain why, whenever we go searching for religion in the flesh, it is always in the first place we look.

Religion Made Flesh

The popular and sensationalist 2011 story that Apple products induce religious experiences is one example of a twenty-first century genre that I will call "brain-based facts." Every day, it seems, there are new discoveries about the cognitive underpinnings of social and cultural phenomena. Spiritual retreats, we are told, function by resetting the brain's dopamine and serotonin levels;[5] political conservatives are more emotional than liberals because they have hyperactive amygdalae;[6] religion is, objectively speaking, an opiate of the masses.[7] As Davi Johnson Thornton argues, such facts carry unique rhetorical force because they carry the

[5] Ian Johnston, "Religious retreats can change the chemicals in your brain, discover scientists," *Independent*, March 23, 2017, accessed March 27, 2017, http://www.independent.co.uk/news/science/religious-retreats-chemicals-change-brain-scientists-jesuits-catholic-christian-ignatius-loyola-a7646436.html.

[6] Sarah Fox, "The neuroscience of politics: what your brain says about your vote," *Science Blog*, March 1, 2016, accessed March 2, 2016, http://thebrainbank.scienceblog.com/2016/03/01/the-neuroscience-of-politics-what-your-brain-says-about-your-vote/.

[7] Jake Ellison, "Study: Turns out religion is kinda like an opiate," *Seattle PI*, March 26, 2017, accessed March 27, 2017, http://www.seattlepi.com/local/science/article/Study-Turns-out-religion-is-kinda-like-an-opiate-11026801.php#.

authoritative weight of science.[8] Brain-based explanations of social groups or cultural practices carry with them the aura of revolutionary scientific discovery, as if the fundamental truth about political conservatives or spiritual retreats has finally been revealed. Yet these fundamental truths rarely tell us something new; they almost always have the effect of validating preexisting stereotypes and dominant social norms. We all knew that there was something religious about Apple fandom, but what was before just a fuzzy intuition is now an objective fact.

This peculiar quality of brain-based facts is an artifact of the modern nature/culture divide, or the separation of nature and culture into two distinct ontological zones. Bruno Latour defines this separation as ongoing intellectual work: moderns are surrounded by nature/culture hybrids, but we continuously purify them into natural or social entities. This, Latour argues, has been essential to the production of scientific facts. We create facts out of social and cultural materials—government funding, human languages, calibrated machines—and then purify them, assigning them to the order of nature as if they were untouched by human hands.[9] Thus, after the epistemological rupture in Western thought known as the death of God, nature became a substitute fundament—a realm of transcendent truths unmediated by human language or culture.

From within this modern mindset, brain-based explanations of culture stand out as both uniquely powerful and delightfully subversive. They are powerful because they seem to anchor an element of culture to the fundamental order of nature, the realm that moderns associate with absolute truth. The naturalized brain operates in such explanations as an epistemological bridge between nature and culture. This helps to explain why brain-based explanations also carry the

[8] Davi Johnson Thornton, *Brain Culture*: *Neuroscience and Popular Media* (London: Rutgers University Press, 2011), 4-5.

[9] Bruno Latour, *We Have Never Been Modern*, trans. Catherine Porter (Cambridge: Harvard University Press, 1993), 1-12.

aura of being subversive. The magnetic fields and radio waves of Calvert's MRI machine did not just pass through Alex Brooks's skull, they also traversed modernity's constitutional border. Brain-based explanations of culture always seem to be delivered with a burlesque wink. We moderns know that nature and culture are supposed to be kept separate, and so we are delighted by certain kinds of nature/culture hybrids—especially those that validate our stereotypes or worldviews.

This dissertation investigates recent efforts to render religion in the flesh. Over the past two decades there has been a boom in biocognitive accounts of religion, representing a substantial influx of concepts and methods from brain science into the field of religious studies. The predominant biocognitive research program, known as the cognitive science of religion (or CSR), has renewed the nineteenth-century project of naturalizing religion. CSR explains religious concepts and practices as the byproducts of evolved psychological mechanisms that all humans share. Religious beliefs are so powerful, CSR scholars argue, because they activate certain hardwired cognitive systems that operate automatically, beneath the threshold of our conscious awareness. (Thus, just as Alex Brooks does not need to turn on his brain's visual expertise system—he just sees Apple products in finer detail—so too do religious persons believe certain concepts automatically.) Like the BBC's Alex Riley and Dr. Gemma Calvert, CSR scholars believe that by studying the brain they are able to peer directly into the order of nature, discovering truths that are unmediated by culture. This, however, is a trap. This dissertation demonstrates how brain-based explanations of religion often smuggle ideology into the seemingly-objective space of the naturalized brain. This has the effect, in Latour's terms, of purifying their claims of the cultural norms and ideological commitments that were essential to their construction.

Within the field of religious studies, the brain has become the focal point of heated debates about the future of the discipline. In recent years, advocates of CSR have argued that cognitive science represents the only legitimate way forward for religious studies, a field that they argue has devolved into hyper-post-modernist jargon ever since it became apparent that "religion" was an intellectual category with no essential meaning or referent. If religious studies reorganizes itself around the naturalized brain, these CSR advocates claim, it can finally establish legitimate intellectual bedrock.[10] These intellectual efforts are once again grounded in the distinctively modern notion of nature-as-fundament, which casts reductionism as the singular route towards absolute truth. This dissertation locates the brain as the latest in a series of phenomena deemed essential to religion by self-declared intellectual reformers, interrogating the perennial attempt to locate a universal aspect of religion that transcends the specificities of language, culture, and history.

Finally, at an abstract level, this project is about Apollonian dreams and nightmares. In *The Birth of Tragedy,* Friedrich Nietzsche describes the origin of Greek tragedy as an outcome of the struggle between two opposing impulses or drives, each named a Greek god that represented them. Apollo, the god of rationality or reason, embodies the drive towards distinction and individuation. Dionysus, the god of irrationality and chaos, embodies the drive towards transgression, excess, and the destruction of individuality. Thus the Apollonian drive is to draw and maintain boundaries, where the Dionysian drive is to transgress or destroy them. Although these two drives are in one sense opposed to one another, Nietzsche argued, they coexist within

[10] See, for example, Edward Slingerland, *What Science Offers the Humanities: Integrating Body and Culture* (Cambridge: Cambridge University Press, 2008); Ann Taves, "2010 Presidential Address," *Journal of the American Academy of Religion* 79, no. 2 (2011): 289-291; and David Sloan Wilson and William Scott Green, "Evolutionary Religious Studies: A Beginner's Guide," in *Creating Consilience: Integrating the Sciences and the Humanities*, ed. Edward Slingerland and Mark Collard (Oxford: Oxford University Press, 2011), 225-242.

any work of art or human soul, with one perhaps dominating the other.[11] In its crude renderings, the Apollonian drive is often depicted as rigid, uncreative, and violent. This overlooks the important point that, for Nietzsche, Apollo is a dreamer. "As the god of all image-making energies," Nietzsche writes, Apollo is also the god of prophesy, dream-experience, and the "inner world of fantasy."[12] The Apollonian drive is to reach a higher truth, Nietzsche argues, the perfect version of our only partially-intelligible everyday reality. The risk of this drive, he continues, is that the dream-image may "become pathological, so that, in the worst case, the semblance would deceive us as if it were crude reality."[13] Thus the Apollonian drive is primarily a creative impulse, one that dreams a more perfect representation of reality than is perhaps even possible. This drive only turns violent and rigid when it attempts to impose its dream-image over and against reality.

This dissertation is, on the one hand, about the Apollonian dreams of those who create brain-based explanations of religion. It is about the novel and persuasive explanatory strategies, concepts, and conclusions that twenty-first century Apollonians have constructed to make religion more intelligible. Out of respect for these dreamers I have attempted—perhaps quixotically—to represent the works of CSR scholars, psychologists, theologians, and thinkers as generously and accurately as possible. This dissertation is therefore, in part, a salute to Apollonian dreamers. On the other hand, this is a project about Apollonian nightmares. Set in the aftermath of post-modernity and the discursive turn in religious studies, it is about a group of

[11] Raymond Guess and Ronald Speirs, introduction to *The Birth of Tragedy and Other Writings*, by Friedrich Nietzsche (Cambridge: Cambridge University Press, 1999), x-xi.

[12] Friedrich Nietzsche, *The Birth of Tragedy and Other Writings*, ed. Raymond Guess and Ronald Speirs, trans. Ronald Speirs (Cambridge: Cambridge University Press, 1999), 16.

[13] Ibid.

Apollonians who, by attempting to essentialize religion, have made an explanatory goal out of a categorical impossibility. In a critical, Dionysian mode I have attempted to demonstrate how biocognitive explanations of religion can turn pathological, attending to the artifice and erasure required to impose these dream-images onto an overly abundant and dynamic reality. This dissertation is therefore about the Apollonian nightmare of multiplicity and the cognitive fundament that was dreamt up to escape it.

Defining Religion

What do we mean when we say, "religion"? In colloquial use, the word refers to cultural traditions such as Christianity, Islam, Buddhism, and so on. However, as Craig Martin argues in his 2012 *Critical Introduction to the Study of Religion*, this colloquial meaning falls short as an official definition of religion.[14] Definitions typically describe distinctive attributes of a thing that are common across all individuals. We define a tiger as a very large solitary cat with black stripes and a yellow-brown coat because, with very rare exceptions, all tigers share these attributes. This definition is helpful because it distinguishes a unique category of beings, since there are no other cat species with these distinctive features. This method of formulating a definition fails when applied to religion because, as many scholars of religion have observed, there are no features or attributes that are uniquely common to all of the traditions that we typically deem religions.[15] Religious traditions themselves are too diverse and varied for there to be any universal feature. Even the most common elements that we associate with religion—supernatural agents, rituals, belief systems—are far from universal.

[14] Craig Martin, *A Critical Introduction to the Study of Religion* (Sheffield, UK: Equinox, 2012), 1.

[15] Ibid., 2.

Furthermore, many elements that would seem uniquely common to religion are also found in traditions and communities that we would deem secular or non-religious. Liberalism and existentialism are belief systems. Many non-religious people believe in ghosts and endow supernatural status to athletes and celebrities. Ritualistic behavior is just as likely to be found at the doorway of a mosque or the locker room of a football stadium. This is sometimes referred to as the "football problem" of defining religion: a definition of religion that is broad enough to encompass everything we colloquially consider religious will inevitably include so-called secular things, like football; conversely, a definition narrow enough to exclude secular things will necessarily foreclose a number of religious traditions.

There is a long tradition in religious studies of responding to this definitional impasse by proposing a new definition of religion that somehow cuts through these issues and arrives at the true essence of religion. Others have taken a different approach, focusing instead on the history of the very category of religion. This group of scholars ushered in what has been called the "discursive turn" in the study of religion, a shift based on the understanding that the word "religion" has no essential referent. It is, rather, an intellectual category that has shifted over the course of Western intellectual history in relation to various events, discoveries, social institutions, power dynamics, and intellectual projects.

"Religion" is a relatively recent term. It emerged in the sixteenth century as an anthropological tool for describing the various peoples encountered during European explorations of the New World. During this period "religion" was primarily used to denote the rituals and creeds of others. As Jonathan Z. Smith argues in his seminal 1998 essay, "Religion, Religions, Religious," this new category enabled missionaries and explorers to compile

inventories of cultural topics that could be compared and ordered.[16] Meanwhile, amidst the European wars of the sixteenth and seventeenth centuries following the Protestant Reformation, intellectuals at home were seeking out solutions to what they saw as the categorical problem of religious disputes: that contradicting claims about absolute truth do not have any transcendent criteria for solution.[17] Once the category of religion migrated back to European metropoles, it was taken up by seventeenth-century peacemakers who wished to confine religion to an element of culture like any other. The recent fissures in European Christianity and the discovery of non-European peoples had created a crisis of intellectual authority. This was solved, as Peter Harrison documents in *"Religion" and The Religions in the English Enlightenment*, by recasting religion to fit emerging rationalist methods of investigation. "Religion" was transformed to be about beliefs, and the truthfulness of conflicting beliefs could now be judged by the recent and much-vaunted scientific method.[18]

Due to these and other social and economic factors, by the late seventeenth century European intellectuals generally shared the concept of "natural religion," defined as a universal and innate set of beliefs and practices across the globe. Peoples around the world were thought to have religion, though only some beliefs could be right. During this period the anthropological project of describing natural religion highlighted similarities, sought out universal truths, and explained away differences as either historical idiosyncrasies or the results of degeneration.[19] As

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[16] Jonathan Z. Smith, "Religion, Religions, Religious," in *Critical Terms for Religious Studies,* ed. Mark Taylor, (Chicago: University of Chicago Press, 1998), 269-271.

[17] J. Samuel Preus, *Explaining Religion: Criticism and Theory from Bodin to Freud* (Oxford: Oxford University Press, 1996), xiv.

[18] Peter Harrison, *"Religion" and the Religions in the English Enlightenment* (Cambridge: Cambridge University Press, 2002), 2.

[19] Smith, "Religion, Religions, Religious," 273.

Charles Taylor argues, "natural religion" emerged in concert with new conceptions of social life that would gradually come to be associated with "secularism." The "secular" was a category originally developed within Latin Christendom to describe profane time, in contrast with the eternal. Over the course of the seventeenth century, the lower "secular" order of this Christian profane/transcendent dyad came to be understood as a realm that needed good social and political order based on rational principles. Some religion was thought to be helpful for this project, so long as it was purged of superstition and fanaticism.[20]

During the eighteenth century, the search for natural religion shifted to naturalistic investigation, which utilized similar methods but transposed religion from the supernatural into the realm of natural history.[21] This shift can be seen in two books published a century apart. An important formulator of "natural religion" was Lord Herbert of Cherbury. In his 1624 book *On Truth, as it is Distinguished from Revelation, the Probable, the Possible, and the False*, Herbert argued that certain "common notions" of religion could be validated as universal and therefore authentic: namely, that God is eternal, good, just, wise, and blessed.[22] Just over a century later in 1757, David Hume argued in his *Natural History of Religion* that religion is the product of human psychology. In our uncivilized, "barbarous" natural state humans faced brutal conditions and were subject to the chaos of storms, disasters, disease, and attacks. Humans, Hume argued,

[20] Charles Taylor, "The Polysemy of the Secular," *Social Research* 76, no. 4 (Winter 2009): 1143-1150.

[21] Smith, "Religion, Religions, Religious," 273.

[22] Edward, Lord Herbert of Cherbury, *De Veritate*, trans. Meyrick H. Carre (Bristol: J. W. Arrowsmith Ltd, 1937), 289-307.

anthropomorphize that which we do not understand; we managed our fear of the unknown by attributing random events to divine agency.[23]

Over the course of the eighteenth and nineteenth centuries, the Western category of "religion" continued to develop in concert with other modern concepts like "science," "magic," and "modernity" itself. In his 2004 book *Making Magic*: *Religion, Magic, and Science in the Modern World*, Randall Styers documents the co-ideation of "religion," "science," and "magic," highlighting three profound epistemic changes that shaped these modern intellectual categories:

> First, through the course of the Reformation and the Enlightenment, religion came increasingly to be seen as properly a matter of the private intellect, a view deeply informed by generations of religious reform—and particularly by Protestant polemics against Catholic ritual and devotional practices. Coupled with this development was the astounding proliferation of capitalism and modern science, social practices sharing related forms of mechanistic and rationalized manipulation of the material world. Finally, the late nineteenth century saw the consolidation of European control over much of Asia and Africa, and colonial conquest and exploitation gave rise to new forms of scholarly analysis of "primitive" culture.[24]

Thus numerous aspects that seem definitional to religion—like, for example, sacredly held beliefs about things beyond this world—either came into being or became uniquely associated with religion at specific historical intersections of political, social, and economic power. Even our commonsense understanding of contemporary "world religions"—a list that usually includes Judaism, Christianity, Islam, Buddhism, Hinduism, and Confucianism—is rooted in the particulars of history. As Tomoko Masuzawa documents in *The Invention of World Religions*, this conceptual framework was initially developed in the nineteenth-century European academy

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[23] David Hume, *Dialogues* and *Natural History of Religion*, ed. J. C. A. Gaskin (Oxford: Oxford University Press, 1993), 136-142.

[24] Randall Styers, *Making Magic: Religion, Magic, and Science in the Modern World* (Oxford: Oxford University Press, 2004), 26.

and quickly became a means of differentiating, totalizing, and depoliticizing non-European cultures.[25]

It is clear that "religion" is not a word that points to a stable thing in the world, like a tiger or a kitchen sink. One of the most important outcomes of the discursive turn in religious studies is the understanding that there is no essence to religion—no universal feature or fundamental element that anchors this word to the world. "Religion," rather, is a shifting category that has been deployed to describe cultural phenomena, social groups, mental states, and material practices in various configurations according to the particular aims and interests of those doing the defining. Like "novella" and "retail," "religion" can be a useful term for dividing up the world, but it lacks cross-cultural and trans-historical specificity because of its idiosyncratic modern European origins. Thus, as Talal Asad famously demonstrated in his critique of Clifford Geertz's proposed universal definition of religion, it would be a category mistake to attempt any definition of all religions across cultures and historical periods.[26] This would be like entering a heated debate about whether an ancient papyrus scroll was a novel or a novella: anachronistic, and not particularly useful.

Another significant consequence of the discursive turn is the recognition that our contemporary understanding of religion is itself a product of history. Drawing on the contemporary philosophy of science, Peter Harrison points out that objects of study are shaped to a large degree by the techniques and assumptions that are used to investigate them. "Religion," he argues, was cut to fit the scientific method. It was constructed along rationalist lines, for

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[25] Tomoko Masuzawa, *The Invention of World Religions: Or, How European Universalism Was Preserved in the Language of Pluralism* (Chicago: University of Chicago Press, 2005), 1-21.

[26] Talal Asad, *Genealogies of Religion: Discipline and Reasons of Power in Christianity and Islam* (Baltimore: The Johns Hopkins University Press, 1993), 29.

example, with a focus on beliefs that could be compared and evaluated based on their correspondence to truth.[27] Barbara Herrnstein Smith, too, underlines how the category of religion is often constructed selectively for particular purposes. "It is not clear that the term 'religion' names a coherent set of phenomena at all," she argues, or whether it is not "a shifting artifact of the various disciplines and discourses that take it as their nominal subject."[28]

As David Chidester observes, recent histories of the study of religion—including works by Harrison, Preus, and other historians of religion that I have cited—have been preoccupied with the internal intellectual development of the category within European academic disciplines.[29] Yet, as Chidester and other scholars have observed, the discipline of comparative religion emerged not just out of the armchair observations of Enlightenment thinkers, but also out of a violent history of colonial conquest and domination. The study of religion, Chidester argues, was entangled with "power relations of frontier conflict, military conquest and resistance, and imperial expansion."[30]

A number of alternative histories of religion have demonstrated the ways that European theories of religion were embedded in the conquest and control of colonized populations, as well as the reification and othering of so-called "world religions."[31] *Curators of the Buddha*, for

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[27] Harrison, *"Religion" and the Religions in the English Enlightenment*, 1-3.

[28] Barbara Herrnstein Smith, *Natural Reflections: Human Cognition at the Nexus of Science and Religion* (New Haven: Yale University Press, 2009), 27.

[29] David Chidester, *Savage Systems: Colonialism and Comparative Religion in Southern Africa* (Charlottesville, VA: University Press of Virginia, 2006), xiii.

[30] Ibid.

[31] On the reification and othering of those deemed non-European, see, for example, *Masuzawa, The Invention of World Religions*, 37-71; Edward W. Said, *Orientalism* (New York: Vintage Books, 1979); Edward W. Said, *Culture and Imperialism* (New York: Vintage Books, 1939), 3-19; Guy G. Stroumsa, *A New Science: The Discovery of Religion in the Age of Reason*

example, a collection of essays edited by Donald S. Lopez Jr., demonstrates how a variety of Buddhisms were not passively discovered by European explorers and sinologists, but actively invented under distinct colonial conditions ranging from European metropoles to Tibet.[32] A number of scholars have similarly described Hinduism as a religious tradition invented within the British colonial context.[33] David Chidester warns, however, against giving too much weight to European imperial ambitions. Religious categories were not purely invented by colonial agents, he reminds us, but rather "emerged through complex interrelations, negotiations, and mediations between alien and indigenous intellectuals."[34] The academic study of religion involved exchanges and relationships, in other words, between European scholars, colonial agents, and so-called indigenous peoples, as well as a variety of other actors and institutions, each with its own sets of interests and powers.[35]

(Cambridge: Harvard University Press, 2010), 145-157; and Julie Kalman, *Orientalizing the Jew: Religion, Culture, and Imperialism in Nineteenth-Century France* (Bloomington, IL: Indiana University Press, 2017).

[32] Donald S. Lopez Jr., ed., *Curators of the Buddha* (Chicago: University of Chicago Press, 1995).

[33] See, for example, Robert E. Frykenberg, "Constructions of Hinduism at the Nexus of History and Religion," *Journal of Interdisciplinary History* 23, no. 3 (1993): 523-550; Robert A. Yelle, *The Language of Disenchantment: Protestant Literalism and Colonial Discourse in British India* (Oxford: Oxford University Press, 2013); Gauri Viswanathan, "Colonialism and the Construction of Hinduism," in *The Blackwell Companion to Hinduism*, ed. Gavin Flood (Malden, MA: Blackwell, 2003); and Esther Block, Marianne Keppens, and Rajaram Hedge, eds., *Rethinking Religion in India: The Colonial Construction of Hinduism* (London: Routledge, 2010).

[34] David Chidester, *Empire of Religion: Imperialism and Comparative Religion* (Chicago: University of Chicago Press, 2014), 18.

[35] See, for example, R. Todd Romero's insightful study of the exchanges—of concepts, gifts, gender norms, and insults, among other things—between Native and Anglo-Americans in colonial New England: R. Todd Romero, *Making War and Minting Christians: Masculinity, Religion, and Colonialism in Early New England* (Boston: University of Massachusetts Press, 2011).

Thus, as a category, "religion" has been tooled for a number of tasks in a variety of circumstances. For sixteenth-century missionaries "religion" was an anthropological repository for cataloging encounters with the New World; for early Enlightenment intellectuals it was a means to oust absolute truth claims from the social order; for self-declared modernists it served as a foil for distinguishing between old and new ways of thinking and acting; in the hands of colonial agents it was a tool for managing social bodies; for indigenous groups it has been a means of gaining political recognition; and in contemporary universities besieged by budget cuts it has helped to justify an academic field as a seemingly unique object of study.[36] This history helps to explain religion's distinct double-valence in our language as a something that is simultaneously particular and ubiquitous. On the one hand, religion seems to involve almost every dimension of human life and experience: beliefs, rituals, identity formations, material practices, clothing, commodities, ethical propositions, origins stories, textual practices, types of space, and all sorts of things dead, alive, and in-between. Simultaneously, and in keeping with the rationalist comparative method that helped shape it, religion appears to be shot through with core properties that can unite this sprawl of features that vary so widely across time and space.

As Wilfred Cantwell Smith argues in his pioneering 1978 book *The Meaning and End of Religion*, the evolution of the concept of religion was a process of reification, of "mentally making religion into a thing, [and] gradually coming to conceive it as an objective systematic entity."[37] The shape of this objective-seeming entity—of religion as we know it today—was

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[36] Some scholars have called for abandoning the term religion all together, though this debate goes beyond the scope of this dissertation. See, for example, Timothy Fitzgerald, *The Ideology of Religious Studies* (Oxford: Oxford University Press, 2000).

[37] Wilfred Cantwell Smith, *The Meaning and End of Religion* (London: SPCK, 1963), 51.

drawn gradually by successive generations of self-interested parties. Like a political district shaped by the gerrymandering of a previous generation, "religion" is an artificial configuration that silently perpetuates itself by seeming real.

Religion may be a product of reification but, as Daniel Dubuisson argues in his 2007 book, *The Western Construction of Religion: Myths, Knowledge, and Ideology*, it has also in a sense become real. Once this complex intellectual construction was formed, Dubuisson argues, it became a network of ideas, relationships, and practices that played a foundational role in the constitution of Western culture.[38] To point out that a particular ideology about religion—say, that religion is fundamentally about privately held beliefs—is socially constructed is not to say that it is not real. Ideology can produce practices, social structures, and sincerely held beliefs. Given these circumstances, Dubuisson argues, the study of religion requires nuance. Religion as it is practiced and understood today must be acknowledged as real, but we cannot consider it as we would other intellectual or artistic creations of the west—such as existentialism or cubist painting—because it has already been inculcated in a universalist anthropological paradigm to produce norms, models, and reference points by which all other cultures can be measured and evaluated.[39]

For the purposes of this dissertation I will endorse Dubuisson's description of religion as a reified intellectual category that configures bodies, institutions, discourses, and subjects. What religion lacks in essence it makes up for in effects; it is as socially constructed as a brick wall (very much so) and as real as those who dream it. Based on the insights of the discursive turn in religious studies, one of this project's operating assumptions is that essentializing religion

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[38] Daniel Dubuisson, *The Western Construction of Religion: Myths, Knowledge, and Ideology*, trans. William Sayers (Baltimore: The Johns Hopkins University Press, 2007), 190-194.

[39] Ibid.

involves rhetorical work. Since there is no fundamental attribute, core elements, or ultimate truth about religion, those who attempt to assign religion an essence will inevitably face an array of exceptions and anomalies that need to be organized and contained. To essentialize religion is to select, curate, exclude, police, and hunt. Moreover, in our particular intellectual moment, those who essentialize religion do so against the grain of prevailing scholarship. Over the course of researching biocognitive texts I have attended to this kind of rhetorical work, since this offers insights into the ideological construction of religion.

Religion, Science, and the Conflict Thesis

There is a widespread notion in contemporary Western society that there is a single, universal scientific method and that, when it is deployed properly, this method will produce pure truths that perfectly reflect the state of nature. This conception of science is significantly flawed for three reasons. First, it ignores the diversity of scientific practice as it occurs "on the ground." As contemporary historians and anthropologists of science have documented, the disciplines that we label scientific involve such a wide range of theories, methods, vocabularies, communities, technologies, and virtues that they cannot be coherently unified into any single epistemology or metaphysics. The sciences, in other words, are too heterogeneous for there to be a single scientific method. Second, this understanding of science overlooks the fact that scientific knowledge—no matter how accurate or persuasive—is always mediated by human language and culture. Scientists and their discoveries are situated in time, space, culture, and society—there is no way to create purified scientific facts that somehow transcend their human origins. Finally, it has become increasingly clear that there can be no singular, unified human discourse that perfectly represents every aspect of the world. Humans, it seems, need multiple overlapping

forms of knowledge to map the various phenomena that surround us.[40] Despite these flaws, contemporary debates about religion and the brain revolve around the understanding that science, done properly, is a method for revealing the absolute truths of nature. This is in part due to modern assumptions about the nature/culture divide, which I will discuss in detail in chapter one, and in part due to the legacy of a nineteenth-century ideology known as the "conflict thesis."

Randall Styers describes in *Making Magic* how, during the latter decades of the nineteenth century, a range of Western thinkers struggled to explain and define the modern cultural formations around them.[41] One key binary that emerged during this period was that of religion and science, which appeared to Western thinkers as antagonistic foils of one another. Frank M. Turner notes that between 1750 and 1870—from the publication of the French *Encyclopédie* to the works of Nietzsche and Darwin—the perceived relationship of science and religion in the West passed from "fruitful co-operation and modest tensions to harsh public conflict, a situation that many observers have since come incorrectly to assume to be a permanent fact of modern cultural life."[42] According to Turner, this "conflict thesis," or the view that religion and science are fundamentally opposed institutions competing for power and adherents, emerged within particular cultural conditions in Victorian Britain. These conditions

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[40] See, for example, Steven Shapin, *Never Pure: Historical Studies of Science as If It Was Produced by People with Bodies, Situated in Time, Space, Culture, and Society, and Struggling for Credibility and Authority* (Baltimore: Johns Hopkins University Press, 2010); Peter Galison and David J. Stump, eds., *The Disunity of Science: Boundaries, Contexts, and Power* (Stanford: Stanford University Press, 1996); and Paul Feyerabend, *Conquest of Abundance: A Tale of Abstraction Versus The Richness of Being*, ed. Bert Terpstra (Chicago: University of Chicago Press, 1999).

[41] Styers, *Making Magic*, 25.

[42] Frank M. Turner, "The late Victorian conflict of science and religion as an event in nineteenth-century intellectual and cultural history," in *Science and Religion: New Historical Perspectives*, eds. Thomas Dixon, Geoffrey Cantor, and Stephen Pumfrey (Cambridge, UK: Cambridge University Press, 2010), 87.

included the widespread generational rejection of British theologies, in which natural theologians combined intricate theological explanations of nature with arguments supporting the contemporary British social and political status quo; the recent expansion of public education, which created a new turf for conquest; and an intellectual atmosphere of social and political confidence made possible by an increasingly powerful publishing industry.[43]

The conflict thesis quickly took off and became widely popular in late nineteenth-century Western thought. It was popularized by two books—John William Draper's 1874 *History of the Conflict between Religion and Science* and Andrew Dickson White's 1896 *A History of the Warfare of Science with Theology in Christendom*—that both criticized organized religion and celebrated science, framing the conflict between them as one that would have an inevitable victor.[44] Colin A. Russell outlines four chief issues that were considered to be in contention. First, religion and science were thought to be epistemologically at odds. It became increasingly clear during the late nineteenth century that scientific knowledge could no longer be seamlessly integrated into religion. Just as Copernicus had displaced the earth from the center of the solar system, so too were a number of eighteenth- and nineteenth-century sciences producing accounts of nature that proved scripture to be inaccurate. Thus religion and science were considered to be in a fundamental conflict over issues like the age of the earth and the origins of humanity.[45]

Second, religion and science were thought to promote fundamentally different methodologies for studying the world. Science is based on "facts," the longstanding theory goes,

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[43] Ibid., 87-110.

[44] Colin A. Russell, "The Conflict of Science and Religion," in *Science and Religion: A Historical Introduction*, ed. Gary B. Ferngren (Baltimore: John Hopkins University Press, 2002), 3-4.

[45] Ibid., 4-6.

where religion is concerned with matters of "faith." Naturalism, Russell points out, goes back to the Middle Ages, but it was revived in nineteenth-century Britain as a means to deny the right of the church to interfere with the progress of science by introducing theological considerations into scientific debates.[46] This division would also serve religionists well, as it carved out a special private realm where science could stake no claim. Thus the notion that religion concerns private matters of faith, where science involves public discourse about facts, amounted to something of an epistemological detente. As I will demonstrate in chapter four, biocognitive accounts of religion have provoked strenuous critiques from theological quarters in part because they trespass this peacetime border. The third potential zone of conflict between religion and science is that of ethics. Many Victorians opposed Darwin for fear that his theories would lead to the law of the jungle, and still today many critics consider science to be fundamentally devoid of moral or ethical value. Finally, religion and science are thought to compete for social power, jostling for adherents to their mutually exclusive worldviews.[47]

The conflict thesis is widely perceived by contemporary historians to be an inadequate historical tool, "so blunt," in Colin Russell's words, "that it is more damaging than serviceable."[48] The conflict thesis overlooks and obscures the diversity within, and overlap between, science and religion. It ignores, for example, that religious elements were integral to the early modern study of nature in England, where natural history was frequently pursued from religious motives, based on religious presuppositions, and internally ordered according to

[46] Ibid.

[47] Ibid.

[48] Ibid., 8.

theological principles of design.[49] The conflict thesis also depends on monolithic conceptions of religion and science. This overlooks the fact that, like any other social institutions, both religion and science incorporate practices involving imported knowledge. Religious traditions often involve annual cycles of rituals coordinated with the solar year, and must therefore have recourse to astronomical knowledge; scientific communities have a long history of modeling aspects of religious practice, such as the use of "witnessing" to establish the public character of early experimental science.[50] In short, the conflict thesis depends on overly simplistic models of two heterogeneous and entangled entities.

Nonetheless, the conflict thesis lingers today. As I will discuss in chapter four, the notion that science and religion are monolithic opposing forces can support seemingly disparate teleological narratives. Religion's debunkers and defenders alike portray the brain as an epistemological battle zone between the two entities. For naturalistic debunkers, the conflict thesis renders religion singular, something that can be naturalized in one final blow. For religion's defenders, the conflict thesis helps to depict science as a singular, aggressive enemy that can be prevented from capturing religion's true essence. Others consider religion and science to have reached a detente, endorsing Stephen Jay Gould's notion of "non-overlapping magisteria," which holds that religion and science simply occupy different turfs: science concerns the empirical constitution of the universe, where religion concerns ethical values and the spiritual meanings of life.[51] Yet, as John Hedley Brooke points out in his groundbreaking

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[49] Peter Harrison, "'Science' and 'Religion': Constructing the Boundaries," *The Journal of Religion*, 86 (2006): 84-85.

[50] Richard G. Olson, *Science and Religion, 1450-1900* (Baltimore: Johns Hopkins University Press, 2004), 4-5.

[51] Stephen Jay Gould, "Nonoverlapping Magisteria," *Natural History* 106 (March 1997): 16-22.

Religion and Science: Some Historical Perspectives, this still reifies religion and science, protecting religion from naturalistic explanation by limiting it to private beliefs and values.[52]

In the writing of this dissertation I have assumed that there is no fundamental relationship between religion and science because each entity is too complex to lend itself to any simplistic historical meta-narrative. Nonetheless, the conflict thesis resembles the category of religion in the sense that it has tangible effects. One of the central arguments of this dissertation is that contemporary biocognitive explanations and defenses of religion are still configured by the conflict thesis, committed as they are to the notion that religion and science are monolithic and oppositional entities.

Epistemological Pluralism and the Richness of Being

In his unfinished manuscript, *Conquest of Abundance: A Tale of Abstraction Versus the Richness of Being*, the late philosopher Paul Feyerabend argues that Western scientists and philosophers are on a "search for reality" based on a metaphysics of concealment.[53] They believe that the important ingredients of the world are hidden, Feyerabend argues, and that these ingredients form a more genuine and uniform reality that underlies the chaotic world of everyday experience. In Nietzsche's terms, Western metaphysics reflects the Apollonian dream of a higher, more perfect order of truth. Feyerabend criticizes what he calls "unitarian realism," or the metaphysical proposition that there is an absolute reality that conforms to a single, coherent order:

> So far a unitarian realism claiming to possess positive knowledge about Ultimate Reality has succeeded only by excluding large areas of phenomena or by declaring, without

[52] John Hedley Brooke, *Religion and Science: Some Historical Perspectives* (Cambridge: Cambridge University Press, 1991), 42-51.

[53] Feyerabend, *Conquest of Abundance*, 11.

> proof, that they could be reduced to basic theory…. An ontological (epistemological) pluralism seems closer to the facts and to human nature.[54]

The notion of an absolute, coherent, and more genuine reality, in other words, does not match with our existing knowledge of the universe. It rather seems to be a dubious metaphysical proposition assumed by self-declared discoverers of ultimate truths.

This dissertation investigates how concepts from the contemporary brain sciences have been mobilized in the search for the ultimate reality of religion. Like Feyerabend's unitarian realists, today's biocognitive theorists of religion claim to possess positive knowledge about the fundamental truth of religion, but they succeed only by first essentializing religion—excluding "large areas of phenomena" in the process—and then declaring that their cut-to-fit version of religion can be reduced entirely to the workings of the brain. One of the main tasks of this dissertation is to show how contemporary conversations about religion and the brain are structured around a shared epistemological framework. This framework, which I trace back to the beginnings of the intellectual era of modernity, is based on numerous faulty assumptions: that religion and science each have an "essence," or a concealed set of intrinsic properties that span their iterations across time and space; that nature and culture are distinct ontological zones; that the scientific study of nature can yield absolute truths that reflect genuine reality as it exists beyond the surface; and that reductionist explanations, which identify underlying causal mechanisms that give rise to a phenomenon, are more valuable than any other form of interpretation or description.

Contemporary cognitivists are by no means the first to seek out the ultimate truth of religion by attempting to look beyond mere appearances. In part due to its inherent categorical ambiguity, religion has long been approached as a messy phenomenon in need of clearing up.

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[54] Ibid., 215.

Various phenomena have been deemed essential to religion over the past three centuries: religious belief, understood as a pre-discursive and qualitatively unique mental state, was emphasized by nineteenth-century theologians and scholars including William James;[55] religious experience, variously known as "pure consciousness," "mystical experience," or "experience of the holy," was considered a transcendent, pan-cultural phenomenon by perennial philosophers of the nineteenth- and twentieth-centuries;[56] and psychological neurosis was famously posited by Freud as the true underlying cause of religion's patterned rites and ceremonies.[57] These are but a few examples of the impulse in Western thought to identify one element of religion that spans and animates all of the world's religious traditions.

Such accounts posit a truth to religion that transcends the specificities of language, culture, and history, and they often do so by positing a pre-discursive, inner cognitive state where religion might reside. For Donald Lopez, our lingering "belief in belief" leads religion to be "represented as something that derives from belief, as something with external manifestations that can ultimately be traced back to an inner assent to a cognitive proposition, as a state of mind that produces practice."[58] This is problematic, he argues, because it isolates just one element of religion that is specific to modern Protestant Christianity and privileges it as genuine and fundamental. Robert Sharf similarly argues that the rhetoric of religious experience "tacitly posits a place where signification comes to an end… a substantive if indeterminate terminus for

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[55] Donald S. Lopez Jr., "Belief" in *Critical Terms for Religious Studies,* ed. Mark Taylor, (Chicago: University of Chicago Press, 1998), 21-35.

[56] Robert H. Sharf, "Experience" in *Critical Terms for Religious Studies,* ed. Mark Taylor, (Chicago: University of Chicago Press, 1998), 94-116.

[57] Daniel L. Pals, *Seven Theories of Religion* (Oxford: Oxford University Press, 1996), 65-70.

[58] Lopez, "Belief," 34.

the relentless deferral of meaning."[59] This ignores evidence that human experiences—including those deemed "religious" or "mystical"—are shaped by a person's cultural environment, intellectual training, personal history, language, worldview, and other particular local factors.

Against this impulse to essentialize religion, I approach religion and the brain with a constructivist, non-reductive intellectual framework that calls for epistemological pluralism in light of the multiplicity of being. Since this framework informs my analysis of—and proposed alternatives to—biocognitive theories of religion, I will briefly define some key terms. In describing my approach as constructivist, I follow Barbara Herrnstein Smith, who defines constructivism as a

> particular way of understanding the relation between what we call knowledge and what we experience as reality. In contrast to the understanding of that relation generally referred to as 'realism', constructivist accounts of cognition, truth, science and related matters conceive the specific features of what we experience, think of and talk about as 'the world' (objects, entity-boundaries, properties, categories and so forth) not as prior to and independent of our sensory, perceptual, motor, manipulative and conceptual-discursive activities but, rather, as emerging from or, as it is said, 'constructed by' those activities… In contrast to referentialist views of language, constructivist accounts of *truth* conceive it not as a matter of a match between, on the one hand, statements or beliefs and, on the other, the autonomously determinate features of an altogether external world (Nature or Reality), but, rather, as a situation of relatively stable and effective mutual coordination among statements, beliefs, experiences and practical activities.[60]

Constructivism, Herrnstein Smith continues, recognizes the mutual determination of concepts, perceptual-cognitive dispositions, and material practices. Knowledge, according to this view, does not amount to the simple discovery of pre-existing truths. Facts are not stumbled upon, like

[59] Sharf, "Experience," 113.

[60] Barbara Herrnstein Smith, *Scandalous Knowledge: Science, Truth, and the Human* (Durham, NC: Duke University Press, 2005), 3-4 (emphasis original).

chairs in dark kitchens, but are rather made by social collectives with shared ideas, assumptions, definitions, interpretive training, systems of measurement, and epistemic values.[61]

In the writing of this dissertation I have approached biocognitive research under the assumption that knowledge is made, since this facilitates the investigation of facts as the products of human imagination, cooperation, observation, and labor. To be clear, however, describing a particular fact as constructed is not—from the constructivist's perspective—a damning accusation. For the constructivist, all knowledge is made. The intellectual value of a statement or theory, therefore, cannot be determined based on its correspondence to some separate, fundamental reality. One must turn to other modes of evaluation, such as, for example, analysis of a theory's internal coherence or its correspondence to existing data.

I have also approached this project with a non-reductive perspective towards religion. In following with Manuel Vásquez, I consider my epistemological framework non-reductive insofar as it highlights "complexity, inter-level connectivity, emergence, situated knowledge, and relative indeterminacy and openness against monocausal, unidirectional, and totalizing explanatory schemes."[62] Reductionism privileges "downward explanation," or the description of phenomena as the emergent products of smaller, simpler relationships. Prominent advocates of reductionism conceive of the universe as an ontological ladder that becomes more complex as one moves upwards, from particles to molecules, cells, organisms, social groups, and so on. The most robust explanations, these advocates claim, are those that reduce a phenomenon from one level to the

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[61] Ibid., 8. See also Steven C. Ward, *Reconfiguring Truth: Postmodernism, Science Studies, and the Search for a New Model of Knowledge* (New York: Rowman and Littlefield Publishers, Inc., 1996); and Jan Golinksi, *Making Natural Knowledge: Constructivism and the History of Science* (Chicago: University of Chicago Press, 2005).

[62] Manuel Vásquez, *More Than Belief: A Materialist Theory of Religion* (Oxford: Oxford University Press, 2011), 5.

simpler processes of the level beneath it. For example, the blooming of a flower might be reduced to the biological operations of cells, and the operation of cells might be further reduced to the language of chemistry or physics.

While reductionism is a useful approach for describing many simple physical systems, it also forfeits attention to a variety of other causal dynamics. Large and complex phenomena can exert downward force, for example, as when social institutions organize and shape individual bodies. Furthermore, current understandings of the universe indicate that causality cannot be simplified to the deterministic interaction of isolated forces. As theoretical physicist and philosopher Karen Barad argues, it would be a mistake to assume that the primary ontological unit of being is an independent object with inherent properties, since any such unit is already influenced and determined by other forces. Rather, Barad argues, our universe is composed of entangled phenomena—of ontologically inseparable, inter- and intra-acting agencies.[63] I therefore approach religion with the understanding that the concepts, beliefs, practices, and communities that we associate with the term are dynamically co-determined, forming complex causal networks that defy the simplistic model of a uni-directional ontological ladder. To be clear: reductionism is a valuable explanatory approach that is useful for explaining particular elements of religious phenomena. I have written this dissertation not as an anti-reductionist, but rather as a pluralist who views reductionism as one approach among many.

This project describes the ongoing production of unitarian metaphysics against—and within—the plurality of being. I am indebted to Mary-Jane Rubenstein, whose *Worlds Without End: The Many Lives of the Multiverse* has served as a model for investigating what Rubenstein

[63] Karen Barad, *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning* (Durham, NC: Duke University Press, 2007), 136-139.

calls "multiplicity," or the creative interplay of order and chaos, of unity and difference, and of singularity and plurality.[64] I approach scientific truth claims as sites of such interplay.

As Victoria Pitts-Taylor notes, philosophies of science have until recently fallen into two camps: "naturalized philosophy," which treats empirical research as more or less neutral information; and social constructionism, which treat scientific concepts and objects as themselves the products of discourse.[65] While social constructionists do not deny the existence of material realities, they nonetheless adopt what Barbara Herrnstein Smith calls a "professional ontological agnosticism," bracketing—to the best of their ability—any assumptions about reality as it "really is."[66] Constructivists like Herrnstein Smith may often point to the complex plurality that a particular theory or hypothesis might overlook, but done carefully this form of critique does not make any ontological commitments; it makes no claims "beyond" our constructions of truth but rather indicates the failure of the critiqued hypothesis to adequately account for a certain set of additional truths.

Yet it has become increasingly clear, Pitts-Taylor notes, that one need not choose between uncritical scientific realism and ontological agnosticism.[67] As Diana Coole and Samantha Frost argue, one can "accept social constructionist arguments while also insisting that the material realm is irreducible to culture or discourse and that cultural artifacts are not arbitrary vis-a-vis

[64] Mary-Jane Rubenstein, *Worlds without End: The Many Lives of the Multiverse* (New York: Columbia University Press, 2014), 18-19.

[65] Victoria Pitts-Taylor, *The Brain's Body: Neuroscience and Corporeal Politics* (Durham, NC: Duke University Press, 2016), 19.

[66] Herrnstein Smith, *Scandalous Knowledge*, 6.

[67] Pitts-Taylor, *The Brain's Body*, 20.

nature."[68] Outlining of his epistemology of pragmatism, William James argues that truth is not an inherent property of an idea, but rather a process. "Truth *happens* to an idea," writes James, it "*becomes* true, is *made* true by events."[69] I agree with James, but would add, following Barad, that this process entangles discourse and materiality at once. In this dissertation I approach religion and the brain in similar terms: as dynamic phenomena consisting of both culture and flesh.

Thesis and Outline

Drawing on original research and building upon existing scholarship from science studies, religious studies, and critical theory, this dissertation argues that contemporary biocognitive accounts of religion are configured by a nineteenth-century epistemological framework that divides nature and culture into two distinct ontological zones. The rhetorical power of brain-based reductionism, the search for religion's cognitive essence, and the fear that the brain sciences will explain religion away, I argue, are all intellectual artifacts of modernity.

This dissertation contributes to contemporary scholarship in two important ways. First, it demonstrates how preexisting ideologies about religion and science have reproduced themselves in contemporary scholarship by shaping researchers' investigative methods, explanatory objects, and perceptions of new data. Second, and relatedly, it nuances contemporary conversations about interdisciplinary collaboration between the sciences and the humanities by interpreting religion as a shifting site of dynamic interplay between biology and culture.

Chapter one explores how the brain has been conceptualized within a series of twenty-

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[68] Diana Coole and Samantha Frost, "Introducing the New Materialisms," in *New Materialisms: Ontology, Agency and Politics*, ed. Samantha Frost and Diana Coole (Durham, NC: Duke University Press, 2010), 27.

[69] William James, "Pragmatism's Conception of Truth," in *Pragmatism and Other Writings*, ed. Giles Gunn (New York: Penguin Books, 2000), 88 (emphasis original).

first century efforts to naturalize elements of human subjectivity, including beauty, sexuality, and religious belief. Building on concepts from Friedrich Nietzsche, Michel Foucault, and Bruno Latour, I argue that these efforts are rooted in a modern conception of the human subject that situates the brain as a bridge between the otherwise divided realms of nature and culture. I then analyze one particular brain-based fact—the claim that analytic thinking promotes religious disbelief—and trace its construction back to the laboratory, demonstrating how this modern conception of the brain enabled a team of psychologists to smuggle ideologies about religion into the seemingly objective realm of neuroanatomy.

The second chapter analyzes the cognitive science of religion (CSR), the recent and most prominent biocognitive research program in the field of religious studies. I demonstrate how CSR's paradigmatic model of an ancient, modular human brain enables CSR scholars to construct a "cognitive fundament"—a natural substrate where the absolute truth of religion resides. I also investigate CSR advocates' calls for the "vertical integration" of religious studies into a single regime of universal knowledge, framing this quest for "consilience" as Apollonian nostalgia for the transcendent truths of a bygone era.

In chapter three I analyze one CSR text in particular, Robert McCauley's *Why Religion Is Nature and Science Is Not*, which claims that religion is cognitively natural and that science is cognitively difficult and therefore rare. I demonstrate how this argument depends on a number of artificial and tendentious distinctions between religion, theology, science, and technology. McCauley's artificial definitions, I argue, help him to reiterate nineteenth-century stereotypes about religion and science in the new vocabulary of cognitive science. Through a close reading of key exchanges between McCauley and his critics, I make two important points: first, that it is categorically impossible to essentialize religion; and, second, that it is crucial that contemporary

scholars attend to the intellectual histories informing their objects of analysis.

In chapter four I turn from biocognitive explanations of religion to theological defenses against biocognitive reductionism. I compare and contrast two distinct intellectual strategies for defending religion. The first major theological responses to CSR defended religion's status as an irreducible, *sui generis* phenomenon and accused biocognitivists of epistemological overreach. More recently, a second group of authors have argued that the scientific concept of neuroplasticity legitimizes religion by proving that it is physically—and therefore ontologically—real. Analyzing four representative texts, I frame these two rhetorical strategies as symmetrical responses to the perception that biocognitive explanation threatens religion's transcendence: one that defends religion's place in the heavens; and another that grafts transcendence down onto the earth.

The conclusion of this dissertation echoes chapter one by once again considering the brain as conceptual and rhetorical object. Surveying the work of the previous chapters, I analyze how the brain has been formulated as a rhetorical object within recent biocognitive discourses of religion. I discuss how the brain has been represented as an intellectual bedrock for those who wish to essentialize religion, or locate a universal element of religion that transcends human culture. Finally, I conclude by calling for a more nuanced approach to religious cognition that recognizes the dynamic interplay between nature and culture.

CHAPTER 1: NATURE, CULTURE, AND THE HUMAN SUBJECT

At the time of this writing, a Google news search of the two keywords "religion" and "brain" yields over a half-million results. Every day, it seems, there are new discoveries about the biocognitive underpinnings of religion. Over just the last three days, the news media tells me, scientists have discovered three new facts about religion: that spiritual retreats reset the brain's reward systems by changing dopamine and serotonin levels;[1] that atheists and highly religious people are together the least likely to fear death;[2] and that, as far as your brain is concerned, religion is a lot like an opiate.[3]

Religion is just one of the topics addressed by the recent boom of popular neuroscience. Discoveries about the brain are now regularly invoked to sell new secrets of sex, health, and economic success. Popular neuroscience continually promises breakthrough insights into human identity and experience, frequently explaining people in terms of "brain types." Psychopaths, we

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[1] Ian Johnston, "Religious retreats can change the chemicals in your brain, discover scientists," *Independent*, March 23, 2017, accessed March 27, 2017, http://www.independent.co.uk/news/science/religious-retreats-chemicals-change-brain-scientists-jesuits-catholic-christian-ignatius-loyola-a7646436.html.

[2] "Atheists and highly religious people fear death the least: study," *Deccan Chronicle*, March 26, 2017, accessed March 27, 2017, http://www.deccanchronicle.com/lifestyle/health-and-wellbeing/260317/atheists-and-highly-religious-people-fear-death-the-least-study.html.

[3] Jake Ellison, "Study: Turns out religion is kinda like an opiate," *Seattle PI*, March 26, 2017, accessed March 27, 2017, http://www.seattlepi.com/local/science/article/Study-Turns-out-religion-is-kinda-like-an-opiate-11026801.php#.

are told, have unique brain structures,[4] and so do left-handed people.[5] Political conservatives have hyperactive amygdalae, which is why they are more emotional than liberals.[6] Babies are a little bit racist.[7] Provocative as they may be, these claims carry the imprimatur of science. As Davi Johnson Thornton argues, brain-based facts carry unique rhetorical force.[8] Popular neuroscience promises order, assuring its readers that their cravings, virtues, and neighbors all operate according to observable cognitive laws. The brain, it seems, contains truths about human culture and experience that are, simultaneously, objective facts of nature.

In this chapter I will investigate this characteristic of brain-based facts. I will explore how the brain has been conceptualized within a series of attempts to bring objective order to elements of human subjectivity, including beauty, sexuality, and religious belief. Building on concepts from Friedrich Nietzsche, Michel Foucault, and Bruno Latour, I will argue that these efforts are rooted in a modern conception of the human subject that situates the brain as a bridge between the otherwise divided realms of nature and culture. Finally, in a case study of Will Gervais and

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[4] Kate Kelland, "Psychopaths Have Distinct Brain Structure, Study Finds," *Huffington Post*, May 8, 2012, accessed March 5, 2016, http://www.huffingtonpost.com/2012/05/07/psychopath-brain-structure-_n_1497753.html.

[5] "Study finds emotion reversed in left-handers' brains," *Medical Xpress*, May 2, 2012, accessed March 5, 2016, http://medicalxpress.com/news/2012-05-emotion-reversed-left-handers-brains.html.

[6] Sarah Fox, "The neuroscience of politics: what your brain says about your vote," *Science Blog*, March 1, 2016, accessed March 2, 2016, http://thebrainbank.scienceblog.com/2016/03/01/the-neuroscience-of-politics-what-your-brain-says-about-your-vote/.

[7] Wynne Parry, "9-Month-Olds Show Racial Bias When Looking at Faces," *Live Science*, May 4, 2012, accessed March 2, 2016, http://www.livescience.com/20089-facial-racial-bias-infants.html.

[8] Thornton, *Brain Culture*, 4-5.

Ara Norenzayan's 2012 essay "Analytic Thinking Promotes Religious Disbelief," I will demonstrate how this conceptualization of the human subject can be used to smuggle covert ideologies about religion into the seemingly objective realm of neuroanatomy.[9]

Nature, Culture, and the Human Subject

Friedrich Nietzsche saw neuroscience coming. In *The Genealogy of Morals*, the nineteenth-century German philosopher describes the "English psychologists" of his day as those who drag elements "of our inner world into the foreground [by] seeking the truly effective and directing agent… in just that place where the intellectual pride of man would least *desire* to find it."[10] By attributing human beliefs and morals to "blind and chance mechanistic hooking-together of ideas, or [to] something purely passive, automatic, reflexive, molecular, and thoroughly stupid," Nietzsche argues, these English psychologists were reducing humanity's esteemed virtues to brute animal functions.[11]

Nietzsche postulates some likely motivations behind this kind of intellectual work—lasciviousness, gloominess, a petty rancor towards Christianity and Plato— and then, in a surprising turn, wishes these psychologists the best:

> I hope from my heart… that these investigators and microscopists of the soul may be fundamentally brave, proud, and magnanimous animals, who…have trained themselves to sacrifice all desirability to truth, *every* truth, even plain, harsh, ugly, repellent, unchristian, immoral truth.[12]

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[9] Will M. Gervais and Ara Norenzayan, "Analytic Thinking Promotes Religious Disbelief," *Science* 336, no. 6080 (April 2012): 493-496, accessed June 23, 2012, http://dx.doi.org/10.1126/science.1215647.

[10] Friedrich Nietzsche, *The Genealogy of Morals*, trans. Walter Kauffman (New York: Vintage Books, 1989), 24 (emphasis in original).

[11] Ibid.

[12] Ibid., 25.

For readers of Nietzsche's previous work, this aphorism on psychology—which occurs in the first aphorism of the first essay of the book—might seem confusing. Nietzsche was famously skeptical of science. In *The Gay Science*, published just a few years earlier, he characterizes scientific inquiry as a vain attempt to "humanize" a chaotic universe through the imposition of artificial laws. Faith in science, Nietzsche concludes, differs from religious faith only in that it denies this motivating passion.[13] Why, then, was Nietzsche so enamored with the science of psychology that he wished for its practitioners to become more brave and proud? It would not be enough to say that he identified with their motivations, though Nietzsche himself was certainly lascivious, gloomy, and full of rancor towards Christianity and Plato. Why, furthermore, does Nietzsche wish for these "microscopists of the soul" to "sacrifice all desirability to truth," including harsh, ugly, and unchristian truths—the very sorts of truth that seem to have enamored him with these psychologists in the first place? Answering these questions will require a diversion into the broader intellectual context of Nietzsche's writing with the help of two of his intellectual heirs: Michel Foucault and Bruno Latour. The work of these two French philosophers will help to shed light on Nietzsche's "microscopists of the soul" by situating them within two fundamental elements of nineteenth-century thought: the nature/culture divide and the human subject.

The Genealogy of Morals was published in 1887, a half-century into what Michel Foucault would later call the "Modern Age." In his 1970 book *The Order of Things*, Foucault argues that Western intellectual history unfolded over a series of discrete intellectual eras, or *epistemes*. Each *episteme*, Foucault maintains, has its own epistemological grammar, a structured

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[13] Friedrich Nietzsche, *The Gay Science*, trans. Walter Kaufmann (New York: Vintage Books, 1974), 172-179.

set of *a priori* conceptions that formed the very conditions of truth, including rules qualifying legitimate forms of speech, presumed relationships between objects and their representation in speech, and conceptions of the totality of all knowledge, also known as "representation." For example, during the "Classical Age" of Western knowledge (dating from the end of the sixteenth century to the beginning of the nineteenth century), words were thought to connect directly and transparently to the objects that they named. The project of knowledge, therefore, was to plot these essential identities, as if filling out a universal grid.[14] This was considered to be a passive enterprise: although identities must be sought out, they were not thought to be altered by the seeker. These epistemic assumptions are apparent, for example, in scientific atlases of the early eighteenth century. Natural historians were trained to capture the "ideal images" beyond the messy surfaces of things in order to produce images that were "true to nature."[15] There was no conception, in this *episteme*, of an active human knower. Humanity was not, so to speak, included in the universal grid of knowledge. Representation transcended the human knower.

In Foucault's account, the classical age ended abruptly after a series of epistemological "mutations" in the late eighteenth century introduced human mediation to representation. There were shifts in three different discourses—what we would now call biology, economics, and philology—that made apparent the impossibility of pure, passive truth-making. Knowledge was suddenly seen as a product of knowers. This threatened the entire order of classical knowledge, Foucault argues, by introducing a gap between words and things.[16] The subsequent *episteme* that emerged during the early nineteenth century represented, for Foucault, a scramble to contain this

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[14] Michel Foucault, *The Order of Things* (New York: Random House, 1970), 117.

[15] Lorraine Daston and Peter Galison, *Objectivity* (New York: Zone Books, 2007), 55-113.

[16] Foucault, *The Order of Things*, 312-314.

fissure. The transcendental grid of the classic *episteme* had been shattered by the appearance of an earthly, human knowledge-maker. According to Foucault's analysis, the modern *episteme* emerged out of multiple efforts to re-stabilize representation and fit humanity within it. Modernity began with an intellectual crisis. How could transcendent truth exist if knowledge was artificially made and not passively discovered?

Foucault's concept of historical *epistemes—a priori* discursive systems that condition all possible knowledge within a society—is not without flaws. The author himself even later qualified that *epistemes* do not necessarily totalize an entire culture; multiple *epistemes* can co-exist and interact.[17] Foucault's concept of the *episteme* is nonetheless useful for the purposes of this dissertation. Bracketing the questions of how totalizing and discrete historical *epistemes* may be, I am interested in how certain fundamental structures of modern discourse still configure contemporary accounts of religion and the brain. In contrast with the Kuhnian "paradigm"—a set of concepts, procedures, and standards that structure specific scientific disciplines—the Foucauldian *episteme* describes a wider set of discursive structures that configure multiple discourses. There are two key components of the modern *episteme* that condition biocognitive accounts of religion today: the nature/culture divide and its corresponding modern human subject.

Bruno Latour opens his pivotal 1993 book *We Have Never Been Modern* with a vignette of the author reading his morning paper. On page four he learns that measurements taken above the Antarctic are not good because they indicate that the hole in the ozone layer is getting larger.

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[17] Michel Foucault, interview with Alain Grosrichard, Gerard Wajeman, Jaques-Alain Miller, Guy Le Gaufey, Dominique Celas, Gerard Miller, Catherine Millot, Jocelyne Livi, and Judith Miller, *Power/Knowledge: Selected Interviews and The Writings, 1972-1977*, ed. and trans. Colin Gordon (New York: Random House, 1980), 194-228.

The CEOs of two major refrigerator manufacturers claim to be replacing the responsible chlorofluorocarbons in their assembly lines, he reads on, but meanwhile certain heads of state are holding back international treaties that would more significantly impact future generations. This dizzying journey through esoteric sciences, sordid politics, nearby factories, and the distant sky is typical, Latour points out, of today's mixed-up affairs. What makes the journey especially confusing, Latour argues, is that each point along the way has its own internal metaphysics: for the politician decrying job-killing environmental regulations, it is macroeconomics; for heads of state, international diplomacy; for upper-atmosphere chemists, the language of nature.[18] Latour continues:

> The smallest AIDS virus takes you from sex to the unconscious, then to Africa, tissue cultures, DNA and San Francisco, but the analysts, thinkers, journalists and decision-makers will slice the delicate network traced by the virus for you into tidy compartments where you will find only science, only economy, only social phenomena, only local news, only sentiment, only sex.[19]

Over the course of such dizzying journeys, Latour writes, the modern reader will continually stumble upon two paradoxes. The first paradox concerns the simultaneous transcendence and immanence of nature. Nature, we are told, is transcendent: it has always been there and would exist without us; science is merely reflecting its image. Yet we are also told that nature is immanent: scientific facts are artificially constructed in the laboratory, subject to the influence of power, money, and human perceptual biases; nature is therefore constructed. The second paradox concerns the simultaneous transcendence and immanence of society. Society, we are told, is transcendent: it is the absolutely powerful sovereign that surpasses us infinitely; we follow its rules and operate within the world it creates for us. Yet we are also told that society is immanent:

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[18] Latour, *We Have Never Been Modern*, 1-2.

[19] Ibid., 2.

society is our free construction that we create as individuals; since it is the sum of each of us, we have the free will to change it however we like.[20]

Nature and society, of course, are in ways both transcendent and immanent. Scientific knowledge is indeed made, yet it can also objectively represent nature. Social agency is indeed circumscribed within networks of discourse and power, yet individuals also exert agency and can assemble into powerful collectives. These paradoxes do not reflect fundamental inconsistencies of nature and society, but rather—in Latour's formulation—reflect something about what it means to be modern. Modernity, Latour argues, involves two sets of distinct practices: *translation*, the creation of nature-culture hybrids like scientific facts and refrigerators; and *purification,* the separation of nature and culture into two entirely distinct ontological zones. For Latour, translation and purification depend on each other: without translation, purification would be pointless; without purification, translation would be slowed down or ruled out.[21] Why, for example, would someone attempt to study the ozone layer if she did not think that nature was a separate, objectively knowable thing? The belief that nature and culture are completely separate zones helps the scientist mobilize a whole network of nature/culture hybrids—machines, government funding, air samples, expert opinion, and community support—to create even more hybrids: a research team, a newly refined scientific instrument, and, eventually, a set of scientific facts.

Thus the perceived paradoxes of nature's and society's immanence and transcendence, Latour argues, actually reflect modernity's greatest discovery and best kept secret: that oscillating between immanence and transcendence can yield a proliferation of otherwise

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[20] Ibid., 30-32.

[21] Ibid., 10-11.

impossible hybrids. Moderns can create scientific knowledge immanently, with their own hands, and then turn around and say that it is transcendent—an absolute truth that simply mirrors nature. Yet these hybrids, Latour argues, must be continuously purified for the process to continue. "The more we forbid ourselves to conceive of hybrids," Latour argues, "the more possible their interbreeding becomes."[22] Once produced, for example, scientific facts must be pushed into the order of nature: "the truth was there all along," we say, "and culture played no part in making it." This helps to explain why, as anti-vaccine activists and global warming deniers have recently discovered, the most effective rhetorical attack against a scientific fact is not to dispute its methods or conclusions but, rather, to simply point out its funders. Regardless of how carefully this bias may have been controlled for in a particular research study, this kind of attack undermines the purification of a supposedly "natural" fact and reveals it to be a nature/culture hybrid. Of course, the fact was always a hybrid—every fact is—but moderns are trained to ignore hybrids so that we can keep making them.

The nature/culture divide can also be read within Foucault's account as a necessary foundation for the modern *episteme*. The classical *episteme* had no division between nature and culture because all truths were thought to be of the same transcendent order. With the introduction of the flawed human knower, however, came the problem of immanence: how can we be confident in our knowledge if truth is not discovered, but made? The modern project that Latour describes—the ongoing translation and purification of nature/culture hybrids that requires endless doubling back between immanence and transcendence—could be read in Foucauldian terms as a strategy for stabilizing representation. Rather than embrace the immanence of knowledge, early moderns created a nature/culture divide that could hide and contain it. In this

[22] Ibid. 12

reading, there is a significant asymmetry between nature and culture as purified ontological zones: nature, for moderns, serves as a surrogate for the lost transcendent truth of the classical age—an ersatz fundament that is supposedly knowable beyond the restrictive mediation of human language, culture, and perception. (This helps to explain the lingering modern habit, even in today's academy, of considering the natural sciences to be more concerned with truth than the disciplines of the humanities.) The modern nature/culture divide is also central to biocognitive accounts of religion, which position the human brain as the interface between nature and culture and thereby stage it as a unique site for reducing the culture of religion to the objective truth of nature. Before describing this technique, however, I must discuss a second, related element of the modern *episteme*: the human subject.

The modern *episteme,* Foucault maintains, was shaped by efforts to stabilize knowledge and to establish a place for the human knower within it. In the process, a new epistemological structure was crafted that, Foucault argues, became central to modern thought: "Man," which I will alternatively refer to as the "human subject." The modern human subject is a bifurcated entity. It emerged, Foucault writes, into a precarious double position, conceptualized by moderns in one of two distinct ways: as either an *object of knowledge* or as a *subject who knows*.[23] These two halves of the modern human subject correspond with the purified ontological realms of nature and culture, respectively. This strategic division, Foucault argues, helped solve the problem of the human subject's imbrication within the field of knowledge. The human subject became an *object of knowledge* insofar as the human individual had, for the first time, entered into the field of representation as a finite entity. The human knower could be known, and so it prompted numerous discourses that operated within the space of the body, studying perception,

[23] Foucault, *The Order of Things*, 318-320.

sensorial mechanisms, the anatomy of the brain, and other materials and processes involved in the production of truth.[24] This genre of discourse covered the surfaces of the human subject, stabilizing knowledge by empiricizing the knower. It approached the human individual as an entity within nature.

The human subject was also understood, separately, as a *subject who knows*. This prompted a second set of discourses, Foucault argues, that took human knowledge as its subject. The nineteenth century saw a wide range of disciplines that studied humanity's cultural illusions, from the West's own past and societies abroad, with attention to their historical, social, and economic conditions. Human knowledge, culture, and experience were carved into a secondary domain that was distinct from nature. The goal of these discourses was to demystify historical, mythical, or otherwise inaccurate beliefs. They heralded the legitimacy of modern knowledge through triumphalist juxtapositions of old and new models of the world.[25] This genre of discourse approached the human as an entity of culture whose individual identity was shaped by tradition, belief, and the capacity for rational thought.[26]

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[24] Ibid., 313-319.

[25] Ibid., 319-320.

[26] Foucault's timeline here is slightly at odds with the history of the study of religion that I outlined in the introduction, since the kinds of discourses Foucault describes as emerging in the early nineteenth century concerned with the "subject who knows" can actually be traced back to the seventeenth and eighteenth centuries. There may indeed have been a tectonic epistemological shift within the study of religion corresponding to the abrupt beginning of modernity that Foucault dates to the early nineteenth century, but it is beyond the scope of this project to go looking for it. (Nor, for that matter, does such an inquiry strike me as particularly productive—this is likely a case of Foucault's tendency to overgeneralize historical trends.)

It is important to underscore Foucault's claim that the human subject did not exist before the modern *episteme*.[27] Rather, the human subject emerged as the epistemological cornerstone of modern thought, and our conceptions of the human are still today informed by its idiosyncratic configuration. The human as we currently understand it, in other words, did not precede the human sciences that emerged during the nineteenth and twentieth centuries. Rather, it was a product of those discourses.

With help from Foucault and Latour, we can now return to our Nietzschean puzzle. Why did Nietzsche celebrate his contemporary psychologists for reducing humanity's inner world to mechanistic animal functions? Why did he wish for these "microscopists of the soul" (hereafter microscopists) to become more brave and proud? Nietzsche seems to have observed something significant in their method. By attributing humanity's moral ideals to brute biology, those English psychologists were drawing connections between nature and culture, traversing the divided halves of the modern human subject. The modern *episteme*, Foucault and Latour both argue, operates by keeping nature and culture apart. The human subject appears in each zone differently as one of two distinct entities: either as an object of knowledge or as a subject who knows; never both. Moral ideals and brute biology, therefore, should never correspond at once to the same being. Nietzsche's microscopists, however, were troubling the nature/culture divide by attributing elements of one ontological zone to the workings of another. These microscopists recognized humans as nature/culture hybrids and violated the principal command of the modern *episteme*: thou shalt purify.

This explains why Nietzsche was so smitten with his contemporary psychologists, but why did he also wish for them to become "fundamentally brave, proud, and magnanimous

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[27] Foucault, *The Order of Things*, 308.

animals who… sacrifice all desirability to truth," including various truths that the author himself would have delighted in?[28] Nietzsche seems to be warning his microscopists of an epistemological trap. The microscopists of Nietzsche's day were reducing elements of culture to the more fundamental truths of humanity's psychological nature. They had broken the modern habit of purification and could see humans as the hybrids that they were, yet they had not overcome the modern conception of nature as an ontological fundament. These microscopists still mistakenly believed nature to be the transcendent, never-immanent realm of absolute truth. Nietzsche diagnoses this mistake as a symptom of the microscopists' "desirability to truth"—their drive to discover pure truths that somehow transcend human mediation. (In Foucault's terms, this drive could be understood as modern nostalgia for the classical age.) Nietzsche, it seems, was delighted to see the nature/culture divide subverted but disappointed to see his colleagues still searching for absolute truth in nature.

Even more disruptive, Nietzsche might argue, would be for a microscopist to abandon the search for absolute truth all together. Imagine, for example, if a microscopist explained aspects of humanity's brute nature as the product of vaunted cultural norms instead of the other way around. A truly subversive microscopist could make the case, for example, that our ability to visually detect fine detail and color is a product of social cooperation. The primate visual system has two distinct pathways through which visual information is transmitted from the visual areas in the back of the brain to the frontal lobes: the magnocellular pathway, which is concerned with movement detection and is common among all mammals; and the parvocellular pathway, which is unique to primates and associated with the detection of fine detail and color. The two pathways go through different parts of the brain, and the parvocellular pathway happens to

[28] Nietzsche, *The Genealogy of Morals*, 24.

follow a route that is linked to the amygdala, a part of the limbic system that is involved in giving emotional valence to particular signals. The expansion of the primate neocortex has been theorized to reflect the increased need for the recognition and interpretation of various social signals. During this evolutionary process, it could well have been the case that the parvocellular pathway developed to process social information, instead of the magnocellular pathway, due to its physical proximity to the amygdala, since additional emotional intuitions would have been helpful for gauging social responses. This could have had a bootstrap effect over the course of human evolution, where fine detail and color recognition continued to improve in concert with the parvocellular pathway's growth, which was itself primarily driven by natural selection pressures to increase social intelligence. Thus, one could argue, your ability to read this small text is a byproduct of social cooperation.[29]

If this argument seems counter-intuitive, it may be due to our modern intellectual habit of separating nature and culture and assigning unique epistemological agency to the former of these two ontological realms. This habit continues to this day, and so too does the tradition of microscopy. We will turn now to a few examples of modern day microscopy, including the use of popular neuroscience to confirm the neuroanatomical truth of social stereotypes. We will also examine two psychologists who claimed to have discovered proof of the conflict thesis within the brain's flesh, unaware that they themselves had placed it there. Analyzing these examples will help us to understand the ways in which microscopy can be used as a set of rhetorical techniques to selectively subvert, or even parasitize, the modern nature/culture divide and its corresponding human subject.

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[29] For the much more sophisticated account of the evolution of sociability that this draws from, see Louise Barrett, *Beyond the Brain: How Body and Environment Shape Animal and Human Minds* (Princeton: Princeton University Press, 2011), 34-38.

The Microscopy of Beauty

At the age of eighteen, Florence Colgate had Britain's prettiest face. This is an objective fact, said *The Huffington Post* and other outlets, because "there's science backing the claim up."[30] In 2012 Colgate won the Britain's Most Beautiful Face contest based on objective measurements of her "perfectly symmetrical" visage and the "optimum ratio" among her mouth, eyes, chin, and forehead.[31] A video accompanying the story documents the porcelain blonde as she applies pink lip-gloss. The broadcaster narrates:

> Florence Colgate's face is considered almost flawless. It's perfectly symmetrical, with large eyes, full lips, and high cheekbones… The competition wasn't just about subjective beauty, it was settled with science. Researchers say the distances between facial features, and the width and length of the face, are deciding factors for perfection. And Colgate scored very close to the ideal.[32]

Like Nietzsche's English psychologists, our modern day microscopists of the soul have dragged beauty out of the heavens and hitched it to cold, mathematical laws. As is often the case with microscopy, the results are simultaneously provocative and unsurprising. To the casual onlooker it is at first quite a shock to learn that science has somehow naturalized something as ephemeral as beauty, but then, upon seeing an image of Florence Colgate (see Figure 1.1) and learning of her optimal features, it seems intuitive that her face is objectively the most beautiful.

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[30] Hillary Hanson, "Florence Colgate, 'Britain's Most Beautiful Face' Has Scientifically Perfect Looks," *Huffington Post*, April 24, 2012, accessed February 25, 2016, http://www.huffingtonpost.com/2012/04/24/florence-colgate_n_1448779.html.

[31] Ibid.

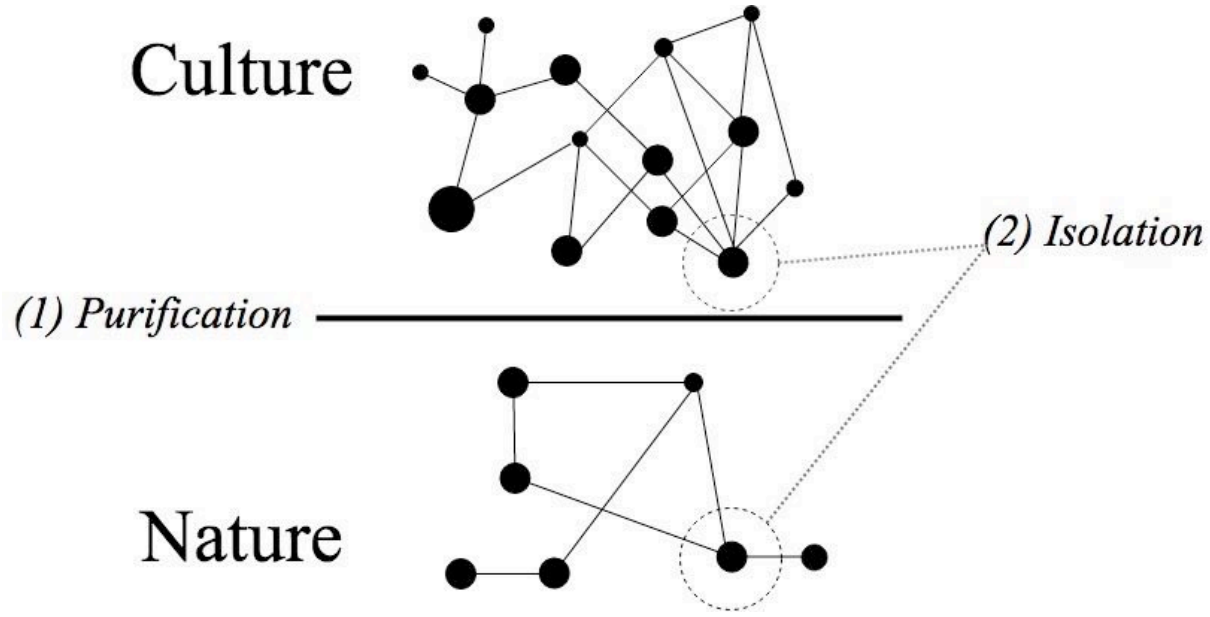
[32] "Britain's Most Beautiful Face?" accessed February 25, 2016, https://www.youtube.com/watch?v=INLq62Jacy8.

Figure 1.1. Florence Colgate's face, before and after analysis. "Britain's Most Beautiful Face Reveals Beauty Secrets?" Redefining the Face of Beauty. August, 2012. http://www.redefiningthefaceofbeauty.com/2012/08/response-to-abc-newsgood-morning.html.

Our modern day microscopists have accomplished something clever. They have taken a thin eighteen-year-old woman with dyed blonde hair and pink lip-gloss—a person who actively embodies the particular beauty norms of her location and time—and pushed her into the heavens. With a few measurements and ratios they have transformed Colgate's beauty into a law of nature that transcends culture, time, and space. How did they do it? Taking Florence Colgate as an example, we can observe that microscopy is a three-step process. Microscopy begins, first, with what Latour calls *purification*: the separation of nature and culture into distinct ontological zones (Figure 1.2). This is a simple first step because, within the modern *episteme*, nature and culture come already divided. Nonetheless, as Latour reminds us, purification is ongoing work. Moderns are surrounded by nature/culture hybrids that must be continuously collapsed into one zone or another. Microscopists arrive to this scene with a narrow mission. The goal of microscopy is to establish a surprising causal link between one element of culture and another element of nature.

"Look," the microscopist proclaims, "this isn't just culture! It's a hybrid, half-buried in nature!" Microscopists therefore require purification to continue in general for their discovery to carry any significance. If nature and culture are already understood to be intermixed, the symmetry of Florence Colgate's face simply is not newsworthy.

Figure 1.2. Microscopy, Steps One and Two: Purification and Isolation.

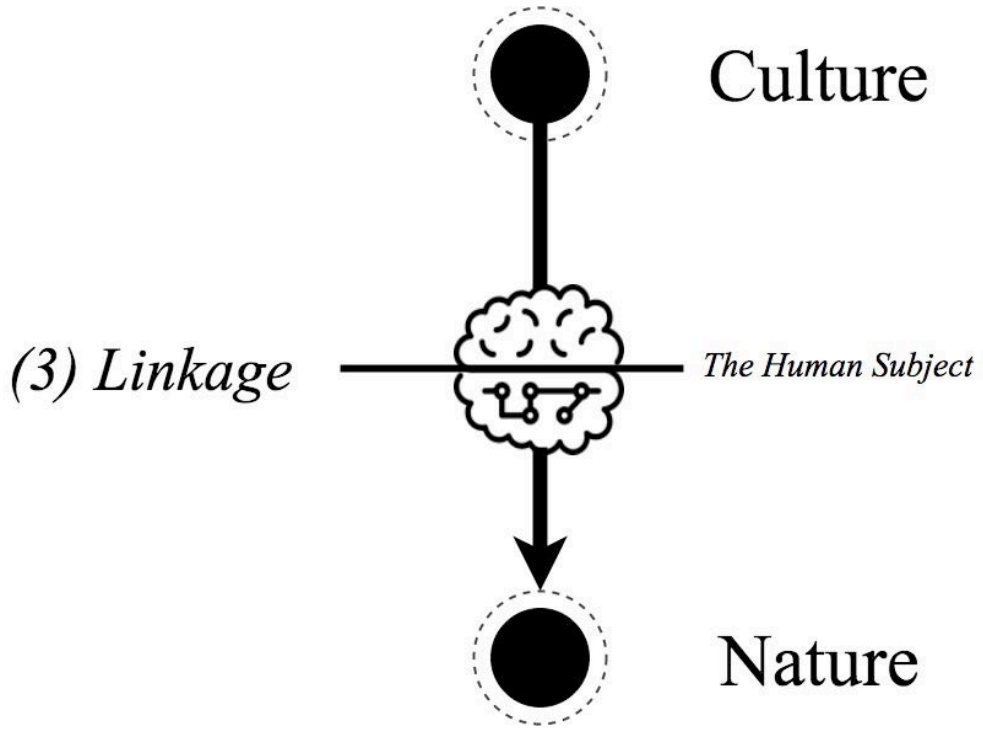


The second step of microscopy, also depicted in Figure 1.2, is the process of *isolation*. The microscopist must pick two elements from the respective domains of culture and nature that can be linked. Before they can be connected, however, each element must stand alone. The microscopist therefore must disentangle each element from a complex web of causal relationships. The ultimate goal of microscopy is to reduce an element of culture to a fact of nature, and thereby discover its absolute underlying truth. The problem, of course, is we do not live in so simple a universe: cultural phenomena are the products of numerous causes across

multiple scales; they rarely lend themselves to single, "magic bullet" explanations. This is where the work of isolation comes in, setting the stage for reduction.

Florence Colgate's face, for example, was isolated from the cultural context of British beauty norms. It was merely her face that our microscopists purported to care about; her size, body type, ethnicity, gender performance, and youth were cut away as if they could have no possible effect on a group of human judges—from the same cultural milieu—with face measurement software at their disposal. From the side of nature, on the other hand, the law of symmetry was isolated as a pure and objective element of nature, with no attention to the technical processes required to produce it. (Did judges measure the contestants in person, with 3D computer models, or based on photographs? Did this process involve other means of assessment, or did judges feed the law of symmetry into a supercomputer only to find Florence Colgate spit back out?) Isolation prepares each element for the third step of microscopy: *linkage*, the connection of culture and nature at the intersection of the human brain (Figure 1.3).

Figure 1.3. Microscopy, Step Three: Linkage.



The human brain, moderns will tell you, is the special place where nature and culture meet. One of the paradoxes of the modern *episteme* is that nature and culture are supposed to be kept separate even while humans traverse between them. Hence the bicameral human subject, we learn from Foucault, who must be split across the two zones. This odd arrangement helps to explain the unique status of the brain in modern discourse. According to the logic of modernity, the human brain is a liminal epistemological space where two ontological zones barely touch—a membrane, so to speak, between nature and culture. This is also the space where microscopists do their work. The brain is the microscopist's route through the divided modern subject, a narrow passageway through which nature and culture can pass as long as they are cut down to fit through the door.

The story of Florence Colgate illustrates two important elements of the microscopic process of linkage. First, microscopy always requires what I will call an "artificially stabilized

brain," or a selective model of human cognition that lends itself to simplistic explanations. For Colgate's face to be objectively the most beautiful, for example, symmetry must activate desire in all human brains in exactly the same way. The tacit assumption of the Colgate story is that human brains are predictable, computer-like devices that process visual cues according to a hard-wired set of universal rules. This, of course, understates the plasticity of desire and ignores the vast diversity of human aesthetic and romantic preferences. Just as nature and culture must be cut down and isolated, so too must the brain be simplified for microscopy to work. Over the course of this dissertation I will investigate a few of the ways that biocognitive theorists of religion have artificially stabilized the human brain to help facilitate microscopy.

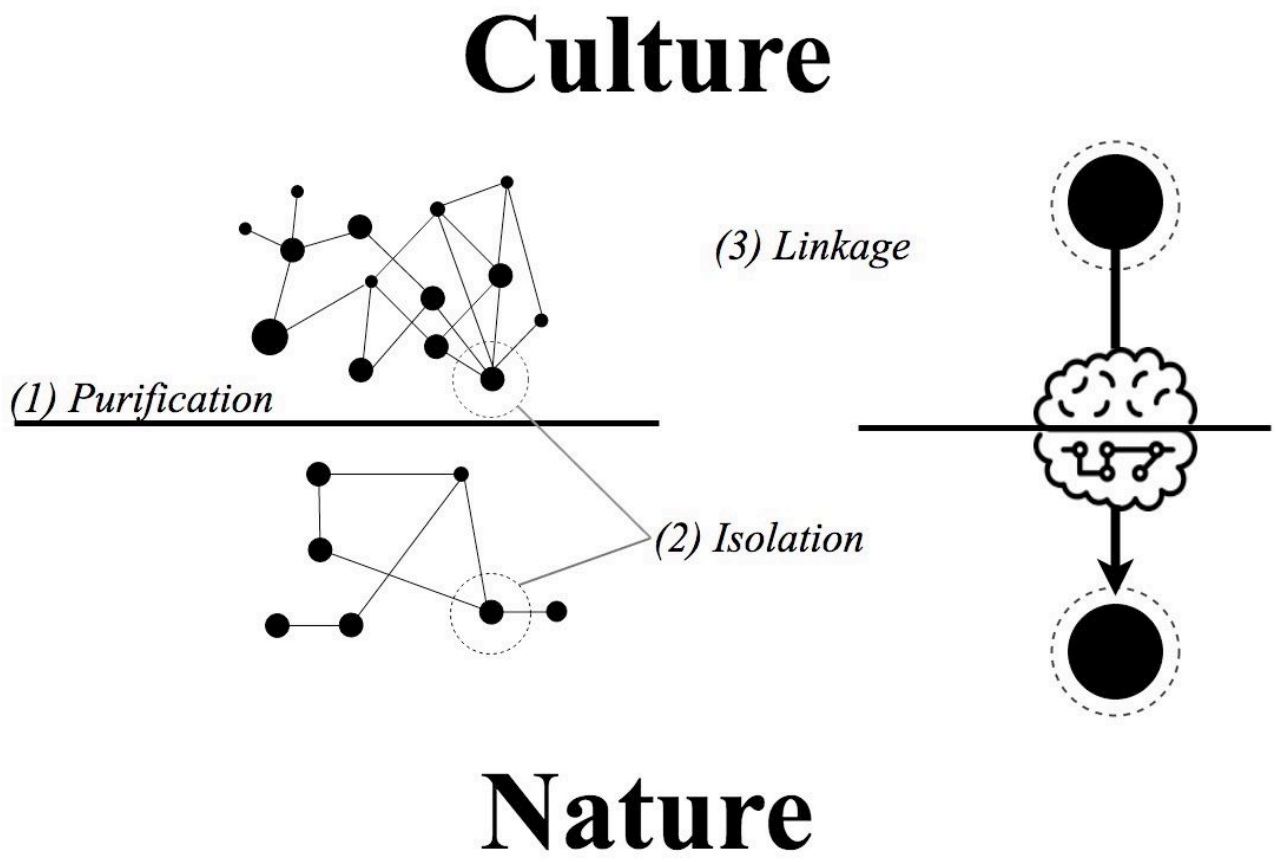
A second important aspect of microscopic linkage is that it almost always directs explanation downwards, reducing culture to underlying patterns of nature. For example, Florence Colgate's beauty—something traditionally considered "subjective" and tied up in social norms—is explained as a mere epiphenomenon of mathematical principles. It would do little good for the microscopist to invert this causal flow and explain nature as a product of culture. Causal flows move in all directions, and there are plenty of examples of culture affecting nature.[33] This goes too far for their modern audiences, however, past the provocative and into impossible. According to the modern *episteme*, absolute truth lies within nature. Humans may make scientific knowledge, moderns say, but true facts about nature transcend the particulars of human language

[33] As I will elaborate in chapter two, there is an entire research field dedicated to the co-evolution of genes and culture. If you can drink milk without getting gassy, for example, you can thank an enzyme in your gut that cleaves lactose into simple, digestible sugars. This little piece of nature is a product of culture: specifically, the social practices of dairy farming by early people of northwest Europe. Peter J. Richerson and Robert Boyd, *Not By Genes Alone: How Culture Transformed Human Evolution* (Chicago: University of Chicago Press, 2005), 191-193.

and culture. Hence, I argue, nature has become a substitute fundament for nostalgic moderns longing for the transcendent truths of a bygone era.

This epistemological idiosyncrasy might be comical if it were not so consequential. As I will demonstrate shortly, the assumption that absolute truth lies in nature supports new forms of brain-based reductionism that can totalize and dismiss entire social groups as the products of cognitive errors. Furthermore, as I will argue in chapter three, microscopy has become the predominant tool for essentializing religion. Religion has proven impossible to essentialize since it is an intellectual category with no coherent, fundamental referent. This, I will argue, is why so many would-be essentializers of religion have turned to contemporary brain sciences: they believe that the naturalized brain offers a way down into the absolute truth of religion, beyond the pesky mediating forces of culture.

Figure 1.4 Microscopy in Three Steps



With the three simple steps of purification, isolation, and linkage (Figure 1.4), the microscopist performs an epistemological magic trick. Unlike the vaudeville stage magician who saws a woman in half, however, the microscopist is one who unites, dazzling their modern audience by sewing a body from culture onto legs of nature. The popular and academic discourses surrounding contemporary brain science are full of microscopists—some religious, some atheistic, some from the sciences, and others from the humanities—but I have begun with the popular media account of Florence Colgate because it offers a simple example of microscopy in action. The microscopist begins, first, within the purified world of the modern *episteme* that continuously separates nature and culture through a selective blindness to their hybrids. Then the

microscopist chooses elements from each ontological zone and isolates them, cutting them away from networks of co-constitutive forces. Florence Colgate's face, for example, was isolated from gender and beauty norms, just as the law of symmetry was isolated to be a pure, unmediated law of nature. Once the microscopist has isolated their elements, they bring them together at the contact point of the human brain. Within the liminal space of the human subject, the stuff of culture can be linked to the stuff of nature. Florence Colgate's beauty—already isolated to facial measurements—can be attributed to mathematical laws of nature. To cross the human subject the microscopist must construct a bridge. In the case of Britain's Most Beautiful Face, the human brain was artificially simplified to be a visual information processor that automatically perceives beauty according to hard-coded patterns. Beauty cannot be in the eye of the beholder, as it were, it must be in the beholder's universalized, naturalized brain.[34]

This is an impressive magic trick. Only microscopy could collapse Florence Colgate—youth, hair dye, pink lip-gloss, and all—into the law of symmetry. One consequence of this trick—likely the subject of Nietzsche's delight—is that it briefly destabilizes the modern *episteme*. For a brief moment, Florence Colgate's beautiful face appears to the modern reader as a nature/culture hybrid, shattering their perception of the nature/culture divide and modern human subject. Yet our microscopists have not followed Nietzsche's advice and overcome the desirability to truth.

We should heed the words of Florence Colgate herself, who was actually skeptical of microscopy. "I just look at my face and, I just see *me*," she said in a Reuters interview, "I don't

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[34] Notice, too, that the brain posited here automatically responds to symmetry with desire only when that desire fits within the range of sexual normality. Symmetry can be found everywhere—from trains to sheep to children—but luckily our microscopists have been careful in their calibration. It is surely not a coincidence that Britain's Most Beautiful Face is a white woman who is eighteen years old—the youngest possible adult.

really see, like, science."[35] The most dangerous consequence of microscopy, which we will see throughout this dissertation, is that it can naturalize ideology by smuggling cultural preconceptions into the seemingly objectively space of the naturalized brain. The microscopist's reduction often comes with a burlesque wink, as if to say, "I've dazzled you, but I'm only showing you something that you already knew. Florence Colgate was already pretty before, but your subjective desire was actually an objective fact!" Thus, to the uncritical modern, the story of Britain's Most Beautiful Face will either legitimate their attraction to Colgate as natural or delegitimize their lack of attraction as abnormal and unnatural. Isolated and naturalized, Colgate's beauty has been stripped of its cultural context and anchored into the modern fundament of natural truth.

A less conservative microscopy would liberate itself from truth seeking and look out for other, more interesting hybrids. Stranger hybrids are out there. It is no coincidence that, at the time of publication, *The Huffington Post*'s algorithms paired the Florence Colgate story with a slideshow of "Amazing Anatomies," including conjoined twins, a wolf-boy, and David Petrovic, a "real-life human magnet."[36] Unfortunately most microscopists have failed to become brave, magnanimous animals in Nietzsche's image. This is especially true in popular neuroscience where, as the next section will demonstrate, microscopy is used to reaffirm cultural stereotypes by naturalizing social difference.

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[35] "Britain's Most Beautiful Face?" accessed February 25, 2016, https://www.youtube.com/watch?v=INLq62Jacy8.

[36] "Amazing Anatomies," *Huffington Post*, April 24, 2012, accessed June 23, 2012, http://www.huffingtonpost.com/2012/04/24/florence-colgate_n_1448779.html#slide=929297.

The Microscopy of Difference

In "Neuroscience in the Public Sphere," an article published in 2012 in the high-impact neuroscientific journal *Neuron*, neuroscientists Cliodhna O'Connor, Geriant Rees, and Helen Joffe analyze some major tropes in popular representations of neuroscience.[37] The authors conducted a LexisNexis search of 6 national UK daily newspapers for articles discussing brain research published between January 1, 2000, and December 31, 2010, yielding a 2,931-article sample that they analyzed and coded according to each article's subject and themes.[38] In their survey of popular representations of the brain, the authors identified a few major trends.

A predominant theme across all brain-based news media, they report, was the tendency to employ the brain as an *index of difference*, using neuroscience to "delineate boundaries between categories of people."[39] Popular media, they argue, tended to underline neurological differences between social types corresponding to existing stereotypes (for example, linking obesity to low intelligence and women to irrationality). This theme was most evident in articles concerning psychopathology, sexuality, morality, and bodily conditions. Psychopaths, criminals, substance abusers, and homosexuals were all reported to have "distinctive brain types," offering neuroscientific objectivity to social stereotypes. By reducing heterogeneous groups to single brain types, they argue, news media were able to essentialize social groups and portray them as internally homogeneous.[40] Take, for example, the following excerpt from a 2006 *Times* article:

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[37] Cliodhna O'Connor, Geriant Rees, and Helen Joffe, "Neuroscience in the Public Sphere," *Neuron* 74, April (2012), 220-226.

[38] Ibid., 220-221.

[39] Ibid., 221.

[40] Ibid., 221-223.

> Addiction is viewed as a mental disorder, and gays are known to be at higher risk of anxiety, depression, self-harm, suicide and drug abuse. Most studies suggest that these problems are brought on by years of discrimination and bullying. But there is another controversial thesis—that gays lead inherently riskier lives. Gambling stimulates the dopamine system in the brain; illicit drugs pep up the same system. Are gays dopamine junkies?'[41]

In just five sentences, the *Times* author is able to reduce a dense network of socio-cultural forces to a single neurotransmitter that is solely responsible for all "risky" behavior. We have once again found microscopy in action: a cultural category representing a massive and heterogeneous social collective ("gays") has been collapsed into the chemical formula $C_8H_{11}NO_2$.

It is clear why such explanations can seem attractive. One can imagine a reader being presented with two types of explanations: a massively complex, multi-causal account and this single, magic-bullet explanation. The former requires the reader to juggle a confusing array of causal vectors, including mental disorders, sexual desire, social discrimination, and so-called illicit behaviors. The latter explanation offers just one cause, the neurotransmitter dopamine, which manifests itself through the brains of addicts and homosexuals alike. This latter explanation exemplifies how microscopy can funnel a complex web of social, cultural, and material causes into a single brain-type, in this case "the dopamine junky." Here a single element from modernity's fundament of nature is made to give absolute truth to a massive and heterogeneous social population. "Gay people are *dopamine junkies*," the reader is invited to realize, "*that's why they are different*."

Social difference, in this picture, is not distributed widely and incrementally across populations. It is aggregated between social groups, whose brain types cause all deviations from the norm. This requires an elaborate epistemological maneuver, where a single element in a

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[41] *Times*, December 18, 2006, quoted in O'Connor, et al., "Neuroscience in the Public Sphere," 223.

causal network is naturalized and then made to hold the remaining elements inside of it. Dopamine—an objective part of nature—is made the single cause of gambling, sex, drugs, and suicide. Through microscopy, the naturalized brain can contain social multitudes. And, once again, cultural norms can be smuggled into nature, lending a social stereotype the aura of scientific credulity. The example of the gay dopamine junky thus reveals, once again, how popular neuroscience can subvert the nature/culture divide only to reiterate a newly-naturalized (and often reactionary) ideology.

O'Connor, Rees, and Joffe observe an additional trope in popular neuroscience that merits our attention: manipulations of the traditional boundary between normality and abnormality. This gesture, they argue, "involved co-opting previously normal behaviors and feelings into the pathological domain."[42] A common form was the application of addiction terminology to everyday behaviors, such as shopping, exercise, or eating chocolate. For example, a 2008 article reported, "Brain-imaging scientists have discovered why breaking up can be so hard to do: the neurologists say that it is because pining after your lost love can turn into a physically addictive pleasure.''[43]

Where Nietzsche's English psychologists linked morality to base material causes, today's microscopists have found an additional means of provocation: aligning social groups and activities with the pathological. This is not a difficult task. Social ills like addiction inevitably involve some of the same cognitive processes as shopping or success on Wall Street, not because these are inherently addictive, but because the same mental routines can be applied to a broad range of activities and purposes. The brain's tools are multi-purpose. The visual cortex can

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[42] O'Connor, Rees, and Joffe, "Neuroscience in the Public Sphere," 223.

[43] *Times*, June 28, 2008, quoted in O'Connor, et al., "Neuroscience in the Public Sphere," 223.

identify Apple products, religious symbols, and sheep alike. If you trace abnormality to a particular brain structure, you will find normality there as well.

The Birth and Journey of a Scientific Fact

Microscopy, I have argued, is a technique that isolates elements of nature and culture and then links them with an artificial model of the human brain. Microscopy is a technique born out of the modern *episteme*: it takes purification for granted and then traverses the bifurcated human subject, tying elements of culture down to the fundament of nature. Since microscopy isolates, decontextualizes, and naturalizes elements of culture, I have argued, it facilitates the smuggling of ideology and cultural norms into the naturalized realm of objective truth. Microscopy is not discipline-specific; it can be practiced by neuroscientists, psychologists, and laypersons alike. Yet I have favored, thus far, examples from the popular media. "Journalists are mere translators of scientific facts," one could argue, "and faulty ones at that! It's unfair to associate microscopy with actual hard-nosed scientific inquiry."

Such an accusation would certainly come from "Neuroscience in the Public Sphere" authors O'Conner, Rees, and Joffe, who are scientists themselves. In their article, the authors take the view that scientific facts are essentially devoid of culture. The problem, they argue, is that scientific facts are easy to manipulate once they leave the laboratory. From the erroneous and popular "Mozart effect" (the notion that early exposure to Mozart will boost a child's mental development) to the extrapolation of a human "faith gene" from a study of vasopressin levels in voles, they say, there are hundreds of examples indicating that the news media is at fault for

inflating and distorting objective scientific facts.[44] It was in response to this problem that the authors set out on their study of popular representations of neuroscience.

Positing what I will call a "media distortion model," O'Connor, Rees, and Joffe maintain that objective scientific facts leave the lab and then "enter a dense network of cultural meanings and worldviews" that determine "which aspects of science travel into public consciousness."[45] According to the media distortion model, microscopy is a secondary technique that journalists have imposed upon clean, objective scientific data. In the following sections of this chapter, I will challenge this interpretation by showing how microscopy also occurs within the lab. Scientists, too, can unwittingly smuggle culture down into the realm of natural facts.

On April 27, 2012, the weekly journal *Science* published an article by Will Gervais and Ara Norenzayan titled, "Analytic Thinking Promotes Religious Disbelief." The article had been announced the day before on the front page of *Science*'s website, Sciencemag.org, which aggregates journal articles, science news, blogs, and podcasts under the *Science* brand.[46] News of the study spread widely. On April 26—a day before the official publication of the article—it was covered by multiple outlets including *The National Post*[47] and *New Scientist*.[48] It was also

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[44] O'Connor, Rees, and Joffe, "Neuroscience in the Public Sphere," "Neuroscience in the Public Sphere," 220.

[45] Ibid.

[46] Greg Miller, "To Keep Faith, Don't Get Analytical," *ScienceMag*, April 26, 2012, accessed June 23, 2012, http://news.sciencemag.org/sciencenow/2012/04/to-keep-the-faith-dont-get-analytical.html.

[47] Douglas Todd, "Religious Belief Reduced by Analytical Thinking: Study," *National Post*, April 26, 2012, accessed June 23, 2012, http://life.nationalpost.com/2012/04/26/religious-belief-reduced-by-analytical-thinking-study/.

featured in various science news aggregators, including *Science Daily*[49] and *Live Science,*[50] which promise real-time coverage of scientific news. On April 27 it was picked up by *Time*'s "Healthland,"[51] *The Atlantic,*[52] *The Los Angeles Times,*[53] *Newstrack India,*[54] and a variety of online city papers across the United States. Coverage continued, from the *Huffington Post*[55] to

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[48] Debora MacKenzie, "Analytical Thinking Erodes Belief in God," *New Scientist*, April 26, 2012, accessed June 23, 2012, http://www.newscientist.com/article/dn21749-analytical-thinking-erodes-belief-in-god.html.

[49] "Analytic Thinking Can Decrease Religious Belief, Study Shows," April 26, 2012, accessed June 23, 2012, http://www.sciencedaily.com/releases/2012/04/120426143856.htm.

[50] Stephanie Pappas, "Analytic Thinking Can Promote Atheism," *Live Science*, April 26, 2012, accessed June 23, 2012, http://www.livescience.com/19923-analytic-thinking-religious-disbelief.html.

[51] Alexandra Sifferlin, "Losing Your Religion? Analytic Thinking Weakens Religious Belief," *Time Healthland*, April 27, 2012, accessed June 23, 2012, http://healthland.time.com/2012/04/27/losing-your-religion-analytic-thinking-weakens-religious-belief/.

[52] Halls Villarica, "Study of the Day: Even the Religious Lose Faith When They Think Critically," *The Atlantic*, April 27, 2012, accessed June 23, 2012, http://www.theatlantic.com/health/archive/2012/04/study-of-the-day-even-the-religious-lose-faith-when-they-think-critically/256402/.

[53] Amina Khan, "Thinking Can Undermine Religious Faith, Study Finds," *Los Angeles Times*, April 26, 2012, accessed June 23, 2012, http://articles.latimes.com/2012/apr/26/science/la-sci-religion-analytical-thinking-20120427.

[54] "Analytical Thinking Can Erode Religious Belief: Study," *NewsTrack India*, April 27, 2012, accessed June 23, 2012, http://www.newstrackindia.com/newsdetails/2012/04/27/161--Analytical-thinking-can-erode-religious-belief-Study-.html.

[55] Greg Miller, "Religion & Brain: Belief Decreases with Analytical Thinking, Study Shows," *Huffington Post*, April 27, 2012, accessed June 23, 2012, http://www.huffingtonpost.com/2012/04/26/intuitive-thinking-religious-belief-analytical-research_n_1457396.html.

Scientific American[56] to *RichardDawkins.net.*[57] Almost all media coverage of Gervais and Norenzayan's study was uncritical, amounting to summaries of the study's purported findings, sometimes garnished with additional speculations by the journalist.

According to my own investigation of English-language media networks during this time period, the life cycle of most popular scientific facts begins with "live" coverage websites, like *Science Daily*, which publish and categorize hundreds of scientific abstracts per day by automatically aggregating press releases, academic journal publications, and internet posts from a selection of fellow media sources. Aggregator sites are a valuable source for science-beat journalists, who can scroll through hundreds of options and choose topics that are most likely to attract readers. In the fast-paced online news cycle, scientific reportage must be written quickly, sometimes in the span of just a few hours. Once an article summarizing a new scientific fact is submitted to a news website, it is typically an editor's job to craft a provocative headline that will help the piece jostle for readership.

Thus, at first glance, the viral spread of this particular scientific fact—that analytic thinking undermines religious belief—seems to fit the media distortion model proposed by O'Connor, Rees, and Joffe. Of the numerous psychological studies of religion that were published during the summer of 2012, one might argue, click-hungry journalists seized on the one that resonated with social prejudices. Even if journalists did not misrepresent Gervais and Norenzayan's findings, they nonetheless selected, repackaged, and amplified them in order to

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[56] Daisy Grewal, "How Critical Thinkers Lose Their Faith in God," *Scientific American*, May 1, 2012, accessed June 23, 2012, http://www.scientificamerican.com/article.cfm?id=how-critical-thinkers-lose-faith-god.

[57] Daisy Grewal, "How Critical Thinkers Lose Their Faith in God," *RichardDawkins.net*, May 2, 2012, accessed June 23, 2012, http://richarddawkins.net/articles/645821-how-critical-thinkers-lose-their-faith-in-god.

attract readers. Cultural biases, according to this interpretation, distorted an otherwise neutral flow of natural facts.

The media distortion model is fundamentally flawed in this case, however, because it ignores the role that cultural norms played in the very construction of this scientific fact. In the following sections, I will argue that Gervais and Norenzayan unreflectively smuggled their own misguided beliefs about religion into the naturalized brain using the technique of microscopy. Their study was almost destined to receive significant media coverage, since it promised to objectively confirm the stereotype that religious belief is inherently at odds with analytic thinking. Over the remainder of this chapter I will offer a critical reading of "Analytic Thinking Promotes Religious Disbelief" as a scientific article. Gervais and Norenzayan's text follows a common template from the contemporary social sciences, involving four general parts: staging, existing evidence, hypothesis and research, and conclusions. I will summarize and critique each part, demonstrating along the way how these modern scientists engaged in microscopy.

Staging and Isolation

In the contemporary social sciences, publications of research findings typically open with what I will call a "staging" statement. Authors usually describe a gap in current knowledge, point to the existing literature that most closely addresses that gap, and explain why their study, with its unique parameters and methods, is a necessary intervention. Gervais and Norenzayan's staging statement is reproduced here:

> Although most people fervently believe in God or gods, there are nonetheless hundreds of millions of nonbelievers worldwide (*1*), and belief and disbelief fluctuate across situations and over time (*2*). Religious belief and disbelief are likely complex, multi-determined, psychologically and cultural shaped phenomena, yet to date little experimental research has explored the specific cognitive underpinnings of religious disbelief (*3, 4*). Here we begin to address this important gap in the literature by applying

> a dual-process cognitive framework, which predicts that analytic thinking strategies might be one potent source of religious disbelief.[58]

In this brief paragraph, Gervais and Norenzayan establish themes that run throughout their article. The authors' citation style might be striking to readers trained in the humanities. It is common in most humanities scholarship to discuss and contextualize scholarly sources, due to the operating assumption that even the most established of facts come from authors who are historically positioned within particular intellectual communities. In the above paragraph, on the other hand, citations are minimized to parenthetical numbers. This has the rhetorical effect of projecting objectivity, when in fact many of the cited texts are either controversial or only partially relevant. The first citation on the prevalence of nonbelief, for example, is to Phil Zuckerman's *Society without God: What the Least Religious Nations Can Tell Us about Contentment*.[59] At first glance one may expect that Gervais and Norenzayan are citing a recent poll or sociological survey, when in fact Zuckerman's book is the tale of a sociologist who spent a year in Scandanavia in order to study the worldviews of nonreligious societies. Regardless of the accuracy of the figure, the citation style collapses a number of elements—sociological data, the context of Zuckerman's popular secularist book, and the adjective *fervently*—into one seemingly objective statement.

Gervais and Norenzayan's opening paragraph also stages a binary that they will draw on throughout the study: a divide between those who "fervently believe in God or gods" and those who, against all odds, do not believe in supernatural agents. This binary understates the range of worldviews between fervent belief and plucky nonbelief. Agnostics and fervent atheists also

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[58] Gervais and Norenzayan, "Analytic Thinking," 493.

[59] Phil Zuckerman, *Society without God: What the Least Religious Nations Can Tell Us about Contentment* (New York: NYU Press, 2008).

complicate these categories, as do religious beliefs and practices that do not concern supernatural agents. The work of isolation—the crucial second step of microscopy— has begun. Gervais and Norenzayan have isolated one element of religion—fervent belief—which they will hereafter consider emblematic of religion in general.

Existing Evidence, Hypothesis, and Artificial Definitions

Gervais and Norenzayan's study is built upon the theoretical framework of "dual-process theory," which posits that information is processed in the brain though two distinct but interacting systems. System 1 relies on "frugal heuristics yielding intuitive responses," where System 2 "relies upon deliberative analytic processing."[60] The existing evidence, they maintain, indicates that both systems can interact simultaneously, but that System 2 has the ability to "override" System 1 "when analytic tendencies are activated and cognitive resources are available."[61] In short, dual-process theory posits that the variety of cognitive processes that humans use to interact with the world can be coherently divided into two distinct, non-overlapping types that correspond to our contemporary categories of "intuition" and "analytic reasoning."

It is common for scientists to describe psychological systems in emphatically conjectural terms, since psychological systems are not physically observable—they cannot be imaged or autopsied—and many hypothesized psychological systems are the subject of rigorous intra-disciplinary debate. Gervais and Norenzayan mention the hypothetical status of dual-process theory, but write that it is sufficient as a model since it has been successfully applied to other

[60] Gervais and Norenzayan, "Analytic Thinking," 493.

[61] Ibid.

phenomena across a range of fields.[62] Based on what we know about microscopy, this gesture merits more careful analysis. Microscopists depend on simplistic, artificial models of the human brain to accomplish their sweeping reductions. Sure enough, there are two immediate reasons to be skeptical of Gervais and Norenzayan's application of dual-process theory to religious belief.

First, dual-process theory is itself a controversial model of human cognition. Critics within the field of psychology have argued that dual-process theory overemphasizes the degree to which human cognitive processes are discrete, rigid, and hard-coded. When humans process information, critics argue, they simultaneously engage multiple cognitive processes, each of which is the product of a combination of genetic and environmental influences. Human individuals learn to navigate the world using their own unique combinations of cognitive and behavioral heuristics, using psychological systems that were inevitably influenced by their socio-cultural and linguistic milieu. It is therefore an oversimplification to divide cognitive processes into two categories—intuitive and deliberative—because this would assume that psychological systems are rigid and hard-wired at birth. As any experienced poker player or bicyclist can attest, however, "deliberative" cognitive processes (like counting cards or balancing in motion) can become "intuitive" with practice. Many researchers have therefore questioned whether dual-process theory can adequately capture the range and dynamism of human cognitive processes. This has prompted alternative models, including the "dynamic graded continuum" framework, which views cognition as an undivided set of interconnected processes, which vary in strength, stability, and accuracy.[63]

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[62] Ibid.

[63] Magda Osman, "An Evaluation of Dual-Process Theories of Reasoning," *Psychonomic Bulletin & Review* 11, no. 6 (2004): 993-994.

There is a second reason to be skeptical of dual-process theory as it is being applied to religious belief: its division between "intuition" and "reason" corresponds with some powerful cultural stereotypes. "Intuition," for example, often evokes femininity, emotion, and faith, where "analytic reasoning" is typically connotative of cold, scientific, masculine deductive work. It would be impossible for psychology or neuroscience to establish a language devoid of cultural associations, but, as we will see, a critical attitude is imperative in cases like this to avoid experimental bias.

Gervais and Norenzayan continue and, in a single flourish, collapse religion into the domain of System 1 processing:

> Available evidence and theory suggest that a converging suite of intuitive cognitive processes facilitate and support belief in supernatural agents, which is a central aspect of religious beliefs worldwide (*10-13*). These processes include intuitions about teleology (*14*), mind-body dualism (*13*), psychological immortality (*15*), and mind perception (*16, 17*). Religious belief therefore bears many hallmarks of System 1 processing.[64]

This assertion initially seems somewhat intuitive. Mind-body dualism is certainly a working intuition that we rarely analyze, and theories like the immortality of the mind or "soul" also seem unreflective. Religious belief, it follows, must be generally intuitive, as opposed to scientific reasoning, which is largely deductive and analytic. Upon further consideration, however, there are important counterexamples to this picture. System 1 intuitions, like those concerning supernatural agents, may be characteristic of many religions, but so too are System 2 cognitive processes like deliberative scriptural exegesis or the kinds of meta-cognitive analysis commonly associated with meditation. Religion is too complex a phenomenon to involve only one category of thought processes; religious persons around the world invariably engage both intuition *and* reasoning when it comes to matters of religious belief, experience, and practice.

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[64] Gervais and Norenzayan, "Analytic Thinking," 493.

Gervais and Norenzayan are skilled microscopists. Under the auspices of summarizing "existing evidence," they have posited an artificial model of the human brain (dual-process theory), isolated specific types of beliefs (mind-body dualism, supernatural agents), and essentialized those beliefs as fundamental to religion. We will see cognitive scientists of religion make similar rhetorical gestures in chapters two and three, so it is worth underscoring a key element of Gervais and Norenzayan's methodology. Before their experimentation has even begun, Gervais and Norenzayan have made a series of subtle, arbitrary distinctions that will configure their results. In a gesture that we will see cognitivist Robert McCauley perform again in chapter three, our microscopists have artificially defined religion as a set of System 1 intuitions by first *isolating* a subset of religious beliefs and then *essentializing* religion to be fundamentally defined by those beliefs. As we will continue to see, this is often how microscopists smuggle ideology about religion into the seemingly objective space of the naturalized brain. Gervais and Norenzayan themselves seem committed to assumptions about religion and science rooted in the conflict thesis. They presume religion to be fundamentally irrational—rooted in primal, natural cognitive processes—and align religious disbelief exclusively with logical, analytic thinking.

Having artificially defined religion as a set of intuitive beliefs according to a simplified model of human cognition, Gervais and Norenzayan state their hypothesis: since System 2 has been observed to override the input of System 1, it may hold that analytic processing will undermine religious belief. They then report on five studies of their own design that they used to test this hypothesis empirically. Study 1 tested whether individual differences in the tendency to

engage in analytic thinking are associated with variations in religious belief, where Studies 2-5 tested whether experimentally inducing analytic processing encouraged religious disbelief.[65]

Research, Conclusions, and Culture in the Lab

Study 1 involved Gervais and Norenzayan's asking a sample of Canadian undergraduates to perform an analytic thinking test, in which "intuitive" readings led to quick and easy, yet incorrect, responses that had to be analytically overridden. The authors provide 3 examples of test questions, all variations of the same form of mathematical problem that asks the reader to make relational judgments about sums. (One question, for example, reads, "If it takes 5 machines 5 [minutes] to make 5 widgets, how long would it take 100 machines to make 100 widgets?"[66] Where the "intuitive" answer is listed as 10, the "analytic" and correct answer is 5.) After completing analytic thinking tests, participants completed multiple surveys measuring religiosity, including a "10-item intrinsic religiosity scale" and "another scale assessing belief in religious supernatural agents."[67] The authors found that "analytic thinking was significantly negatively associated" with religious belief, demonstrating that "at the level of individual differences, the tendency to analytically override intuitions in reasoning was associated with religious disbelief."[68]

Studies 2-5 used "experimental manipulations to elicit analytic thinking" in order to measure whether there is a direct causal effect of analytic processing on religious belief. For each study, groups of participants (mostly Canadian undergraduates) were primed with either

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[65] Ibid.

[66] Ibid.

[67] Ibid., 494.

analytic or neutral stimuli, and then surveyed on their religiosity scale. Study 2, for example, used "visual priming," where groups were either shown an image of Rodin's *The Thinker* or non-analytic "control" artwork, such as the *Discobolus* of Myron. Studies 3, 4, and 5 had some participants complete tests previously shown to activate analytic thinking, such as random word rearrangement and responding to questionnaires in difficult-to-read fonts. In each of the four studies, the authors report, analytic thinking groups reported slightly—but significantly—less religiosity. Gervais and Norenzayan maintain that, "across all studies, it is difficult to think of a broad alternative explanation that could parsimoniously explain" these results, and that this lends empirical weight to the hypothesis that analytic processing promotes religious disbelief.[69]

Gervais and Norenzayan have, by this point in their paper, successfully indexed religious people according to their brain type by isolating an element of culture ("religious disbelief") and linking it to an element of nature (objective, disembodied "analysis") by means of the artificially stabilized brain of dual-process theory. The authors then report that they could not imagine any glaring "broad alternative explanation" for the experimental results indicating a positive correlation between analytic thinking and religious disbelief. As I will argue shortly, there is a broad alternative explanation for these results, but Gervais and Norenzayan cannot imagine it because they themselves were unwittingly causing these observed effects by priming their participants with a set of stereotypes about religion and science. Uncritical of their own System 1 intuitions about religion, our microscopists had smuggled culture into the brain, spun around, and then called what they found "nature."

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[68] Ibid.

[69] Ibid., 495.

Despite their best efforts, Gervais and Norenzayan overlooked the ways that their own cultural backgrounds affected their experimental design. This is especially apparent when considering certain methodological inconsistencies. Studies 2-5, for example, produced similar results despite the fact that they in fact measured quite different cognitive mechanisms: in Study 2 participants simply viewed an image associated with reasoning (e.g. *The Thinker*); in Studies 3 and 4 participants engaged in word rearrangement, with the test group fed words like "analyze," "reason," and "ponder"; and in Study 5 participants filled out surveys about their religiosity in either difficult- or easy-to-read fonts. Each study tested quite different cognitive acts— viewing symbolic objects, rearranging grammar puzzles, and language processing—that the authors were confidently gathering under the umbrella of "analytic thinking." Aside from certain cultural associations, however, it is not clear why any of these acts is more analytic than intuitive. Is viewing a picture of a famous statue an analytical act, requiring deliberative reasoning, or a fast-and-frugal process of recognition? The answer might vary from person to person. Perhaps a sculptor or art historian will view *The Thinker* analytically, where a non-expert would not.

Although these studies did not measure exclusively analytic cognitive processes, they did hold something else in common: a set of cultural associations with religious disbelief. The sample of participants—mostly Canadian undergraduates—likely shared backgrounds and cultural outlooks similar to their observers, and so they were already primed to pick up on such cues. If the outlook of the experimenters was perceptible, this would have likely affected the results, especially since Gervais and Norenzayan measured religious beliefs using surveys. Religiosity is notoriously hard to measure, and surveys are notoriously bad at measuring it: people generally have complicated ideas about religion that do not easily fit into a multiple-

choice option, and they are easily influenced to self-report more or less religiosity based on their surrounding environment and context.[70]

Gervais and Norenzayan magnified the risk of cultural contamination with a series of uncritical choices in the construction of their experiments. In Study 2, images of *The Thinker*—compared to "control" images of other art—produced the difference in self-reported religiosity. There is no reason to expect that *The Thinker* will prompt deliberative reasoning and the *Discobolus* of Myron will prompt intuition. There is reason, however, to expect that Canadian undergraduates will associate the image of *The Thinker* with reason or deliberative inquiry, which in Western culture are typically contrasted against religious belief, and that this would affect their answers to subsequent questions about their religiosity.

The designs of Studies 3 and 4 were particularly obtuse. During these experiments, participants were given five randomly arranged words (e.g., "high winds the flies plane") and asked to drop one word and rearrange the remainders into a meaningful phrase (e.g., "the plane flies high").[71] According to previous studies, Gervais and Norenzayan argue, this task requires System 2 thinking. Yet in both Study 3 and Study 4, the test and control groups were given the same kind of exercise. The only difference was that test groups were given word banks that included words like "analyze," "reason," "ponder," and "rational." Thus it seems likely in these two studies that the test and control groups alike were prompted to engage in analytic thinking, where only the test groups were exposed to words that happen to be associated with rationality and reason. The most likely cause of the test groups' lower self-reported religiosity, therefore,

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[70] Robert Wuthnow, *Inventing American Religion: Polls, Surveys, and the Tenuous Quest for a Nation's Faith* (New York: Oxford University Press, 2015), 193-202.

[71] Gervais and Norenzayan, "Analytic Thinking," 495.

was not the act of analytic thinking. Rather, it was their exposure to particular cultural connotations that influenced their answers on a subsequent survey about religious belief.

In keeping with the genre of contemporary social sciences, Gervais and Norenzayan conclude "Analytic Thinking Promotes Religious Disbelief" by acknowledging some of their study's limitations. They remind readers that it involved surveys of a small population within a single demographic, for example, and that it is part of a much larger debate concerning the rationality of religious beliefs.[72] They offer the impression that the study has taken just a few steps into the dark recesses of the brain and that subsequent research might continue where they left off. But what if they are on the wrong path entirely?

In the terms of microscopy, Gervais and Norenzayan claim to have explained elements of culture (religious beliefs and disbelief) according to the workings of nature: in this case, the System 2 override function of the naturalized human brain. Like other microscopists whom I have discussed in this chapter, the authors have validated social stereotypes by anchoring them in the fundament of nature. Yet, as a closer investigation of their experimental design reveals, Gervais and Norenzayan fell into microscopy's most common epistemological trap: they themselves believed in purification, even as they exploited the nature/culture divide. Gervais and Norenzayan mistook their location. They thought that they had isolated just one element of culture and followed it into the naturalized brain, but they had never actually entered a pure, objective space of nature. Influenced by the ideology of the conflict thesis, Gervais and Norenzayan had cut religion down to fit the image of the conflict thesis, and so their seemingly-naturalized truth was already a product of culture.

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[72] Ibid., 496.

Taken as a case study, “Analytic Thinking Promotes Religious Disbelief” and its surrounding news coverage also offer a counterpoint to the media distortion model posited by O’Connor, Rees, and Joffe. In this case, we cannot accuse the news media of distorting an otherwise-objective fact. It seems that online news outlets did selectively amplify this particular research study since its findings corresponded to long-standing stereotypes about religion and science and would thereby garner more attention and ad revenue. Yet Gervais and Norenzayan were themselves guilty of smuggling those very stereotypes into the seemingly objective realm of nature. If this chapter’s investigation of brain-based facts makes anything clear, it is that cognitive accounts of religion run distinctive risks as they traverse the presumed divide between nature and culture.

CHAPTER 2: THE COGNITIVE SCIENCE OF RELIGION AND THE METAPHYSICS OF CONSILIENCE

The main focus of this dissertation is the cognitive science of religion (CSR), the recent and most prominent biocognitive research program in the field of religious studies. CSR draws its concepts and methods from a cluster of scientific sub-fields that emerged in the 1960s and 1970s: evolutionary psychology, cognitive psychology, and cognitive neuroscience. CSR also stands out, both as an academic subfield and as an intellectual approach to the study of religion, for three major reasons. First, it is by far the most successful and fastest growing of the various cognitive paradigms that have emerged in religious studies over the past two decades. At the turn of the millennium there was a wave of new biocognitive accounts of religion, marking an influx of concepts from the boom of the neuro- and cognitive sciences in the previous decade. These initial works were diverse in their methodologies, explanatory goals, and intellectual commitments. Proponents of "neurotheology," for example, argued that breakthroughs in neuro-imaging, which provided fine-grained details about the functions and activities of specific brain regions, allowed scholars to identify the neural correlates of religious experiences and concepts. This, they argued, would help legitimize the "reality" of religion.[1] The early theorists and champions of "memetic theory," on the other hand, used cognitive accounts of memory and

[1] See, for example, Shawn Joseph, ed., *NeuroTheology: Brain, Science, Spirituality, Religious Experience* (San Jose: University Press, 2003); and Andrew Newberg, *Principles of Neurotheology* (Burlington, VT: Ashgate, 2010).

mimesis to argue that religion was a "virus of the mind" that exploited its hosts.[2] Others still argued that neuroscience would finally facilitate a true "contemplative science" that could unite Western science with the empiricism of Buddhist meditative practice.[3] While these and other early biocognitive accounts of religion claimed to be the initiators of revolutionary paradigms, only CSR persists today as a robust subfield with its own peer-reviewed academic journals, annual conferences, and a steady stream of scholarly manuscript publications.

The second reason that the CSR subfield merits consideration is that it so closely resembles the intellectual project, described in the introduction, of Humean natural history. Despite their claims of being radically innovative, CSR practitioners resemble David Hume and other eighteenth- and nineteenth-century natural historians of religion: they, too, are attempting to transpose religion from the supernatural realm to the earthly, fleshy domain of natural history; and, also like Hume, they aim do so by rooting religious beliefs and practices in the function—or malfunction—of humanity's ancient psychological mechanisms. While there are also significant differences between CSR and its intellectual predecessors, I will demonstrate how CSR falls into many of the same epistemological traps. As the saying goes, those who do not learn from intellectual history are doomed to repeat it.

The third and final reason that CSR stands out is that it has recently become the focal point of heated disciplinary debates about the future of the academic study of religion. A few prominent advocates of CSR have argued that cognitive science should not be treated merely as one additional approach to the study of religion. Rather, they argue, it deserves privileged

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[2] See, for example, Richard Dawkins, "Viruses of the Mind," in *Dennett and His Critics: Demystifying Mind*, ed. Bo Dahlbom (Oxford: Blackwell, 1993), 13-27; and Susan Blackmore, *The Meme Machine* (Oxford: Oxford University Press, 1999).

[3] See, for example, B. Alan Wallace, *Contemplative Science: Where Buddhism and Neuroscience Converge* (New York: Columbia University Press, 2009).

epistemological status as the only truly scientific and objective framework for studying religion. If religious studies reorganizes itself around the naturalized brain, these CSR advocates claim, it can finally establish legitimate intellectual bedrock. These totalizing epistemological claims have, in turn, prompted resistance and criticism from an unlikely coalition of theologians and secular scholars. Yet, despite the novelty of cognitive science and the contributions of a few forward-thinking scholars, these disputes have generally conformed to perennial debates about the essence of religion and the limits of reductionism. In chapters three and four I will argue that this is in large part due to the fact that CSR and its theological critics both operate within the same ideological confines of the conflict thesis.

In this chapter I will investigate the cognitive science of religion by approaching it as an intellectual paradigm. Following Thomas Kuhn, I define paradigm as a set of shared rules, theories, concepts, and techniques that both configure and define particular scientific communities. With his concept of scientific paradigms, Kuhn emphasized the social dimensions of scientific practice. Paradigms make collective research possible, Kuhn argued, by establishing a shared set of norms and standards for a field. Paradigms also condition research by influencing how scientists make predictions, formulate investigations, and interpret new evidence.[4]

The goal of this chapter is to identify some of the key concepts, assumptions, and methods that shape CSR research. Drawing on extensive research of CSR scholarship, I highlight specific texts and arguments that exemplify broader characteristics of this recent intellectual paradigm. Nonetheless, paradigms meander and sometimes shift. Scholarship is always changing, and so this chapter does not promise a timeless or universal portrait of this field. It offers, rather, a snapshot of a particular historical moment: the emergence, at the beginning of

[4] Thomas S. Kuhn, *The Structure of Scientific Revolutions* (Chicago: University of Chicago Press, 1962), 11-19.

the twenty-first century, of an intellectually particular and socially significant research program oriented towards biocognitive explanations of religion.

This chapter begins with a look at "faces in places," or the everyday phenomenon of seeing faces on inanimate objects, which I use to explain both CSR's approach to religious perceptions as well as my own approach in representing CSR as a research program. I then outline what I argue are the three main axioms of CSR scholarship: first, that the human brain is composed of evolved cognitive modules, resembling an ancient toolbox; second, that the human brain functions as an information processor, resembling a modern computer; and, third, that neurobiological reductionism brings scientific objectivity to the study of religion. Next, I demonstrate how these axioms inform one of most significant explanatory projects of CSR: the description of gods and other supernatural agents as the byproducts of a "hyper-active agency detection device" that humans are thought to share. The final two sections of this chapter are focused on critique. Drawing on alternative accounts of human psychology, I argue that CSR depends on a selective and tendentious model of the brain for its "microscopy" of religion. Finally, I turn to contemporary calls for "consilience," or the total integration of humanities scholarship into a single cognitive framework. The metaphysics of consilience, I argue, is built upon modern assumptions about nature, culture, and absolute truth.

Faces in Places

The blog "Faces in Places" is built around the simple premise that inanimate objects resembling faces are funny.[5] Some of the objects featured on the site are so expressive that they seem to have personalities, like the sink that carries a look of existential dread (Figure 2.1). Others do not look like faces at first until you see enough key elements. For example, the banana

pictured in Figure 2.2 looks nothing like a face until you notice the small brown spot on the left that resembles a right eye. For most viewers, once one sees a face the effect is permanent. Mister Banana cannot be unseen.

Figure 2.1. Joslin, Jay. "Robin's Sinking Feeling II." Digital image. Flickr. March 4, 2006. https://www.flickr.com/photos/moonbird/107879230

Figure 2.2 Steve. "smile." Digital image. Flickr. September 17, 2001. https://www.flickr.com/photos/behappy1_98/6155050973.

[5] "Faces in Places," last modified January 8, 2015, accessed January 31, 2016, http://facesinplaces.blogspot.com/.

While it might seem quite natural to perceive faces in the images above, this is actually a curious mental habit. Mister Banana carries a youthful air and a sly, knowing grin. He seems content. Why do two small dots and a line stimulate such active anthropomorphizing? There are no public blogs, as of this writing, cataloging rhombuses, letters, or words, even though they are equally unlikely patterns to appear on objects. Why "Faces in Places" but no "Shapes in Landscapes" or "Nomenclature in Nature"?

For evolutionary psychologists, the answer is that faces have long been uniquely important to human life. Throughout our evolutionary history, and to this day, facial recognition is a crucial task in day-to-day human survival. A nearby face could be a stranger or a friend, a predator or prey, and so the speedy recognition of that face could be the difference between life and death. It is likely that the human brain at some point develops a special mechanism for rapid facial pattern recognition. The existential sink, it seems, is the accidental offspring of this mental disposition.

Seeing faces in places is an example of what Friedrich Nietzsche called "aesthetic anthropomorphisms," humanity's shared tendency to impose order and meaning onto a chaotic universe.[6] Writing two decades after the publication of Darwin's *On the Origin of Species*, Nietzsche theorized in *The Gay Science* that human perception—and, therefore, knowledge itself—is structured around various idiosyncratic adaptations:

> Over immense periods of time the intellect produced nothing but errors. A few of these proved to be useful and helped to preserve the species: those who hit upon or inherited these had better luck in their struggle for themselves and their progeny. Such erroneous articles of faith, which were continually inherited until they became almost part of the basic endowment of the species, included the following: that there are enduring things, substances, bodies; that a thing is what it appears to be; that our will is free; that what is good for me is also good in itself.[7]

[6] Nietzsche, *The Gay Science*, 168.

[7] Ibid., 169.

Even logic, Nietzsche argued, originated in a nature red in tooth and claw. "Innumerable beings who made inferences in a way different from ours perished," he speculated, but "for all that, their ways might have been truer."[8]

For his part, Nietzsche was pulling knowledge down from the heavens into physical bodies mired in the chaos of nature. Against transcendent truths, Nietzsche offered a cluster of cognitive shortcuts that just so happened to have survived and propagated. Truths, in this picture, are not mirror images of an orderly nature. They are impositions forced onto the world by humanity's peculiar perceptive framework.

Nietzsche's account of cognitive error could be read as a corrective against the predominant epistemology of science that came before him. As Lorraine Daston and Peter Galison document in their 2007 book *Objectivity*, scientists during the eighteenth and early nineteenth centuries trusted the individual mind as a discerning, self-aware observer. Humans were thought to be the passive receivers of images and sensations; it was the role of the scientist to overcome this passivity and find truths that exist beyond the world's surfaces. Scientific atlas makers, for example, sought to realize the "ideal image" of, say, a plant species by looking beyond individual variants and their imperfections (e.g., a wilted leaf).[9]

Nietzsche was ahead of his time in many ways, but in this case he was participating in a larger intellectual trend. By the time of Nietzsche's writing at the end of the nineteenth century, most philosophers and scientists had turned away from the passive view of the scientific observer described by Daston and Galison. After Kant, Daston and Galison argue, the self was increasingly understood as active, dynamic, and liable to impose its preconceptions and pet

[8] Ibid., 171.

[9] Daston and Galison, *Objectivity*, 17-39.

hypotheses on data. New observational technologies, like photography, offered measurements so precise that human capacities seemed faulty.[10] Where at the end of the eighteenth century scientists sought to actively synthesize sensations into observational truth, by the time Nietzsche wrote *The Gay Science* in 1886 scientists were striving to eliminate the distortions of their minds from the scientific process.[11]

Today, practitioners of CSR have taken up a similar campaign against humanity's aesthetic anthropomorphisms, albeit with a different focus. Where Nietzsche was after truth itself, CSR scholars have targeted religion. The majority of religious concepts and practices—including supernatural agents, ritual impurity, and fear of divine punishment—are, they argue, like faces in places: errors produced by overactive minds. A predominant trope in CSR scholarship is the notion that religious concepts appear sensible to the human mind in the same way that Mister Banana appears to have a face. Religious concepts activate various subconscious psychological systems, they argue, that evolved in humanity's ancient past. According to CSR practitioners, these evolved psychological systems are universal—they have become, in Nietzsche's terms, part of the basic endowment of the species. This, they argue, explains why religion appears to be a natural phenomenon that emerges in every culture across the globe.

CSR is intellectually diverse, with its own internal contentions and methodological debates, but there are nonetheless a few recurring features of its central texts. For example, as Barbara Herrnstein Smith argues in her 2009 book *Natural Reflections*, CSR works are generally

[10] Daston and Galison's account also aligns closely with Michel Foucault's description of the modern *episteme* that I summarized in chapter one. The epistemological shift that Daston and Galison identify between passive and active notions of the "scientific self" correspond to Foucault's classical and modern *epistemes*, respectively.

[11] Daston and Galison, *Objectivity*, 201-205.

united by a triumphalist self-identification with science.[12] I argue, furthermore, that there are three distinct axioms that inform and configure CSR scholarship. First, CSR conceives of the human brain as ancient and modular, made up of discrete "mental organs" that have evolved over millions of years. Second, CSR maintains that, like a computer, the human brain is an information processor that operates according to specific, hard-wired rules. Third, CSR operates within an epistemology of neurobiological reductionism, which posits a unidirectional model of causality. Neurobiological reductionism assumes that cultural phenomena can be reduced to "lower-level" physical processes, unproblematically and without remainder.

I will describe each of these axioms in turn, but before I proceed I would like to clarify something about my own methodology. I have two goals for this chapter that will initially seem at odds with one another. One of these goals is to represent CSR as accurately and as generously as possible. As a critical theorist it is imperative that I try to represent and understand the texts that I critique in their own terms and—to the extent that this is possible—avoid simplifying or distorting them for my own intellectual purposes. Another motivation behind this first goal is that I am interested in CSR not just as a research program, but also as a way of thinking and conceiving of the world. As a former CSR believer myself, I am more interested in the seductive metaphysics of CSR, so to speak, than in the truth value of any particular CSR claim. In this chapter I have ironed out some of CSR's minor inconsistencies and presented its most persuasive hypotheses with the hope that even the most skeptical reader will get a glimpse of what it is like to occupy this paradigm.

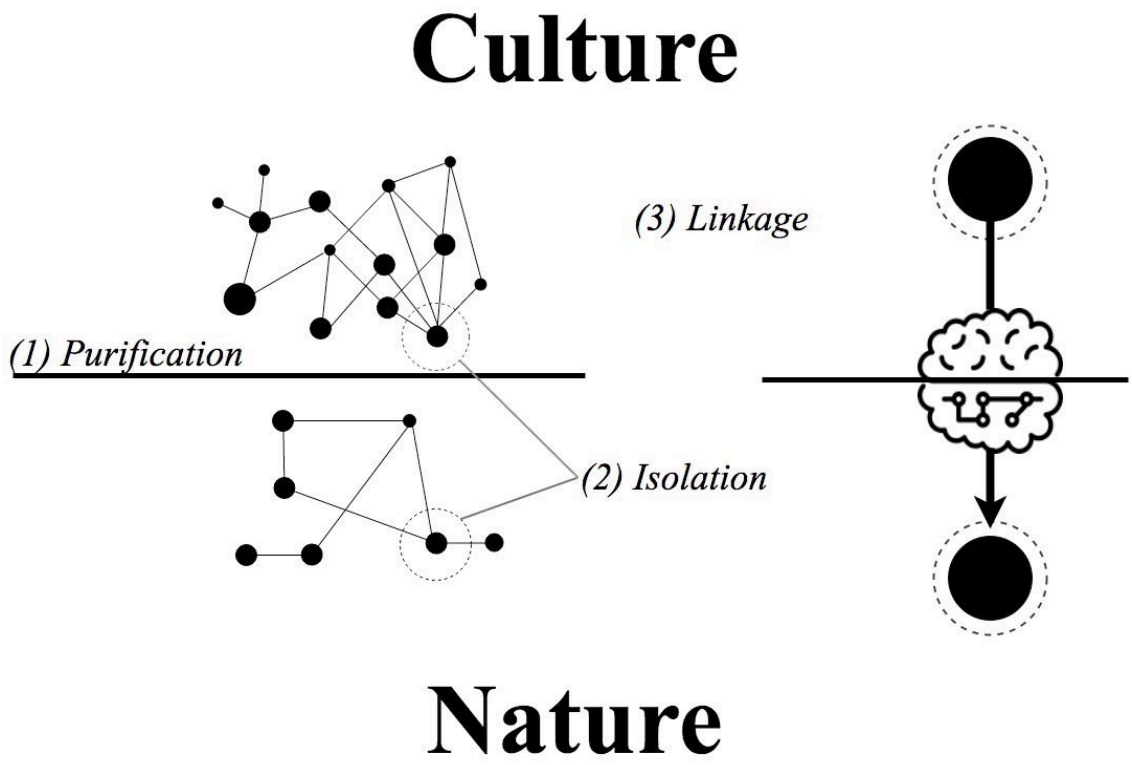
The second purpose of this chapter is to demonstrate how CSR engages in microscopy, or the reduction of culture to the fundamental truths of nature (represented again in Figure 2.3

[12] Herrnstein Smith, *Natural Reflections*, 31.

below). As I argued in chapter one, microscopy requires some intellectual hatchet work: to pick up an element of culture and carry it across the culture/nature divide, the microscopist must first isolate it by hacking away a tangled causal web, and then build a crude model of the human brain to serve as a bridge. In their attempt to essentialize religion, I argue, CSR practitioners often unwittingly smuggle certain ideological commitments into the seemingly-objective space of the naturalized brain.

The pairing of these two goals—to generously represent CSR and to critique its rhetorical artifice—would seem counterintuitive if the goal of this dissertation were to debunk the cognitive science of religion once and for all. This is not, however, the goal of my project. Once again, I am more interested in the metaphysics of CSR: where it came from, how it is made, and what values motivate its Apollonian struggle to simplify religion so that it might conform to the natural order. The structure of this chapter, therefore, will mimic on a larger scale my critique of Florence Colgate: I will initially present CSR in such a way that the reader might feel as convinced of CSR's merit as they were of Colgate's objective beauty, only to then reveal the work of microscopy. Like Colgate's face, I will argue, CSR's brain must be made up, all the way down to its natural-looking foundation.

Figure 2.3. Three Steps of Microscopy.



Axiom 1: The human brain is like an ancient toolbox.

CSR posits a particular model of the brain that is largely derived from the field of evolutionary psychology, which in the 1970s pioneered the use of adaptationist reasoning to posit and study psychological mechanisms. Against their colleagues in sociobiology, who applied evolutionary theory directly to manifest behavior, early evolutionary psychologists argued that humans have innate psychological mechanisms that evolved over the course of human history as survival-enhancing adaptations. The distinctive approach of evolutionary psychology was to explain so-called "universal" features of human psychology by reconstructing

adaptive problems faced by human ancestors and then positing specific mental organs that likely originated as adaptations for solving those problems.[13]

A central premise of evolutionary psychology— and, by extension, of CSR—is that the human brain evolved a special set of cognitive modules, or "mental organs," over the course of our ancient past that correspond to mental tasks like facial recognition, predator detection, and intuitions about the physics of simple objects. These modules, evolutionary psychologists argue, are hard-coded from birth, the product of hundreds of thousands of years of genetic evolution. Just as a baby deer is born with the mental systems necessary for it to immediately know how to walk, so too, it seems, are human individuals born with mental systems that prepare them for various necessary tasks.

Evolutionary psychologists posit that humans have what we might call "ancient brains," since these cognitive modules initially evolved within a very different environment than those that most humans occupy today. Our species spent roughly 2.5 million years adapting to life in small tribes of hunter-gatherers. On this scale, the cultural revolution of 40,000 years ago and the agricultural revolution of 10,000 years ago were mere temporal blips. Evolution could not possibly catch up to these rapid changes, and so evolutionary psychologists argue that our modern brains are made up of cognitive modules that are adapted for a very different world. When you drive your car to a hip new restaurant to sample the latest triumph in molecular gastronomy, you are nonetheless using the brain of a hunter-gatherer: hence the road rage on your way to dinner, your decision to order that delicious-smelling porterhouse steak, and your dissatisfaction with the lavender creme brûlée that—while interesting—was not quite sweet enough.

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[13] Kevin Laland and Gillian Brown, *Sense and Nonsense* (Oxford: Oxford University Press, 2002), 154-6.

In many cases, the adaptive function of these posited modules is quite clear. Imagine, for example, that at this restaurant outing you witnessed your waiter leave the bathroom without washing his hands. You would likely tell your fellow guests and would revolt at the sight of the waiter holding the top of your drinking class while refilling it. These reactions, evolutionary psychologists would argue, stem from the psychological adaptations of a generalist species. Our ancestors ate a variety of foods and therefore faced a wide range of pollutants, from plant toxins to pathogens. Arguably, generalist species like humans and rats need to evolve not only strong immune systems but also specific cognitive systems to minimize the danger of contamination. Humans therefore evolved psychological predispositions to detect correlations between foods and somatic disorders and to react emotionally to contact with possible sources of contagions. Thus, for evolutionary psychologists, your reaction to the waiter, along with your aversions to rotting corpses, feces, and spoiled vegetables, all stem from an evolved "contagion detection" module.[14]

Adaptations can also produce maladaptive behavior in new or changing environments. The moth that hovers around artificial lights and exposes itself to predators is following an instinct to maintain a constant angular relationship towards light sources after nightfall. This evolved trick for predator avoidance happens to be maladaptive in contemporary urban environments, where lamps can trigger behavior that originally evolved in relationship with the moon and stars.[15] Another example of maladaptive behavior is the human penchant for eating

[14] This is a favorite example for many CSR practitioners. See, for example, Pascal Boyer, *Religion Explained: The Evolutionary Origins of Religious Thought* (New York: Basic Books, 2001), 119-120.

[15] Florian Altermatt and Dieter Ebert, "Reduced flight-to-light behaviour of moth populations exposed to long-term urban light pollution," *Biology Letters* 12 (April 2016), accessed January 4, 2017, http://dx.doi.org/10.1098/rsbl.2016.0111.

sugars and fat. As CSR practitioner Robert McCauley argues in his 2011 book *Why Religion Is Natural and Science Is Not*, our preference for calorie-dense foods was adaptive when they were hard to procure, but now that they are readily available people tend to over-consume them. The obesity pandemic and the rapid increase of diabetes, he maintains, stem from this incongruity between our ancient brains and our modern environments.[16] Today our ancient mental tools can, in some contexts, do more harm than good.

CSR practitioners emphasize another distinction about our ancient mental toolboxes: that the tools themselves are specialized and separate. Prompted to explain the blog "Faces in Places," most psychologists would agree about why humans anthropomorphize these objects. Humans encounter faces hundreds of times a day, and the identities of those faces are important; it is therefore reasonable to expect that we have a facial recognition system that can occasionally misfire. How this happens, however, is the subject of some debate. Is facial recognition an innate, "domain specific" cognitive module that correspond to one function alone, or is the human brain a "domain general" neural network that handles particular tasks using an array of systems? Are facial patterns specifically pre-programmed into the brain, in other words, or do humans learn those patterns quickly because they are important? Evolutionary psychologists—and CSR practitioners after them—commit strongly to a "domain specific" view, emphasizing the independence and specialization of the brain's various modules. They liken the brain to a Swiss army knife: a set of individual tools that operate separately from one another, each designed for a specific task.[17]

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[16] Robert N. McCauley, *Why Religion Is Natural and Science Is Not* (New York: Oxford University Press, 2011), 54.

[17] Barrett, Dunbar, and Lycett, *Human Evolutionary Psychology*, 270-271.

Axiom 2: The human brain is like a modern computer.

The second axiom of CSR is that the human brain's operation resembles that of a modern computer. CSR practitioners frequently use information-processing metaphors to describe a brain that is programmed by evolution to process sensory "inputs" according to discrete, rule-based operations, also known as "mental algorithms." Lee Kirkpatrick, for example, defines psychological mechanisms as

> information-processing modules designed by natural selection to attend to certain features of the environment, process this information according to specific algorithms, and generate behavioral, cognitive, and emotional output, in ways that solved the recurrent adaptive problems faced by our ancestors.[18]

Sights, smells, and sounds go in, in other words, and specific thoughts and behaviors come out. What happens in the middle is the operation of various mental algorithms that are difficult to observe, but that can be deduced based on the evolutionary struggles of our ancestors.

For CSR practitioners, the "software" of the brain functions independently and automatically when triggered by the right sensorial input. We just *see* a face on the banana; it is not a willed thought or conscious choice. The fact that most of us cannot unsee a face on an inanimate object indicates that our facial recognition software is manipulating our sensorial experience before it even reaches our conscious mind. This is a point that Nietzsche himself would agree with. Much of the human brain's information processing occurs subconsciously, beneath our conscious awareness. In his landmark 2001 book *Religion Explained: The Evolutionary Origins of Religious Thought*, Pascal Boyer uses Daniel Dennett's phrase "Cartesian theater" to describe the illusion that thought is limited to that which we consciously

[18] Lee Kirkpatrick, "Toward an Evolutionary Psychology of Religion and Personality," *Journal of Personality* 67, no. 6 (1999): 923.

experience, rather than the higher-order emergence of underlying cognitive machinery.[19] Against the Cartesian theater, Boyer offers the alternative metaphor of a wealthy Victorian household: guests upstairs notice that their shoes are shined every morning, that their meals are prepared at the right time every day, and that the house remains well-kept, unaware of the systematic division of labor and complex organizational structure downstairs. Humans, he argues, are similarly ignorant of our "mental basements."[20]

An experiment by psychologist Rachel Gelman offers a supporting example of this view. Gelman tested preschoolers, ages three and four, on whether a set of animals and animal statues could move. The preschoolers clearly knew that animals could move by themselves and that the statues could not, but they could not explain their intuition. Some of Gelman's subjects explained that the statue couldn't move because it didn't have legs. When shown that the statue did have legs, they responded that they were not "good legs." The preschoolers' ability to derive inferences about the statues despite their lack of sufficient explanatory vocabulary indicates that the children had intuitions about the statues due to a specialized cognitive module, but they lacked the experience necessary to explain what they believed. Arguably, had external cues alone informed their conceptions of animals and statues, the children should have been able to simply retell the information they had learned. Thus, Boyer argues, there is good reason to think that—like a modern computer—our brains process information automatically, according to pre-written codes that function underneath the surface.[21]

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[19] Boyer, *Religion Explained*, 18.

[20] Ibid., 93-94.

[21] Ibid., 109.

CSR practitioners are particularly interested in a subset of mental software known as psychological "inference systems."[22] Inference systems are specialized explanatory modules that organize and contextualize sensorial information into mental categories and then use those categories to derive intuitions. They were presumably designed by evolution to process an immense amount of sensory information quickly and efficiently. For example, humans seem to have a common template for deriving knowledge about animals. No matter what the particular type (walrus, zebra, ostrich), research indicates that we utilize a single animal template to make inferences about tokens in general. If the average child learns that an ostrich lays eggs, that child automatically infers that all ostriches lay eggs.[23] There is evidence for the existence of other templates used to derive inferences for categories such as plants, inanimate physical objects, artifacts, and other minds.

Pascal Boyer calls these "ontological categories," and he posits that they are used to derive rapid, default inferences about new concepts without having to reacquire information relating to their kind. When we learn about a new tool for cracking nuts, for example, we already have a rich set of inferences which tell us that the tool will not sleep, eat, or breed. This is not a purely learned belief or the outcome of repeated experience. Rather, Boyer argues, it is the output of a cognitive module that automatically produces rapid judgments according to specific rules.[24]

CSR practitioners emphasize that the seeming chaos of human thought can be reduced to the simultaneous, rapid-fire operation of multiple cognitive modules. Boyer provides a

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[22] Scott Atran uses the term "conceptual module" to describe the same systems, but the computational metaphor remains. He distinguishes a conceptual module as an "innately constrained database for processing inputs." See Scott Atran, *In Gods We Trust* (Oxford: Oxford University Press, 2002), 58.

[23] Boyer, *Religion Explained*, 38-45.

[24] Ibid., 61.

particularly imaginative example of how multiple inference systems can operate simultaneously to parse incoming sensory information:

> In a quiet and prosperous suburb, a dapper old gentleman with a hat comes out the back door of a house and walks across the lawn. He is carrying a big screwdriver and a crowbar, which he puts in his trousers' side-pockets. He looks around a few times and then proceeds along the pavement. Not far from there, a child is playing with a huge Labrador on a leash. All of a sudden, the dog starts at the sight of a cat in the next garden and gives a sudden pull that makes the leash snap out of the child's hand. The dog dashes after its prey, charges across the pavement and knocks over the old man, who trips and falls flat on his face, his hat rolling in the gutter. The man yells in pain as the screwdriver has sprung out of his pocket and badly cut his arm. The man picks himself up and limps away, massaging his bloodied hand, leaving his hat in the gutter. You were not the only witness of all this; a police officer was patrolling the neighborhood. She picks up the hat, runs after the gentleman, puts her hand on his shoulder and says "Hey, wait!" As the man turns he recoils in visible shock at the sight of the police officer, looks around as if trying to find an escape route and finally says: "All right, all right. It's a fair cop." From his pockets he extracts a handful of rings and necklaces and hands them over to the bemused police officer.[25]

Boyer explains that the perception of these seemingly simple events actually requires multiple inference systems to work rapidly and in concert. One must understand the physics of solid objects as well as physical causation to make sense of the dog pulling the leash, snapping it from the child's hand, and knocking the man over. These kinds of events, Boyer argues, are automatically parsed in our minds by an "intuitive physics" inference system. One must understand goal-oriented motion to put together that the dog is charging after the cat based on its own desire (and not, for example, due to the wind or some other invisible force). To make sense of the confusion and confession of the thief, one must understand mental representation and deduce the thoughts and intentions of each actor (the man and the officer) in real time.[26]

Thus despite our conscious experience, CSR practitioners argue, we are not neutral observers of the events around us. Echoing Nietzsche, they argue that the world as we perceive it

[25] Boyer, *Religion Explained*, 96.

[26] Ibid.

comes narrowed, distorted, and categorized by mental systems that evolved long ago. Since our psychological inference systems are biologically hard-wired and therefore nearly universal across all human individuals, the observations and concepts that we share with one another are constrained and configured by the same mental systems. This, CSR practitioners argue, facilitates communication. If I give you a tool, you know not to feed it. If you tell me that you heard something running behind your house, I know that it had a mind and a goal. We are rarely aware of the functioning of these mental algorithms because they are ubiquitous and therefore seem natural.

Axiom 3: Neurobiological reductionism brings scientific objectivity to the study of religion.

In *Religion Explained,* Pascal Boyer calls for an intervention. Up until recently, he argues, theories of religion have been "thoroughly confusing," involving elaborate schemes to explain all of religion with "magic bullet" causes like psychological comfort or social cohesion.[27] As a result, he argues, contemporary anthropologists limit themselves to mere descriptions of religion since they do not think they can ask clear questions about its origins. This, he maintains, is because we have not yet achieved a thoroughly *scientific* account that can be hashed out and debated. Boyer frames his new scientific approach as uniquely empirical:

> In [scientific] theory, we describe phenomena that can be observed and even measured. We explain them in terms of other phenomena that are also detectable. When we say that *a* implies *b*, our account is vulnerable to counterexamples where *a* occurs without *b.* I do not know if this is enough to define scientific explanations but I am sure it excludes quite a few theories of religion. Some people say that the origin of religion is a long-forgotten visit from wise extraterrestrials who were compassionate enough to leave us with fragments of their knowledge. These people will not be interested in the kind of discoveries I discuss here.[28]

[27] Ibid., 48, 5.

[28] Ibid., 48.

Boyer is not the only CSR scholar calling for science to come clear up the study of religion. In fact, a distinctive feature of biocognitive accounts of religion in general is the tendency for authors to claim unique epistemic status for their projects. Titles like *Religion Explained, Breaking the Spell,* and *The God Delusion* are just a few examples of how recent evolutionary accounts tend to frame their projects triumphantly, arguing that religion has not been properly accounted for until now.[29]

CSR practitioners often begin with an overview of the field of religion, describing it as fragmented or exhausted, and then offer evolutionary or cognitive analysis as a means of centering and unifying a new and improved discipline. Boyer, for example, begins *Religion Explained* with a review of failed "origin scenarios" from the history of the study or religion, and then deliberately weighs the explanatory benefits of his revised form of scientific functional analysis.[30] Similar arguments can be found in the works of Susan Blackmore, Richard Dawkins, and Daniel C. Dennett, who all frame an all-or-nothing choice between their specific explanatory strategies and non-scientific accounts of religion, generally conceived.[31]

There are immediate reasons to be skeptical of these grandiose claims. It is unclear why scientific analysis should be the only legitimate means of studying religion, and, even if it were, contemporary biocognitivists would not be the first group of scholars to propose naturalistic accounts of religion. Nonetheless, CSR practitioners have made compelling arguments for the integration of scientific methods into the academic study of religion. In her plenary address as

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[29] Daniel C. Dennett, *Breaking the Spell* (New York: Viking, 2006); Richard Dawkins, *The God Delusion* (New York: Mariner Books, 2006); and Boyer, *Religion Explained*.

[30] Pascal Boyer, *Religion Explained*, 25-27.

[31] See, e.g., Dennett, *Breaking the Spell,* 29-53; Blackmore, *The Meme Machine*, 202-203; and Dawkins, *The God Delusion*, 51-59.

the 2010 president of the American Academy of Religion, for example, Ann Taves argued that integration with the sciences would help legitimize religious studies in the eyes of our colleagues and, perhaps more importantly, the bureaucrats in charge of shrinking university budgets.[32] In his 2008 book *What Science Offers the Humanities*, prominent CSR advocate Edward Slingerland argues that integration with the natural sciences would also bring clarity to the study of religion and facilitate more efficient collaboration; scientific integration, he states in no uncertain terms, is "the only way to clear up the current miasma of endlessly contingent discourses and representations of representations that currently hampers humanistic inquiry."[33]

To achieve scientific objectivity, CSR practitioners argue, scholars must engage in what social and cognitive scientist Dan Sperber terms "ontological restraint." In his 1996 book *Explaining Culture*, Sperber argues that the scientific study of culture must limit inquiry to only include entities that can be understood in causal, naturalistic terms.[34] For Sperber,

> a causal explanation is mechanistic when it analyses a complex causal relationship as an articulation of more elementary causal relationships. It is naturalistic to the extent that there is good ground to assume that these more elementary relationships could themselves be further analysed mechanistically down to some level of description at which their natural character would be wholly unproblematic.[35]

Sperber models culture as a population of mental representations (e.g., beliefs, desires, intentions, fantasies) and public productions (e.g., visible gestures, linguistic utterances, symbolic markers, written texts) that interact and often reproduce each other. A belief in transubstantiation, for example, might lead a mother to teach that concept to her daughter and

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[32] Taves, "2010 Presidential Address," 289-291.

[33] Slingerland, *What Science Offers the Humanities*, 9.

[34] Dan Sperber, *Explaining Culture* (Oxford: Blackwell Publishers, 1996), 99.

[35] Ibid., 98.

take her to the ritual of mass. This produces mental representations in the daughter, including not just belief in the concept of transubstantiation but also other associations, emotions, and preferences. Years later that daughter will likely pass on this mental representation to her own child, once more through public productions like speech and ritual.

Mental representations and public productions are, for Sperber, "tokens" that can be isolated and objectively measured. The frequency of the belief that wine is transubstantiated into blood, for example, can be counted in a given group based on the number of public productions and mental representations relating to that belief. Pascal Boyer takes a similar tack, advocating for an "epidemiological" approach to religion that studies the proliferation and distribution of religious beliefs across a population. For Boyer, a religious mental representation can be modeled as the product of external "vectors" such as person-to-person communication or encounters with a religious text.[36]

In these authors' imagining, a religious concept like transubstantiation can be isolated and molecularized, broken up into a series of naturalistic entities across the various mediums of flesh, thought, speech, art, text, and emotion. Objectified in this way, a religious belief or concept can be studied scientifically like any other deterministic system. One could, for example, study causal chains of mental and public representations that add up to the abstract idea of an omnipotent, omnipresent God. Are there similarities across different public productions (e.g., stories, texts, or myths) of omnipotence? Are some mental representations of an absolute God more likely to be remembered and communicated than others? For Sperber, Boyer, and other CSR practitioners, the isolation of discrete religious entities makes objective descriptions and comparisons possible. The ultimate goal of such analysis, they argue, would be the

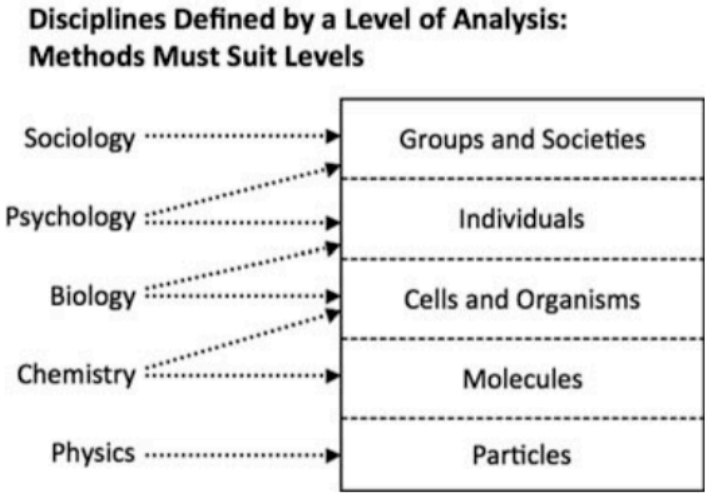
[36] Boyer, *Religion Explained*, 46.

comprehensive explanation of a religious phenomenon according to its underlying physical causes.

CSR practitioners generally advocate for neurobiological reductionism, an explanatory approach that describes complex mental and behavioral phenomena as the product of more basic sets of naturalistic causes within the physical brain. Neurobiological reductionism has become the hallmark epistemology of CSR, championed as revolutionary for introducing scientific objectivity to the study of religion. CSR practitioners argue that recent developments in evolutionary psychology, neuroscience, and cognitive science have finally made it possible to explain the psychological underpinnings of religion in scientific terms. Furthermore, they argue, neurobiological reductionism offers a way to integrate the various strands of religious studies into a single, coherent system.

CSR scholars generally advocate for a "consilience" model of human knowledge, which posits that all knowledge can eventually be united into a single, coherent system. Often described in optimistic and ecumenical terms, the consilience model is promised to incorporate every discipline across the sciences and the humanities into a single epistemological framework. This framework resembles an ontological ladder: simple, small things are at the bottom (e.g., particles and molecules) and complex things are at the top (e.g., humans and societies). As Ann Taves illustrates, each ladder rung, or "level of analysis," corresponds to a different set of academic disciplines (Figure 2.4).

Figure 2.4. “Disciplines Defined by a Level of Analysis.” Ann Taves, “2010 Presidential Address,” *Journal of the American Academy of Religion* 79, no. 2 (2011): 290.



For advocates of the consilience model, explanation is always more robust when it moves downward, reducing higher-level phenomena to their lower-level causes. These advocates therefore call for the “vertical integration” of academic disciplines. If sociologists can reduce phenomena from the level of “groups and societies” down to the level of “individuals,” they could pass the baton onto teams of psychologists and biologists, eventually rooting society-level phenomena in robust natural explanations.

The ontological ladder of consilience helps to contextualize CSR’s enthusiasm for neurobiological reductionism. In this view, the human brain (or, in Taves’ model, the border between “Individuals” and “Organisms”) marks a crucial threshold: it is where culture passes into nature and, therefore, where explanations become scientific. Aware that reductionism has a bad reputation among theologians and some scholars of religion, CSR practitioners often distinguish between good and bad forms of reductionism. As Edward Slingerland states, theologians and postmodernists understandably fear “crude reductionism,” or grandiose,

sometimes unsavory essentialist claims about human nature.[37] Yet, Slingerland argues, almost any explanation involves reductionism of some sort—to compare and analyze is almost always to simplify.[38] More nuanced and less incendiary, he continues, is "non-eliminative reductionism," which "recognizes the reality of complex, emergent human-level structures of meaning."[39] Non-eliminative reductionism, Slingerland argues, recognizes that higher-level phenomena exist and have value. Nonetheless, he maintains, "human-level structures of meaning should not be seen as possessing special ontological status, but rather must be understood as grounded in the lower levels of meaning studied by the natural sciences, instead of hovering magically above them."[40]

I have thus far outlined three axioms of the cognitive science of religion that, despite their simplicity, should help provide a portrait of this intellectual approach to the study of religion. Assuming an epistemology of neurobiological reductionism, or the view that so-called "human-level" phenomena can be reduced to the operation of lower-level physical processes, CSR seeks to explain religious beliefs and practices as the products of lower-level brain modules that humans all share. Since the human brain is assumed to be ancient and modular, it follows that some mental processes will be genetically encoded, spanning across cultures because they are universal to human cognition. Finally, since the brain is thought to work like a modern computer—processing information automatically, according to pre-written codes that do not require conscious activation—it follows that humans may believe or participate in religious phenomena unreflectively and automatically. These axioms together inform an explanatory

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[37] Slingerland, *What Science Offers The Humanities*, 14.

[38] Edward Slingerland, "Who's Afraid of Reductionism? The Study of Religion in the Age of Cognitive Science," *Journal of the American Academy of Religion* 76, no. 2 (March 2008): 375.

[39] Ibid.

[40] Ibid.

approach to religion that is variously known as the "epidemiological" or "byproduct" model of religious cognition, which I will summarize shortly after a brief detour to explain an under-recognized concept that is in fact crucial to CSR's byproduct model.

Introducing Morphospace

The best way to conceptualize CSR's byproduct model is to begin with a biological concept that subtly informs it: morphological space, or "morphospace," the spatial representation of actual and possible biological forms. I will use the term morphospace generally to describe any visualization that contextualizes the real— or that which *has been realized*— within a larger possibility-space of that which *could be realized*. Morphospace models have been used to represent a variety of phenomena, from cells to individual species to all living organisms.[41]

In paleontologist David Raup's influential model of shell shapes, for example, snail shells are mapped on a three dimensional cube where each axis corresponds to a variable characteristic in the geometry of a shell: the expansion rate, or the rate of increase in the size of each shell section per revolution; the distance between the cross section and the coiling axis (or, how far each tube moves away from the center); and the translation rate, which measures how far the tube moves vertically per revolution (Figure 2.5).[42] Theoretically, any coiled snail shell can be represented as a point in this three dimensional space. In Figure 2.6, previously discovered snail taxa have been mapped as individual points in such a morphospace. The darkened area of actual organisms represents a rather small wedge of the much larger possibility space of yet-unrealized (or undiscovered) shell shapes.

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[41] Philipp Mitteroecker and Simon M. Huttegger, "The Concept of Morphospaces in Evolutionary and Developmental Biology: Mathematics and Metaphors," *Biological Theory* 4, no. 1 (January 2009): 54-56.

[42] David M. Raup, "Geometric Analysis of Shell Coiling: General Problems," *Journal of Paleontology* 40, no. 5 (September 1966): 1178-1190.

Figure 2.5. Raup's three axes of shell shapes. David M. Raup, "Geometric Analysis of Shell Coiling: General Problems," *Journal of Paleontology* 40, no. 5 (September 1966): 1178-1190.

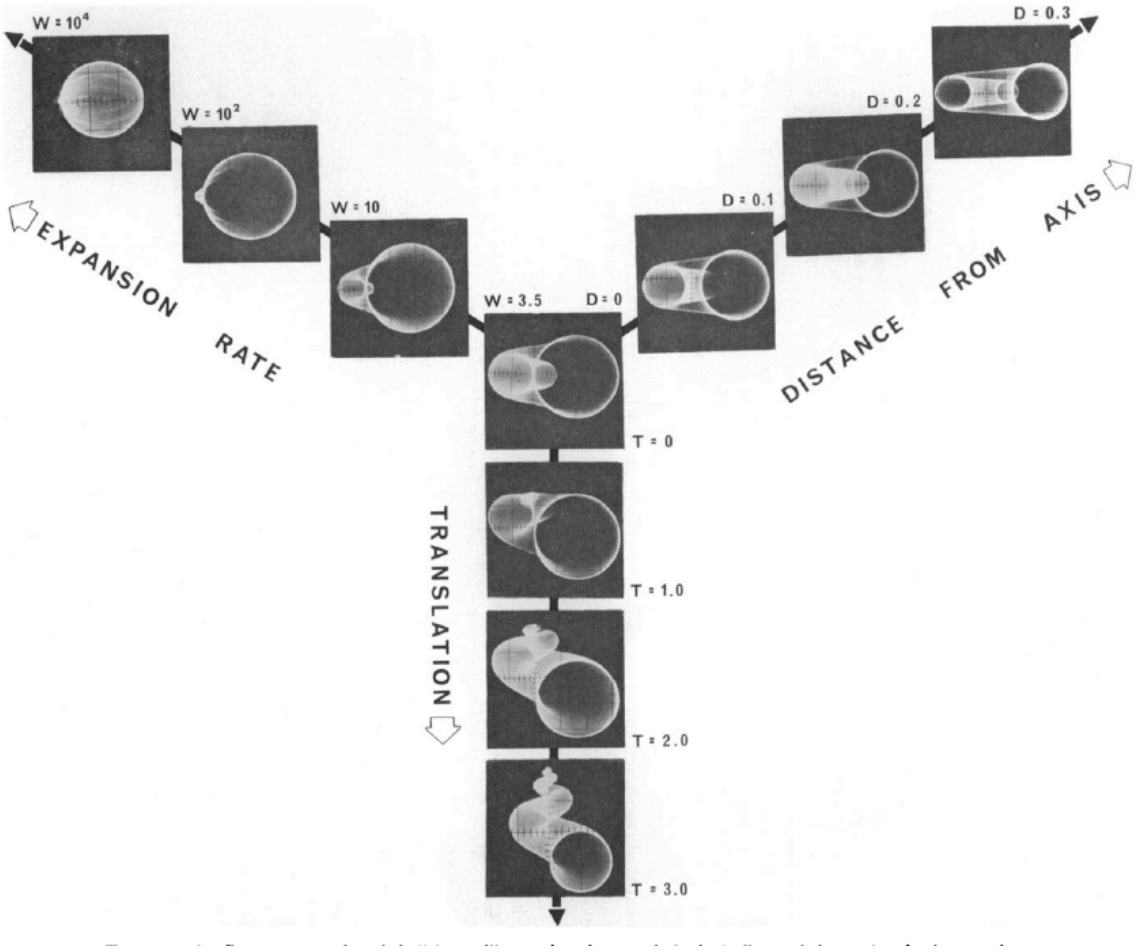
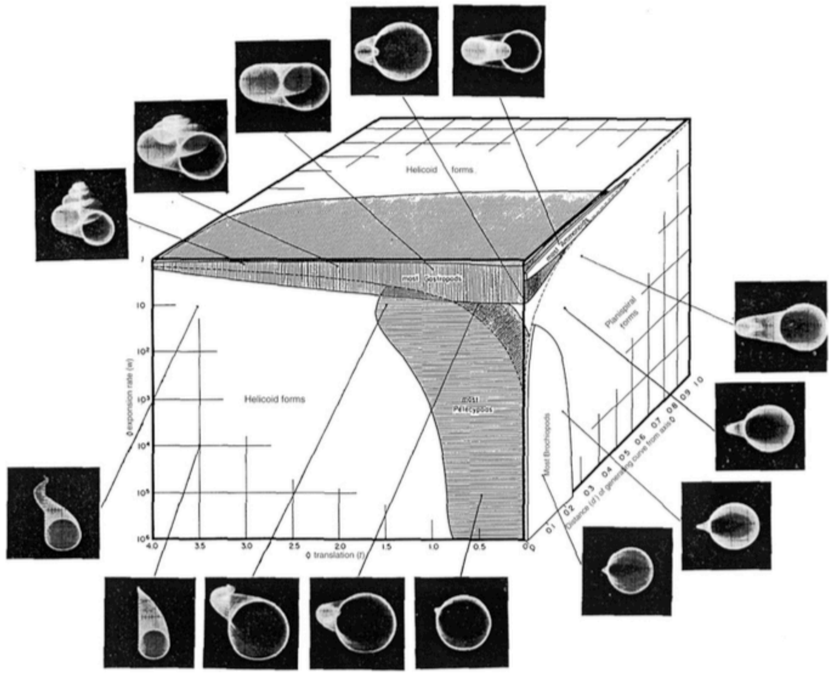


Figure 2.6. Raup's 1966 morphospace model of shell shapes. David M. Raup, "Geometric Analysis of Shell Coiling: General Problems," *Journal of Paleontology* 40, no. 5 (September 1966): 1178-1190.

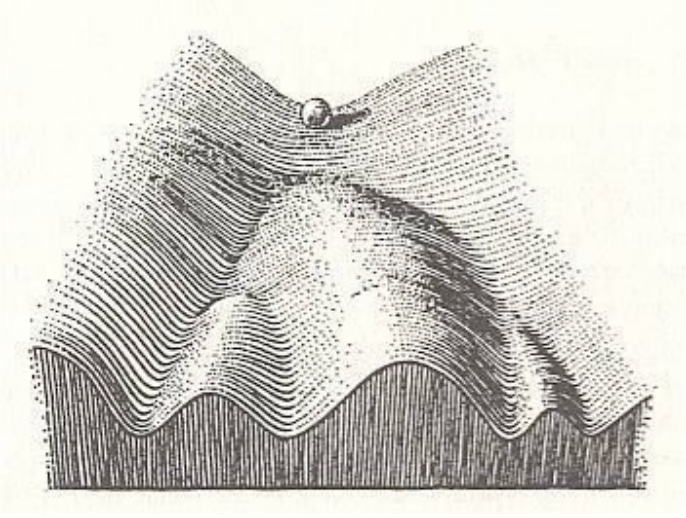


Geneticist C.H. Waddington pioneered a similar spatial metaphor that is frequently used to describe developmental constraints in evolutionary biology. A biological structuralist, Waddington argued that natural selection alone is insufficient to explain biological forms because minor perturbations in evolution are often sufficiently constrained to have no effect on developmental outcome. Waddington likened biological development to a ball rolling on a landscape: despite an infinite number of possible paths, the ball's motion is channeled by various constraints (Figure 2.7). The reason that there are no animals with wheels at the end of their limbs, for example, is not that this would not be adaptive. Rather, it is because the evolution of tetrapod limbs occurred incrementally through the focal condensation and bifurcation of cells—physical growth that, simply put, can either push straight outward or branch into multiple lines

(e.g., human hands and feet).[43] Possible first steps towards evolving a wheel represent the tall hills of a landscape: the ball will, much more often than not, fall back down into a channel.

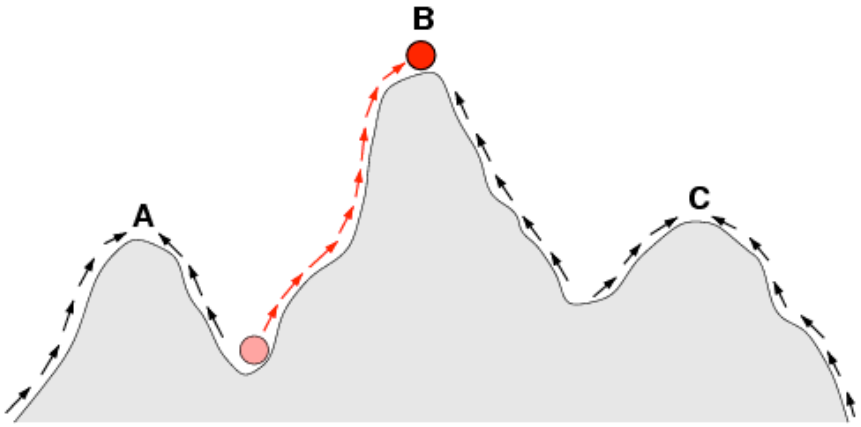
Morphospace models are similarly used in evolutionary biology to visualize fitness landscapes, which represent potential paths for the evolution of a species. Natural selection, represented by upward arrows in Figure 2.8, is like a blindfolded hiker who only walks uphill, without any end goal. Such a hiker may end up at the highest point in the landscape or at a lower relative peak, and will be stuck either way since she cannot move downhill. A species may similarly find itself at the top of an evolutionary peak that is relatively less adaptive than other possibilities. Fitness landscapes also help to demonstrate how some traits— like wings or thumbs— can evolve independently across multiple species. Just as there are multiple paths to the top of certain mountains, there can be multiple starting conditions that converge on the same developmental form or evolutionary strategy.

Figure 2.7. Waddington's Landscape. C.H. Waddington, *The Strategy of the Genes: A Discussion of Some Aspects of Theoretical Biology* (London: Ruskin House/George Allen and Unwin Ltd, 1957), 36.



[43] Kim Sterelny and Paul E. Griffiths, *Sex and Death: An Introduction to Philosophy of Biology* (Chicago: University of Chicago Press, 1999), 232-233.

Figure 2.8. Evolutionary Fitness Landscape. Digital image. Wikimedia Commons. July 18, 2004. https://commons.wikimedia.org/wiki/File:Fitness-landscape-cartoon.png.



Morphospace models are particularly useful for representing convergence points within dynamic systems, whether as dark space in a cube, valleys of a plain, or peaks of a landscape. Convergence points—also known as "basins" and "attractors"— represent an area of possibility space that continuously becomes actualized. This raises further questions: "Why are so many shell shapes unrealized?" or, more generally, "What micro-processes are channeling the system toward these results?"

Theoretically, morphospatial thinking should offer a more nuanced approach to the study of so-called cultural universals, such as music, burial rituals, or rites of passage. There are benefits to approaching such phenomena as attractors that are likely to be realized in cultural systems due to a convergence of various forces, pressures, and constraints. As Pascal Boyer rightly points out, essentialist accounts of religion forfeit nuance for simplicity. Any explanation of a recurring cultural formation that describes it as the inevitable result of some single cause (e.g., economics or existential anxiety) will ignore other contributing causal forces. Essentialist explanations also fail to stand up well to counter-examples or exceptions. A cultural morphospace model, on the other hand, would simply identify a convergence point and then

analyze which causes coalesce in order for the phenomenon to pop up in numerous—but not necessarily all— societies.

One example of how this can be done well is Pascal Boyer's explanation of cross-cultural similarities in music. Human auditory cortexes categorize, isolate, and identify sounds associated with human language. This system has been honed by evolution to recognize the specific frequencies that define vowel and consonant sounds, such as an adaptation for fine-grained sound analysis in communication. As a result of this common psychological feature, Boyer argues, there are basic similarities across most musical traditions, such as the equivalence between octaves and the privileged role of particular intervals like fifths and fourths.[44] There are, in other words, particular sound frequencies and percussive intervals that provide purified, intense doses of the kind of signal that usually activates our auditory cortexes. Within the infinite possibility space of possible musical forms, there are cultural attractors that musical traditions tend to converge upon due to our shared cognitive architecture.

The benefit of such an account is that it explains a recurring phenomenon without resorting to an essentialist claim about the fundamental nature of music. As a descriptive model, Boyer's account still allows for significant variations. An avant-garde experimentalist like John Cage, for example, would here represent someone who observes musical convergence points and then consciously defies them. This is an important consideration here because, at its best, CSR's byproduct model resembles a morphospatial approach to the study of religion.

The Byproduct Model and the Birth of Gods

CSR's byproduct model is named after its central argument: religion did not evolve by natural selection, but rather as a byproduct of otherwise adaptive human traits. This is a rejoinder

[44] Boyer, *Religion Explained*, 132.

against two intellectual camps. One the one hand, some scholars have argued that religion was itself an adaptation that enhanced the survival of our species. This position has superficial merits. Despite certain religious practices, like vows of celibacy, that are detrimental to an individual's reproductive success, religion seems to benefit human groups as a whole. Religion provides a shared worldview that can facilitate cooperation and trust and that often promises divine punishment for antisocial behavior. Numerous studies have found religious involvement to correlate positively with general well-being and optimism and negatively with depression and delinquent behavior.[45] Evolutionary biologist David Sloan Wilson therefore posits an "organismic" theory of religion in his 2002 book *Darwin's Cathedral*, conceiving of religious groups as adaptive units that evolve towards better staying power and group cohesion.[46]

On the other hand, another group of scholars posit that religion does indeed evolve by natural selection, but that it does so with no concern for its human hosts. Memetic theory, originally proposed by Richard Dawkins and expanded significantly by Susan Blackmore, holds that ideas and concepts themselves evolve in ways similar to genes.[47] A "meme" describes a unit of human culture, such as a melody, phrase, or behavior, that spreads from mind to mind analogously to the way that individual genes propagate over successive generations. According to memeticists, these cultural units are replicated via mind-to-mind transmission. Sometimes memes can mutate, and sometimes those mutations enjoy differential replicative success in the competitive environment of human culture. Thus, like genes, memes display replication, mutation, heritability, and they undergo natural selection. Memeticists consider religions to be

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[45] Robert Hinde, *Why Gods Persist* (New York, NY: Routledge, 1999), 216-20.

[46] David Sloan Wilson, *Darwin's Cathedral: Evolution, Religion, and the Nature of Society* (Chicago: University of Chicago Press, 2002), 1-25.

[47] See Dawkins "Viruses of the Mind," 13-27; and Blackmore, *The Meme Machine*.

"viruses of the mind," or self-propagating cultural formations that evolve without particular concern for human benefit.[48]

According to CSR practitioners, both of these approaches are misguided. In the vein of C.H. Waddington, they argue that certain religious beliefs and practices recur independently not by natural selection, but rather due to the contours of human psychology.[49] Culture, they argue, has very little room to evolve by natural selection because it is so powerfully channeled by our psychological inference systems, those ancient tools that, unbeknownst to us, automatically filter and process our sensory data.

Dan Sperber was perhaps the first to articulate the notion that small psychological biases could create large-scale convergence points for cultural systems. In his 1996 book *Explaining Culture,* Sperber posits gods as an example of "cultural attractors." Gods are salient, easy to imagine and remember, and they activate powerful inference systems that we already have for understanding humans. Given these and other micro-biases in cultural production and transmission, he argued, cultural change is likely to cluster towards the concept of supernatural agency.[50]

Expanding on Sperber's work, Pascal Boyer argues that cross-cultural religious ideas are those that activate our psychological inference systems in such a way as to be more likely to be

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[48] Dawkins, "Viruses of the Mind," 15.

[49] Memetic theory has been criticized on a number of other fronts, including its lack of empirical theories or testable predictions. It also supposes a deeply flawed model of human culture based on the high-fidelity replication of genes. This ignores the fact that humans digest, amalgamate, simplify, and revise information instead of repeating, verbatim, what was originally heard. For more on this debate, see Susan Blackmore, "The Meme's Eye View," in *Darwinizing Culture,* ed. Robert Aunger, (Oxford: Oxford University Press, 2000), 25; and Kate Distin, *The Selfish Meme* (Cambridge: Cambridge University Press, 2005), 4.

[50] Sperber, *Explaining Culture*, 12.

remembered, communicated, and retained. For example, Boyer reasons that when a religious concept kindles a person's contagion inference system, he or she is more likely to retain and communicate that representation in the future. (We might call this the dirty waiter rule.) We have an evolved disposition to seek out information and produce inferences concerning contagions in our environment, so pollutant-based religious proscriptions (e.g., against eating pork) should be particularly salient and memorable.

According to Boyer and others, the most successful religious concepts and beliefs are those that trigger one set of inferences but contain traits that contradict the information provided by that ontological category. Theoretically such mental states stick out in the mind when they cannot be filed into one template or another, and are subsequently more likely to be remembered and communicated. Indeed, religions across the globe contain concepts and beliefs with ontological violations. The Aymara people of the Andes believe in a mountain that has live body parts, bleeds, and feeds on animal sacrifices (natural object + organs, digestion).[51] The Uduck-speaking peoples of Sudan report that ebony trees eavesdrop on people's private, secretive conversations (plant + interest in strategic information).[52]

In a series of cross-cultural experiments, Boyer and psychologist Justin Barrett tested the notion that ontological violations increase the memorability of a concept or belief. They designed a number of stories in two versions, some with violations of ontological expectations and some without, and tested for differences in recall. Boyer and Barrett tested American and European subjects, as well as the Fang people in Gabon (in both small villages and the capital city), to control for cultural biases and literacy. They found that stories with violations fared much better

[51] Boyer, *Religion Explained,* 65.

[52] Ibid., 69.

than normal stories. Long-term recall, over the course of many months, was greatly increased by the presence of ontological violations. Furthermore, violations of ontological categories, specifically, were recalled better than stories with simple oddities. For example, "a man who walked through a wall," an ontological violation, fared better than "a man with six fingers," which is simply a violation of expectations.[53] Thus, for cognitive anthropologist Scott Atran, supernatural beliefs all share dual aspects of being commonsensical and counterfactual. This makes them "intuitively compelling yet fantastic, eminently recognizable but surprising."[54]

A distilled version of the byproduct model goes something like this. Humans are endowed with a suite of evolved psychological modules tailored to life in the Pleistocene, which function rapidly, automatically, and implicitly. Some of these psychological mechanisms significantly influence the retention, transmission, and salience of certain beliefs and concepts. Since psychological modules are always involved in cultural change, from the representation of cultural inputs in the human mind to the production of public outputs in specific forms, they significantly constrain cultural representations to the extent that natural selection can only occur in a very limited sense. Constant psychological biases at this small scale of transmission also produce large-scale cultural attractors, or recurring cultural formations. Universal features of religion such as burial rituals or belief in supernatural agents must therefore reflect biases in micro-level processes of transmission and retention. Religious concepts and beliefs are, in this view, recurring byproducts of evolutionary psychology—a set of cognitive basins on humanity's cultural plane.

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[53] Ibid., 79-81.

[54] Atran, *In Gods We Trust*, 83.

The byproduct model has been applied to a wide range of religious phenomena, including religious moral principles, spiritual impurity, and burial rituals. The most substantive, popular, and controversial explanatory object of this approach has been supernatural agency, or beliefs and concepts concerning gods, angels, spirits, and other nonhuman agents. Numerous CSR practitioners have explained supernatural agents as a byproduct of a hyperactive agency detection device (HADD) that humans evolved to better detect predators and track prey.

Between 4 and 8 months of age, human infants can track eye gaze and pointing, and by 18 months most understand how to enlist others to help achieve particular goals. Psychologists using computer animations can induce one-year-olds to attribute emotions and goals to small, colored dots moving on a screen (one "chasing" the other, for example). Fifteen-month-olds have been found to infer goal-directed behaviors in an orangutan puppet and to follow its gaze, even though they do not respond in such ways towards inanimate objects like mechanical pincers, which lack a face and do not interact contingently with the child.[55] According to CSR practitioners, these and other developmental studies suggest that humans are equipped with mental tools that aid in the detection of "agents," or entities that initiate and control their own actions and interact with others. From within the paradigm of evolutionary psychology, it seems likely that agency detection is accomplished by a psychological module that, in Scott Atran's words, interprets "visual displays of apparently self-initiated movement as belonging to distinct kinds of goal-directedness, such as helping or hindering or harming."[56]

Cognitive mechanisms for recognizing and interpreting animate agents would likely have been adaptive if they primed our ancestors to anticipate the presence of predators and more

[55] Ibid., 62-63.

[56] Ibid.

rapidly detect prey. Given the evolutionary environment of our ancestors, it was likely adaptive to have a highly active agency detection system, since this would make one more adept at social interactions and quicker to detect predators and prey in the surrounding landscape. Setting the agency "trip-wire" too low, causing individuals to mistake noise for signal, would likely not have been maladaptive so long as misperceptions could be abandoned once they were perceived as misguided. (The tendency today, for example, to mistake a blowing tree branch for an intruder at the window is not too costly if we can go back to bed.) Thus, according to many CSR practitioners, humans are equipped with a hyperactive agent detection device (HADD) that predisposes us to attribute natural events to intentional causes, and therefore project human-like beings into the world.[57]

Pascal Boyer additionally maintains that gods and spirits are not represented as being particularly human, but as having minds.[58] Supernatural agents are attributed beliefs and desires

[57] This line of argument is very common, but see Justin Barrett, *Why Would Anyone Believe in God?* (Walnut Creek, CA: AltaMira Press, 2004), 36.

[58] Experimental evidence supports the notion that humans understand supernatural agents as other minds. Justin Barrett and Frank Keil asked religious devotees in America and India questions about how their god(s) would act in certain situations. They provided situations, such as how God intervenes in the world, which allowed believers to choose between anthropomorphic and 'theologically correct' notions of their supernatural agents. In most situations the believers responded that gods act as persons would in the world (unable to alter physical and biological processes, for example), despite the explicit doctrines of their religions that state otherwise. This discrepancy between explicit theology and implicit understandings of supernatural agents has been confirmed in numerous experiments, revealing the interplay between reflective and non-reflective beliefs. According to this and other experiments, we intuitively understand gods as other minds, not the deities described in religious texts. Hence many cross-cultural similarities in supernatural agents (their having beliefs and desires, for example) are likely effects of our pan-human psychological make-up. Furthermore, in harmony with research in ontological variations, research suggests that concepts of supernatural agents that violate innate and modularized expectations, like those about the movement of objects (folk mechanics) and the intentional nature of agents (folk psychology), are inherently more memorable, attention-grabbing, and transmissible. See Barett, *Why Would Anyone Believe in God?*, 10; and Atran, *In Gods We Trust*, 95-113.

and understood to have memories, thoughts, and perspective because humans are predisposed to look for other minds in the world through our HADD.[59] In the process of seeking out other minds, Boyer argues, we tend to confuse natural events with intentional effects and begin to posit the existence of supernatural beings. These concepts are easily conjured up because, for Atran, "natural selection has trip-wired cognitive schema for agency detection in the face of uncertainty."[60] This overactive agency detector engenders supernatural interpretations not only because it biases our perception of natural events, but also because it makes concepts of supernatural agents all the more believable. When presented with a cultural concept like "ancestor sprits" or "omnipotent god," humans already have automatic inference systems at their disposal to understand the features of those minds. This facilitates group understandings of such agents, since every individual is working with the same psychological templates.

Thus, according to the byproduct model, supernatural agents represent a cultural attractor. Our species' dual predilections to over-perceive agency and remember and communicate tales of category-defying agents together make gods, spirits, ghosts, and other unusual agents likely to emerge across cultures. Theoretically this does not make supernatural agents inevitable. Given the span of human history and cultures, there have surely been many societies that did not converge upon this cultural formation. According to the byproduct model, however, gods are primed to succeed. Depictions and beliefs about a new supernatural agent are likely to proliferate much more quickly than, say, accounts of a man with six fingers.

This account of supernatural agents is popular among CSR practitioners for many reasons. First, it exemplifies many of the field's paradigmatic tenets and techniques. The HADD

[59] Boyer, *Religion Explained*, 144.

[60] Atran, *In Gods We Trust*, 71.

account draws on just one ancient cognitive module and explains how its subconscious operation can manifest as a wide variety of religious phenomena. It delivers on the promise of neurobiological reductionism by collapsing a vast range of cultural forms (every god, spirit, ghost, and angel, from every society across time and space) into a single fold of the naturalized brain. Finally, if accurate, this explanation of supernatural agents would represent a significant explanatory accomplishment for the natural historian of religion. Gods are a feature of religion perceived to be universal by most and sacred by many. If the idea of God was not yet dead, then surely CSR practitioners must have killed it. If we look closer, however, there are some loose ends hanging from CSR's model of the brain.

CSR's Artificially Stabilized Brain

Microscopy, as I have defined it, is a technique that temporarily subverts the modern nature/culture divide by isolating elements of nature and culture and linking them through an "artificially stabilized brain," or a selectively simplified model of human cognition that can facilitate broad reductionism. I have likened microscopists to epistemological tricksters. In the days of vaudeville, stage magicians would lay an assistant in a box and then saw that box in half, only to have the separated legs and head still move. Today's microscopists do this exact same trick but in reverse. They connect a body of culture to the legs of nature, dazzling their modern audiences who assume that the two cannot meet. If we wished to play the skeptical audience member and discover the secret of this trick, there would be a clear place to start: the junction point where legs and body meet. Thus, if we wish to understand how CSR accomplishes its microscopy of religion, then we should begin with the brain.

The first two axioms of CSR together portray the human brain as a cluster of highly specialized, preprogrammed modules that operate automatically without our conscious

awareness. Upon closer analysis, it becomes clear that these assumptions are crucial for the byproduct model because they establish a pan-human cognitive fundament. If all humans come hardwired with the exact same fixed psychological systems that go unalloyed by culture or environment, then religious concepts and beliefs can be reduced to this natural order of the brain dependably and unproblematically across cultures. Yet, while facial recognition and agency detection may seem to be compelling examples that at least some human behavior is determined by genetically hardwired cognitive modules, even this assertion is contested within current psychological literature.

Within evolutionary psychology, for example, the general consensus is that cognitive modules are not preprogrammed to the degree that CSR practitioners envisage.[61] Infants, research indicates, are not born with innate modules so much as predispositions and biases corresponding to domains like biology, physics, and psychology. These biases channel attention towards certain sensory inputs, like human faces, but do not act as specialized algorithms that come pre-programmed. These predispositions are adaptive because they direct infants to learn domain-specific knowledge over time through ongoing interaction with their environments. (According to evolutionary logic, such predispositions would be more adaptive than hardwired mental algorithms because they would be less costly to develop and more flexible for adapting to local circumstances.) Furthermore, while there is strong evidence that the human brain develops specialized modules and inference systems in this way, it is also generally understood that this is an ongoing process that is patterned by an individual's environment. Cognitive modules are thus much more flexible than the ancient toolbox metaphor allows.[62] The cognitive systems that most

[61] Barrett, Dunbar, and Lycett, *Human Evolutionary Psychology*, 276-279.

[62] Ibid.

all humans share seem less like a set of identical Swiss army knives and more like an array of soapbox cars that every individual builds over time using the materials at hand.

Even facial recognition, a favorite example within CSR literature, has been demonstrated to fit this more nuanced model of cognitive development. In a brain scan study of bird watchers and car experts, for example, those specialists were shown to use the brain areas associated with face processing when prompted with photos of birds and cars, respectively. Non-specialists showed no such response. Thus it seems that humanity's facial recognition module would be better described as a "visual expertise" region that responds to any sensory input that a person perceives as being distinctly individual rather than as part of a general domain or category.[63] (I happened to have experienced changes in my visual expertise region recently. Having never been interested in cars, vehicles on the road have always appeared to me as a relatively undifferentiated mass. When I recently decided to purchase a new car, however, and began researching the differences between various makes and brands, I quickly experienced a rather significant shift in my daily perception of cars around me. It was as if a new mental system had taken over.)

Another issue with CSR's axiomatic assumptions about the brain is that our understanding of the human brain's ancient cognitive modules is grounded in "adaptationist reasoning," an inferential method that has been highly controversial within evolutionary psychology. Adaptationist reasoning begins by positing a recurrent adaptive problem in the Pleistocene and then seeks out psychological mechanisms that might have produced optimal solutions to that problem. Such a psychological mechanism would have been adaptive in the Pleistocene environment, the reasoning goes, and would therefore have been selected. A

[63] Ibid., 180.

hypothesis about an evolved psychological mechanism is confirmed if it corresponds to observations of modern human behavior. The byproduct model usually comes in at the next step, drawing up hypotheses about religion based on previously identified evolved psychological mechanisms. Thus the hyperactive agency detection device, which originally evolved as an adaptation to the environment of our ancestral past, now produces unreflective, automatic beliefs about supernatural agents. However, as Joseph Bulbulia notes, this research agenda is tailored to explain religious thought in a specific way. Features of religion are automatically portrayed as byproducts of adaptive psychological mechanisms, rather, for example, than according to the possible adaptive functions of the religious features themselves.[64]

Matteo Mameli raises deeper concerns about adaptationist reasoning itself. This form of deduction, he argues, rests on a series of dubious assumptions. First, adaptationist reasoning assumes that the genes selected in ancestral environments for producing adaptive psychological mechanisms should today produce those very same psychological mechanisms. Like all other traits, however, psychological mechanisms are the product of developmental interactions between genes and the environment, and so it may be the case that genes selected in our ancestral environment produce very different psychological mechanisms or behaviors today.[65] Furthermore, Mameli argues, empirical and theoretical evidence indicates that changes in developmental environment can produce modifications in psychological mechanisms. (A child reared to identify birds regularly from a young age, for example, will likely develop a "visual expertise" module that differs from that of a child raised to identify cars.) If some or many

[64] Joseph Bulbulia, "The Cognitive and Evolutionary Psychology of Religion," *Biology and Philosophy* 19 (2004): 663-664.

[65] Matteo Mameli, "Evolution and Psychology in Philosophical Perspective," in *The Oxford Handbook of Evolutionary Psychology*, ed. Robin Dunbar and Louise Barrett (Oxford: Oxford University Press, 2007), 27.

psychological features of modern humans are influenced by the interaction between the current developmental environment and genes selected in ancestral environments, then strict adaptive thinking cannot reliably explain human evolutionary psychology.[66]

Adaptive thinking assumes that we have enough accurate and detailed knowledge about Pleistocene selection pressures to understand the specific adaptive problems faced by our ancestors. The trait-selective environment of the Pleistocene was constantly changing, however, as humans substantially modified their physical and cognitive niche through cultural transmission and niche construction.[67] CSR overlooks this problem by depicting pre-agricultural human life as a single, static, natural state of affairs. This is problematic for two reasons. First, it understates the dynamism of Pleistocene environments, given what we know about the interplay between environmental, ecological, and human psychological selection forces. Second, as Mameli argues, it overstates our knowledge of Pleistocene phenotypes and environments, which in fact is quite limited.[68]

There is an additional reason to be skeptical of CSR's "ancient brains" hypothesis and its emphasis that contemporary humans have brains that—due to the relative recentness of the agricultural revolution— are still designed for Pleistocene conditions. Where Mameli demonstrates that contemporary culture can influence psychological mechanisms—that the "environment" side of gene-environment interactions plays a role in cognitive development—there is also additional evidence that genes themselves can be patterned by culture, evolving much more quickly in response to cultural changes than the byproduct model lets on. A favorite

[66] Ibid., 27.

[67] Ibid., 28.

[68] Ibid.

example from the CSR literature of maladaptive evolved behavior is that of the moth whose hard-wired navigation systems have been hijacked by streetlights and candle flames. Ironically, there is substantial evidence that moths are quickly adapting to these urban environments.[69]

In the case of humans, there is extensive evidence indicating that we have undergone significant genetic evolution over the last 10,000 years. Proponents of gene-culture coevolution have documented numerous examples of culture creating "downward" pressure to influence the selection of genes. Take, for example, lactose intolerance. Most of the world's human population cannot digest milk, as they lack the enzyme necessary to break down lactose. If an adult who lacks this enzyme drinks milk, the lactose in that milk is fermented by bacteria, leading to flatulence and diarrhea. This is true for almost all mammals, who after weaning stop producing the enzyme that cleaves lactose into simple sugars that can be absorbed. Yet some groups of humans can digest milk into adulthood. In the early 1970s, geographer Fredrick Simmons suggested that the ability to digest lactose evolved in response to a history of dairying. The people of northwest Europe have long kept cows and consumed fresh milk. Dairying was carried to India by Aryan invaders and has been practiced by pastoralists in western Asia and Africa for millennia. In each of these regions, most adults can drink fresh milk. In the Mediterranean, on the other hand, where bacterial cultures were long ago outsourced to cleave lactose in the production of yogurt and cheese, only some adults can drink fresh milk. Wherever dairying is absent, it is rare for any adults to be lactose tolerant. As genetic data has subsequently confirmed,

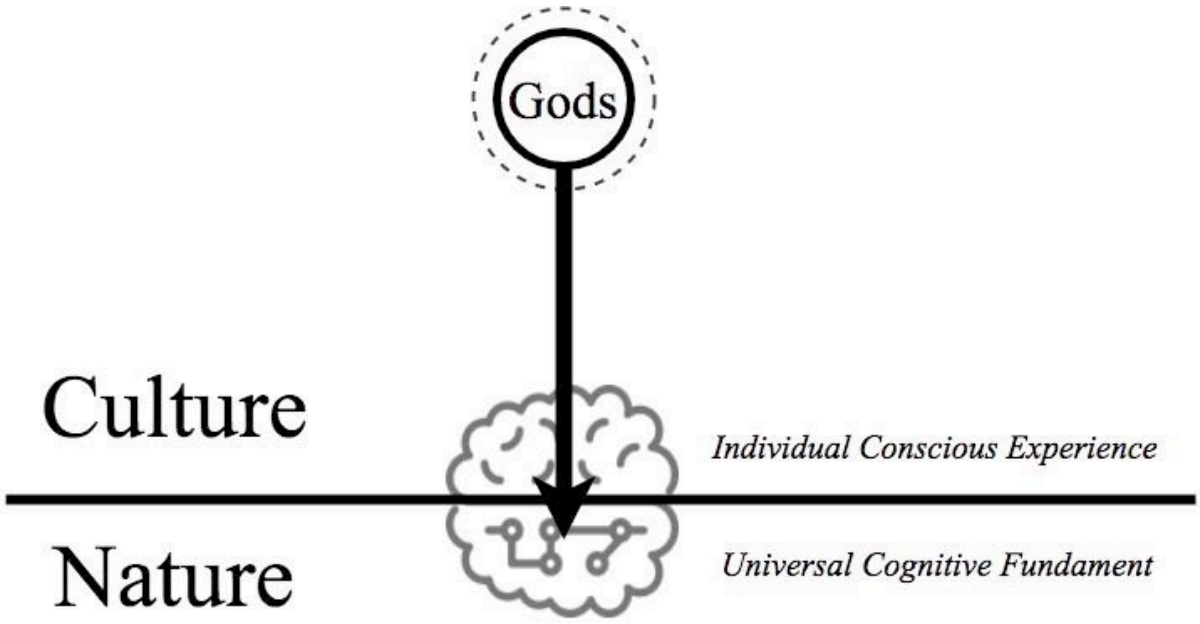
[69] Altermatt and Ebert, "Reduced flight-to-light behaviour of moth populations exposed to long-term urban light pollution," 1.

adult lactose digestion is controlled by a single dominant gene, and statistical analysis indicates that a history of dairying is the best predictor of a high frequency of this gene in a population.[70]

To summarize, CSR's axiomatic assumptions about human cognition depart from general scientific and psychological scholarship by positing a much more simplified and genetically determined human brain that is universal across cultures. Recognizing that this is a selective account of human cognition offers a key insight into CSR's distinct form of microscopy: that CSR reduces religion to nature by positing a universal cognitive fundament that is unalloyed by cultural influence (Figure 2.9). This is apparent in CSR's byproduct model account of supernatural agents. For gods and spirits across all cultures to be reducible to the misfiring of a few pan-human psychological mechanisms (e.g., a hyperactive agency detection device and folk psychology), then these mechanisms must be universal across human bodies; they must function automatically and predictably, like a computer, regardless of their particular cultural environments.

[70] Richerson and Boyd, *Not By Genes Alone: How Culture Transformed Human Evolution*, 191-193. For further discussion of gene-culture coevolution and agriculture, see Robert Boyd and Peter J. Richerson, *The Origin and Evolution of Cultures* (Oxford: Oxford University Press, 2005), 337-374.

Figure 2.9. CSR's Microscopy of Gods and Cognitive Fundament.



In *Natural Reflections*, Barbara Herrnstein Smith points out that numerous alternative models of cognition have been developed in cognitive science, evolutionary biology, linguistics, developmental psychology, and the philosophy of mind that all recognize features of cognition that are ignored by byproduct theorists like Atran and Boyer.[71] Crucial aspects of human cognition, including experiential learning and the complex transmission of skills and beliefs, are ignored by the byproduct view in order to simplify their account. Why, one might ask, would these scholars seek to explain religion with such a simplistic model of the brain that ignores the role of ongoing interactions between individuals and their environments? The answer seems to be that they are in search of absolute truth. If the same cluster of cells can be used for face-

[71] Herrnstein Smith, *Natural Reflections*, 37

processing and bird-watching, that would mean that our brains actively modularize in concert with our environments over the course of our lifetimes. This noun-to-verb shift, from ancient modules to ongoing modularization, pulls cognition up from the order of nature and into the messy domain of culture. Only by portraying cognitive modules as ancient and fixed can CSR practitioners claim to trace religion unproblematically down to nature.

To be clear, psychological mechanisms like HADD and folk psychology surely play a causal role in people's day-to-day conceptions and experiences of supernatural agents. CSR practitioners are not wrong for identifying this particular filament of cultural flesh. Their mistake is in seeking to reduce all supernatural agents, across time and space, to a universalized set of cognitive mechanisms. As any anthropologist of god-believers can attest, the agentic quality of gods and spirits is just one dimension of a phenomenon that arises out of the complex interplay between myriad social, political, cultural, and material forces. Spirits are often understood as agents, but they have many other qualities: some mount the living to dance and fight and eat, others demand sacrifice from a distance, still others are diffused into multiple agencies across nature, and yet still others do not exist at all, having sacrificed themselves in some spectacular generative death. While the psychology of agency-ascription does seem crucial to a robust understanding of supernatural agents, it is not clear why this element should replace or absorb all other attributes and modes of analysis. This is reminiscent of a rhetorical gesture that we saw in the problematic "gay dopamine junky" from chapter one: microscopists often select one material node out of a dense causal network and then ascribe it exclusive, absolute agency.

Thus far it is clear that CSR practitioners commit three common mistakes associated with microscopy. First, they require an oversimplified model of the brain that ignores the complexities of human cognition. Second, as I will further discuss shortly, they assume a simplistic model of

causality that privileges reductionism by ignoring the multi-directionality of causal flows. Third, CSR practitioners must isolate religious elements for reduction. As I will discuss in detail in chapter three, this sets our microscopists out on an impossible quest to essentialize religion.

The Metaphysics of Consilience

Perhaps the most common feature of biocognitive theories of religion—whether rooted in cognitive science, memetics, evolutionary psychology, or neuroimaging— is the declaration that science has finally been brought to bear on religion through the reduction of religious thought to cognition. Reductionism is widely celebrated within CSR literature as the purest form of explanation. Throughout *Religion Explained*, for example, Pascal Boyer identifies scientific explanation exclusively with descriptions of underlying causal mechanisms. Edward Slingerland argues that the humanities have become lost in the "extreme relativism of postmodernist theory" and that they will only get their bearings when they realize that the truth lies downward.[72] Reductionism also plays a powerful role in the epistemological framework of consilience. Once we achieve "vertical integration" between the humanities and the sciences, consilience advocates argue, cultural and social phenomena can finally be nested downward into their constituent physical processes.

Such rhetoric about reductionism is both familiar and significant. It is familiar because reductionism has been championed, to varying degrees of success, by countless thinkers as the ideal method for explaining phenomena ranging from religion to genes to the fundamental laws of the universe. As Joelle Abi-Rached and Nikolas Rose argue, reductionism was central to the emerging neuroscience of the 1960s because it informed a collaborative, interdisciplinary vision of the brain as a "complex biological system that needed to be dissected and studied from

[72] Slingerland, *What Science Offers the Humanities*, 5.

different levels of analysis."[73] It is no surprise that CSR, informed as it is by this intellectual history, should foster a general favoritism towards reductionist methods and explanations. This particular rhetoric is significant, however, because it goes beyond the mere preference for reductionist explanations. Advocates of consilience claim that all of religious studies scholarship—and even the humanities more generally—ought to be vertically integrated into a unified reductionist framework. This comes at a time when humanities departments in the United States have been besieged by budget cuts, and when general interest in neuroscience has created an industry of popular books, magazines, and television shows. Vertical integration would fundamentally reshape religious studies as a discipline; calls for consilience thus merit our attention because they are attractive, consequential, and dangerously flawed.

Reductionism is a powerful explanatory method, but, as many critics have pointed out, it is privileged by CSR practitioners in ways that are both dubious and self-serving. Herrnstein Smith, for example, takes issue with Pascal Boyer's exclusive identification of scientific explanation with descriptions of underlying causal mechanisms. This viewpoint, she argues,

> reflects standard views from when the major examples of scientific theories and explanations were drawn from the physical sciences (largely astronomy, physics, and chemistry), [where] current understandings in philosophy of science recognize a variety of explanatory modes and due attention is given to the biological, behavioral, and social sciences. In the latter sciences, explanation often takes the form of models of the emergence of complex phenomena from the dynamic interaction of multiple forces and contingent events operating at various levels of organization.[74]

Boyer's narrow account of what counts as science, in other words, is in fact out of line with contemporary scientific practice.

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[73] Joelle M. Abi-Rached and Nikolas Rose, "The Birth of the Neuromolecular Gaze," *History of the Human Sciences* 23, no. 1 (2010), 24.

[74] Herrnstein Smith, *Natural Reflections,* 37-38.

The vertical ontology that Boyer, Slingerland, Taves, and other CSR practitioners promote is a limited portrait of causality. Take, for example, the "levels of analysis" posited by CSR advocate Ann Taves (Figure 2.3). In this model, there are discrete ontological planes that correspond to various fields of scientific and humanistic inquiry: particles are studied by physics, molecules by chemistry, and so on. There are two fundamental problems, however, with this kind of onto-epistemological ladder. First, it ignores scientific discourses like biophysics and ecology that complicate this picture of discrete explanatory levels. Taves's choices are quite telling. Physics, chemistry, biology, psychology, and sociology seem sufficiently far away from each another, without being so far dispersed that a rogue phenomenon might slip through the cracks. Ecology, however, introduces a problem: it introduces causal relationships that move in every direction; there is no obvious "level" for ecology since it studies interactions among multiple levels of analysis. Second, this vertical model takes for granted the accuracy and transparency of the sciences that posit these levels of analysis. For Taves and other consilience advocates, the "cellular/organismic level" exists in the world, autonomously, and existed there before humans ever put it to language. This is far from given, and it runs against trends in contemporary philosophy of science that view such levels as discursive products themselves, constituted within specific historical, social, and cultural networks.[75]

As Richard Shweder argues, the recent trend of "consilience" and "vertical integration" models may initially seem to be an appealing ecumenical call for interdisciplinary cooperation. Upon closer inspection, however, the intellectual mission to "unify knowledge" can be traced to a distinct metaphysical program that is inherently hostile to many of the claims and methods

[75] See, for example, Isabelle Stengers, *Cosmopolitics I*, trans. Robert Bononno (Minneapolis: University of Minesota Press, 2010), 14-27; and Andrew Pickering, *Constructing Quarks: A Sociological History of Particle Physics* (Chicago: University of Chicago Press, 1984).

associated with the humanities. Advocates of consilience, Shweder argues, share a similar picture of reality that is oriented around an ontology of materialism and a corresponding epistemology of empiricism.[76] Thus, for "consiliators," as Shweder calls them, reality is made up of physical things that can be observed, studied, and tested. As Shweder points out, this worldview helps to explain two of the most common tropes in consilience literature. First, advocates of consilience share a preoccupation with the debunking of mind/body dualism, which to them represents the now-overcome failure to properly explain consciousness as an epiphenomenon of the material brain. Second, consiliators share an impatience with the diversity of theoretical languages and intellectual stances to be found in the humanities, which they take to indicate a kind of scientific immaturity.[77] This impatience with epistemological plurality would seem to be a product of consilience metaphysics. If only material stuff exists, and if all material things can be explained with empirical observation and reductionism, then there would be no need for gender theory or critiques of intellectual categories or odd-sounding disputes about biopolitical subjectification. This impatience with epistemological pluralism helps to explain CSR advocate Edward Slingerland's claim that

> bringing the humanities and the natural sciences together into a single, integrated chain seems to me the only way to clear up the current miasma of endlessly contingent discourses and representations of representations that currently hampers humanistic inquiry.[78]

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[76] Richard A. Shweder, "The Metaphysical Realities of the Unphysical Sciences: Or Why Vertical Integration Seems Unrealistic to Ontological Pluralists," in *Creating Consilience: Integrating the Sciences and the Humanities*, ed. Edward Slingerland and Mark Collard (Oxford: Oxford University Press, 2011), 56-57.

[77] Ibid., 57.

[78] Slingerland, *What Science Offers the Humanities*, 9.

If Slingerland's reader happens to share his consilience metaphysics and all that comes with it—physicalist materialism, faith in reductionism, a distaste for multiplicity, and reverence for absolute truth—then the vertical integration of science and the humanities would indeed seem a worthy endeavor. There is one catch, however, which casts a shadow upon Slingerland, Taves, and other consiliators' intellectual vision: our universe is rather complicated. According to our contemporary scientific, philosophical, and scholarly understandings of the world, matter and agency do not comport themselves to the simplistic vertical model that consilience requires. It would take an additional dissertation to begin to describe the many kinds of phenomena and relationships that the consilience model overlooks, but for now I will point to a few examples of its deficiency.

First, consilience espouses a highly limited account of causality that only recognizes "upward determination," or the ability of small, simplistic objects to affect larger ones. This ignores that sociocultural phenomena often exert downward force, such as the example of farming practices affecting genes that I discussed earlier. Even this counterexample is a poor representation of causality because it presumes an isolated force. As theoretical physicist and philosopher Karen Barad argues, it would be a mistake to assume that the primary ontological unit of being is an independent object with inherent properties, since any such unit is already influenced and determined by other forces. Rather, Barad argues, our universe is composed of entangled phenomena—of ontologically inseparable, inter- and intra-acting agencies.[79]

In this light, the plurality of theoretical language in the humanities is not an indicator of scholastic immaturity, but rather of the rich diversity of phenomena in the world. A plurality of being requires a plurality of explanatory languages. It again seems trivial to offer so limited an

[79] Barad, *Meeting the Universe Halfway*, 136-139.

example, but we might consider Michel Foucault's seminal study of disciplinary power. The classical and modern *epistemes* (those discrete epochs, described in chapter one, that Western Europe shifted between during the early nineteenth century), Foucault argues, promoted markedly different penal practices. During the classical age, punishment was directed against the body through torture in order to demonstrate the asymmetrical power relation between the sovereign and the accused. During the modern age, in contrast, there was a diffusion of power mechanisms in a fine-grained network of disciplinary functions that acted on the body through constant and anonymous coercion, normalization, codification, and supervision. With modernity came the rise of disciplinary institutions, including prisons, schools, hospitals, and military barracks, which all acted on the body, but indirectly, through measurements, subtle arrangements, and petty forms of coercion. This molecularization of discipline proved even more effective. As Foucault documents, disciplinary institutions help to create norms—calculable values that condition the modern individual to monitor and regulate themselves.[80] A central theme of Foucault's work is that institutions and regimes can effectively *create* individuals. Discipline was not merely a means of penalizing bodies, he argues, but also of composing them—of configuring human bodies and minds from birth so that they could become elements of larger systems: from schools, so to speak, to factories and barracks.[81]

Foucault's concept of disciplinary power is a significant counterexample to CSR's metaphysics of consilience because it reveals what vertical integration can miss. (Slingerland himself voices a distaste for Foucault, and so this is a particularly important point to heed.) Disciplinary power is not, to take a CSR practitioner's usage of the term, an empirical, reducible

[80] Michel Foucault, *Discipline and Punish: The Birth of the Prison*, trans. Alan Sheridan (London: Penguin Books, 1977), 26-129.

[81] Ibid., 164-170.

entity that can be represented in purely physical terms. Discipline, Foucault argues, moves through bodies; it is a form of power that is often invisible, distributed across school chairs, kindergarten codes of conduct, rules for time out, and the shifting definition of ADHD in the Diagnostic and Statistical Manual of Mental Disorders. Disciplinary power is made up of objects large and small; in Barad's terminology, it is a phenomenon made up of widely distributed but nonetheless entangled intra-acting agencies. It would be categorically impossible to "vertically integrate" such a phenomenon because it simply does not conform to consilience metaphysics, which requires "higher-level" phenomena to collapse seamlessly into lower levels.

Furthermore, as Barbara Herrnstein Smith argues in her 2005 book *Scandalous Knowledge*, the unification of knowledge does not appear to be a desirable ideal:

> Everything we know about the dynamics of intellectual history indicates that the play of differing—and indeed conflicting—perspectives is a necessary condition for the emergence of new ideas and practices in any field. In view of the tendency of all established conceptual systems to move towards self-affirming structures of ideas and of all disciplines—including the natural sciences—to be at risk of stagnation from taken-for-granted assumptions and habitual practices, the maintenance… of epistemic multiplicity and divergence appears crucial for the continued vitality of any intellectual community. That is why one would promote the vigorous, ongoing interaction of different disciplines and disciplinary practitioners: the mutual appropriation of skills and techniques, the inter-translation of concepts and findings, the extension of models and theories into new domains of application, the provision of new perspectives on old problems and so forth.[82]

Here Herrnstein Smith underscores the important difference between interaction and integration. Interaction between disciplines, she argues, facilitates new ideas and makes possible the kind of robust critique that can only come from an alternative intellectual perspective. The integration of the humanities into the sciences, on the other hand, would narrow scholarship towards a smaller set of axiomatic assumptions, theoretical vocabularies, and habitual practices. This may have to potential to make post-integration scholarship more "coherent" to the extent that it would be

[82] Herrnstein Smith, *Scandalous Knowledge*, 124.

more simplistic and thereby easier to understand without specialized training, but it would also inevitably forfeit attention to complex phenomena and increase the likelihood of intellectual stagnation. The choice, it seems, is between coherence and nuance.

If this dissertation had a methodological mantra, it would be that metaphysics requires work: essences must be distinguished, anomalies contained, multiplicity flattened. This mantra has helped us to see microscopists at work. Where we see an artificially simplified brain, for example, we should expect that someone is using it to dig for absolute truth. The same is true for the consilience model and its ambitious but foolhardy call for vertical integration. The main purpose of this critique is not to accuse Slingerland and Taves of intellectual sins, but rather, so to speak, to study the sinners. If consilience portrays an overly simplified universe, then why do so many CSR practitioners flock to it? In the language of computer coding, why do CSR practitioners see this as a feature and not a bug? It seems that the metaphysics of consilience offers three key benefits.

The first and perhaps most obvious benefit of the consilience model, for CSR practitioners, is that it is self-serving. It is no coincidence that the only religious studies scholars calling for consilience are themselves CSR practitioners. The consilience model imagines the brain to be the crucial, sole point of contact between nature and culture, and, therefore, between the vertically integrated sciences and humanities. CSR's consiliators have written entire books imagining how religious studies can be aligned with science, and in each case CSR plays a foundational role in translating, and thereby giving order to, previously unintegrated modes of humanistic inquiry.[83]

[83] See, for example, Ann Taves, *Religious Experience Reconsidered* (Princeton: Princeton University Press, 2009), 161-168; and Slingerland, *What Science Offers the Humanities*, 151-221.

Second, CSR practitioners seem eager to adopt the consilience model because of its presumed potential to return order to the study of religion. As I documented in the introduction, the "discursive turn" in religious studies has revealed the ambiguity and instability of religion as a concept. Religion, we have learned, has no universal definition or essential referent. It is, rather, a shifting intellectual category that has been deployed to describe cultural phenomena, social groups, mental states, and material practices in various configurations according to the particular aims and interests of those who wield it. The discursive turn represented an intellectual crisis for some groups, especially those who were invested in essentialist definitions of religion (theistic, atheistic, or otherwise). Advocates for consilience seem to think that religious studies is still experiencing an identity crisis, and that vertical integration offers a solution.

For example, in her presidential address to the 2010 meeting of the AAR, which amounted to a call for vertical integration, Ann Taves opened by recognizing "the historical instability of our object of study."[84] For too long, she argued, scholars of religion have been limited to provisional definitions and borrowed methods. Lacking an essential object of study, Taves told the crowd, we have raided other disciplines for concepts and tools, and now we cannot coherently talk to one another. It was time to fix this, she argued, by reorienting religious studies around the brain sciences. For Taves and other consiliators, the brain seems to promise a return to essential truth. After so many failed attempts over the past century to locate a universal element of religion that transcends the specificities of language, culture, and history, the brain, they argue, will finally unite us.

The final benefit of the consilience model, related to the nostalgia for religion's essence, is that the vertical integration model seems to promise a return to absolute truth. Nature, I argue,

[84] Taves, "2010 Presidential Address," 291.

today serves as a substitute fundament for nostalgic moderns. The classical age promised a single, unified grid of knowledge that transcended human knowers. As Foucault argues, this was shattered by the realization that humans were themselves imbricated in knowledge making. Modernity's answer, Latour argues, was not to embrace the immanence of knowledge, but rather to purify nature and culture into separate realms so as to selectively forget that nature is artificially made. In this context, consilience represents a misguided attempt to anchor all of human truth into the fundament of nature. What the consiliators do not realize is that, no matter how rigid the structure or deep the pilings, there is no bedrock below—no pure substrate of nature capable of undergirding human knowledge. Of course, our nervous builders have no reason to fear. Instead of digging for absolute truths they should stand up and survey the abundance all around them, at what has always been a multitude of hybrids all dancing on the same plane.

In this chapter I have analyzed the cognitive science of religion as an intellectual paradigm. I have argued that CSR practitioners share a common model of the human brain—an information processor made up of ancient, evolved modules—that configures their research. I have also argued that neurobiological reductionism is central to CSR scholarship because it helps to posit a "cognitive fundament," where statements about religion might be anchored to absolute truth of nature. In the following chapter I will continue to investigate CSR scholarship, focusing on one significant intellectual project in particular: Robert McCauley's argument that religion is cognitively "natural" and science is cognitively "unnatural."

CHAPTER 3: ARTIFICIAL DISTINCTIONS AND COGNITIVE ESSENCES

The central argument of this dissertation is that contemporary debates about religion and the brain are still configured around two flawed epistemological binaries from the modern era: the conflict thesis, which distinguishes religion and science as monolithic, oppositional entities; and the nature/culture divide, which conceives of nature and culture as separate ontological zones. Based on its title, Robert McCauley's 2011 book *Why Religion Is Natural and Science Is Not* might seem to overturn the former binary across the axis of the latter. Conventional wisdom associates religion with the realm of the unnatural, the exceptional, and the unprovable. We often think of religion as something that is concerned with miracles, supernatural agents, private matters of faith, and other elements of human life that go beyond the empirical, natural world. Conversely, we often associate science with the objective, mundane natural world.

McCauley's book does indeed upend these particular assumptions. Its central thesis is that religion is "cognitively natural," or the product of mundane psychological processes from humanity's ancient evolutionary past, whereas science consists of cognitively "unnatural" thought processes that are exceptionally rare and difficult. While these arguments may seem counterintuitive, I will argue in this chapter that they nonetheless service the ideology of the conflict thesis.

In this chapter I will analyze McCauley's 2011 book as well as some subsequent debates between McCauley and his critics, which together provide a case study of the rhetorics and ideologies that inform contemporary biocognitive theories of religion. I have chosen *Why Religion Is Natural and Science Is Not* as an object of critical analysis for two reasons. First,

McCauley's project in many ways represents the pinnacle of the CSR rhetorics that I am concerned with in this project. I argue that CSR represents the latest in a series of attempts to essentialize religion by identifying within it a core element that transcends the particularities of culture, language and history. As I demonstrated in chapters one and two, CSR practitioners engage in "microscopy," or reductions of cultural phenomena to the fundament of nature. Where the typical CSR project reduces one element of religion to a function or region of the naturalized brain, however, McCauley's work represents an attempt to essentialize all of religion to a particular domain of cognitive processes. To take on this monumental task, McCauley mobilizes an impressive array of CSR research; based on its reception within the field, *Why Religion Is Natural and Science Is Not* is one of—if not the—most successful synthetic work of CSR scholarship.

The second reason why I have chosen *Why Religion Is Natural and Science Is Not* as an object of analysis is that McCauley's project was widely discussed by colleagues and critics alike. McCauley's work has been the topic of numerous articles, dedicated conference panels, and academic journal volumes. Since McCauley himself participated in many of these exchanges, there exists a substantial written record of the author's work in progress. In this chapter I will analyze key exchanges between McCauley and his critics that illustrate the significant role that the conflict thesis plays in the formation of McCauley's intellectual categories.

This chapter is composed of five sections. In the first two sections of this chapter I will summarize McCauley's arguments about the cognitive naturalness of religion and the cognitive unnaturalness of science. I will then highlight criticism of the artificial definitions within McCauley's text and analyze the author's struggle to maintain clear divisions between religion,

theology, science, and technology. McCauley's strenuous distinctions, I argue, exemplify how essentializing religion requires endless rhetorical work, and in the fourth section of this chapter I will explore how McCauley's efforts service the ideology of the conflict thesis. In the fifth and final section I will analyze exchanges between McCauley and his critics and then draw from *Why Religion Is Natural and Science Is Not* a lesson about why it is crucial for modern-day microscopists to be critically aware of the intellectual histories that inform their objects of analysis.

The Cognitive Naturalness of Religion

Religion, McCauley argues, comes naturally to the human mind. Religious concepts—such as supernatural agents, spiritual impurity, or sacred space—activate ancient, evolved cognitive systems that all humans share. This makes them intuitive and easy to believe. On the other hand, McCauley argues, science is unnatural for the human mind because it involves radically counterintuitive and abstract forms of thought that are extremely difficult for most human brains to practice. This, the author maintains, is why religion is so ubiquitous and science is such a recent and rare social phenomenon.[1]

McCauley frames his argument around an adapted version of dual-process theory, the same theoretical framework utilized by psychologists Will Gervais and Ara Norenzayan in "Analytic Thinking Promotes Religious Disbelief."[2] Dual-process theory posits that information is processed in the brain by two distinct systems. System 1 is a set of "fast and frugal" mental processes that are automatic and unconscious, such as facial recognition or automatic inferences based on mental categories. System 2 is a set of deliberative, analytical mental processes that

[1] McCauley, *Why Religion Is Natural and Science Is Not,* 3-4.

[2] Gervais and Norenzayan, "Analytic Thinking Promotes Religious Disbelief," 493-496.

require more cognitive resources, but which can override System 1 if enough mental energy is available. McCauley labels System 1 "natural cognition" and System 2 "unnatural cognition," since System 1 thought process are generally considered to have originated in humanity's ancient past, whereas System 2 thought processes are thought to be—on the time scale of human evolutionary history—relatively new.[3]

As I point out in chapter one, dual-process theory has some significant flaws. First, it overemphasizes the rigidity of cognitive processes, ignoring, for example, that deliberative processes can become automatic and intuitive with practice. Second, it is not clear that the dynamic range of human cognitive processes corresponds neatly to two distinct systems. This has prompted researchers to establish alternative models, including the "dynamic graded continuum" framework, which views cognition as an undivided set of various interconnected processes that operate at various speeds and levels of conscious access.[4] Finally, the notion that System 2 processes require extra energy to override System 1 processes has recently come under fire. (This assumption informed psychologists Roy Baumeister and Dianne Tice's infamous 1998 "ego depletion" experiment, which reported that difficult cognitive tasks deplete an individual's willpower and thereby increase their likelihood to make unhealthy dietary choices, like accepting a piece of chocolate cake.[5] The study, which has been cited over 3,000 times and launched an

[3] McCauley, *Why Religion Is Natural and Science Is Not,* 4-6.

[4] Osman, "An Evaluation of Dual-Process Theories of Reasoning," 993-994.

[5] Roy F. Baumeister, Ellen Bratslavsky, Mark Muraven, and Dianne M. Tice, "Ego Depletion: Is the Active Self a Limited Resource?" *Personality Processes and Individual Differences* 74, no. 5 (May 1998): 1252-1265.

entire self-help genre, was recently debunked and made emblematic of psychology's "reproducibility crisis").[6]

McCauley only explicitly addresses the first of these flaws. At the onset of *Why Religion Is Natural and Science Is Not*, the author divides "natural" cognition into two categories: "practiced" natural cognition and "maturationally" natural cognition. McCauley distinguishes as "practiced" any complex mental process that is deliberatively learned and then eventually becomes intuitive with experience. Learning to ride a bicycle, for example, initially involves System 2 cognitive processes (e.g., concentrated focus, or analysis of previous mistakes), but over time it becomes familiar and, eventually, automatic. "Maturationally" natural cognition, on the other hand, refers to a set of biologically coded, subconscious mental processes that require no experience or instruction.[7] McCauley offers chewing and walking as examples. Adults do not teach infants how to chew or walk; rather, these activities "naturally" occur in babies across cultures because they have been hardwired into our brains by evolution.[8]

Another way of framing the difference between McCauley's two categories of System 1 thought processes is to say that maturationally natural cognition is natural and practiced natural cognition is cultural. The author brings up this distinction throughout *Why Religion Is Natural and Science Is Not*, whenever he needs to account for a System 1 process that is not biologically hardwired, but instead seems influenced by an individual's cultural environment. "With extensive practice," McCauley emphasizes, "thoroughly *cultural* activities eventually begin to

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[6] For a helpful overview, see Daniel Engber, "Everything is Crumbling," *Slate*, March 6, 2016, accessed March 17, 2017, http://www.slate.com/articles/health_and_science/cover_story/2016/03/ego_depletion_an_influential_theory_in_psychology_may_have_just_been_debunked.html.

[7] McCauley, *Why Religion Is Natural and Science Is Not,* 4-6.

[8] Ibid.*,* 20-22.

feel natural. They become *second nature*… However natural they may come to feel, though, theirs… is a *practiced* naturalness."[9] When cultural activities work their way into the subconscious, they may mingle with truly natural cognitive processes. But we must not forget, McCauley implores, that walking and bicycling belong to the ontologically separate realms of nature and culture. Understanding that these cognitive processes are from separate orders, McCauley promises, will yield insights into the nature of religion.

McCauley argues that there are three reasons to immediately expect that religion is a natural phenomenon. First, religion is ancient. We know that religion dates back to our prehistoric past, McCauley maintains, thanks to widespread anthropological evidence of ritual sites among prehistoric groups. McCauley provides just one example: a 70,000-year-old massive stone python at Tsodila Hills in the Kalahari Desert of Botswana, which is reputed to be the oldest known ritual site in the world.[10] If religion were unnatural or rare, the argument goes, it would not have emerged so long ago in the natural history of our species.

Second religion is ubiquitous. Religion, McCauley argues, "is a universal phenomenon among human groups" that has popped up in every human culture since the "emergence of our species in prehistory."[11] Even when all forms of religion are actively suppressed in totalitarian regimes, the author points out, religious ideas and practices "invariably bubble up."[12] If religion were unnatural, it would be much easier to stamp out and less likely to emerge independently across human cultures.

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[9] McCauley, *Why Religion Is Natural and Science Is Not,* 24-25 (emphasis original).

[10] Ibid.,148.

[11] Ibid., 149.

[12] Ibid.

The third criterion that McCauley offers for determining the naturalness of a human activity is whether it can be found in other species. Natural human activities like walking and chewing are rooted in our biology, and so we share them with our evolutionary cousins. Building on the work of Walter Burkert, McCauley hypothesizes that religious rituals are built on the kinds of ritualistic behavior that can also be found in animals. The religious supplicant who kneels before God, for example, resembles in posture the subordinate primate who bows before a dominant rival.[13] Regardless of whether such supplicating animals experience religion, McCauley argues, their ritualistic behavior indicates that human religion is built on natural foundations.

For McCauley, religion seems natural because it is ancient; it recurs independently throughout history, and seems rooted in the natural dispositions of human minds. But what, exactly, constitutes religion? In the introduction of this dissertation I discussed the recent "discursive turn" in religious studies, which ushered in the widespread recognition that the category of religion has no essential referent. Rather, religion is a shifting category that has been deployed to describe cultural phenomena, social groups, mental states, and material practices in various configurations according to the particular aims and interests of those who wield it. McCauley ignores the scholarship and insights of the discursive turn, arguing instead that there is in fact "little controversy" among scholars about what defines religion. His statement is telling:

> For all of the difficulties associated with defining "religion," the collection of elements by means of which scholars routinely identify religious systems usually invites little controversy. Not every religion includes exactly the same list of elements, but nearly all systems we are tempted to treat as religions share a number of prominent ones (such as myth, ritual, beliefs about agents with counterintuitive properties, sacred spaces, and the like). Furthermore, people have little trouble recognizing less clear cases as such (for instance, certain elite, esoteric forms of Buddhism). All of this is due, in no small part, first, to the fact that those elements have recurred throughout human history in religious

[13] Ibid., 148-150.

> systems the world over and, second, to the fact that their recurrence does not depend on the influence of prior systems of the same sort. New religions pop up all the time; however, the ones that last any time at all mostly stir in the same old ingredients.[14]

Thus McCauley identifies religion like Supreme Court Justice Potter Stewart identifies pornography: he knows it when he sees it. For McCauley, there are a number of key elements that define religion even if they are not all universal, such as ritual and belief in counterintuitive agents. Even when faced with fringe cases like "esoteric Buddhism," he argues, we can nonetheless "recognize" religion when we see it using common sense.

Recognizability and common sense are faulty metrics for identifying religion, however, because "religion" and many of its component elements are reified categories that have been shaped by historical norms and ideologies. The notion of an "esoteric Buddhism" devoid of ritual, for example, is itself a product Western intellectual history. During the nineteenth century, Western scholars and theologians sought to identify a "pure" Buddhism that aligned with the scientific and Enlightenment values of their time.[15] Tomoko Masuzawa argues that the "discovery" of Buddhism was, in fact, "from the beginning… a textual construction" created by European Sinologists, linguists, and theorists as a foil to Western Christianity.[16] As numerous contemporary scholars have demonstrated, the Buddhism of popular imagination—a largely philosophical tradition concerned with ethical behavior and empirical study of the mind—fails to account for a wide range of Buddhist history and practices.[17]

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[14] Ibid., 151-152.

[15] Judith Snodgrass, "Publishing Eastern Buddhism: D. T. Suzuki's Journey to the West," in *Casting Faiths: Imperialism and the Transformation of Religion in East and Southeast Asia*, ed. Thomas David Dubois (New York: Palgrave Macmillan, 2009), 49-50.

[16] Masuzawa, *The Invention of World Religions*, 126.

[17] See also Donald S. Lopez Jr., *Buddhism and Science: A Guide for the Perplexed* (Chicago: University of Chicago Press, 2008); Alexey Kirichenko, "From *Thathanadaw* to Theravada

McCauley is one of many CSR practitioners who appeal to a common sense approach to defining religion. This example illustrates a key risk of this perspective. Since many of our common sense understandings of religion and religious traditions are based on inherited cultural categories rather than empirical observation, it is easy to mistake ideological constructions for raw, unmediated data. This is worth noting because it is a recurring issue in CSR literature and McCauley's work. For now, though, I will return to McCauley's main argument.

We all recognize religion when we see it, McCauley maintains, and we can deduce that it is a ubiquitous ancient phenomenon. What, then, could explain all the various core elements of religion that pop up from culture to culture? This, argues McCauley,

> is where maturationally natural cognitive systems step back on stage. I contend that a small number of variations on a limited set of elements lies beneath the assorted myths, rituals, beliefs, doctrines, icons, sacred spaces, and more that humanity's religions present. Our maturationally natural cognitive systems are primarily responsible for those elements and the forms that their variations take…. Their superficial diversity notwithstanding, religions share the same cognitive origins and vary within the same limited framework of natural cognitive constraints.[18]

Religion, in other words, is an outgrowth of human biology. Religion is ancient and ubiquitous because it stems from the one constant across all human cultures: our brains. Marshaling research by Pascal Boyer, Justin Barrett, Rodney Stark, and other CSR scholars, McCauley rehashes the byproduct model of religious cognition, which describes religious beliefs, experiences, and practices as the outputs of otherwise adaptive cognitive systems. After summarizing CSR scholarship on counterintuitive representations (thought to activate multiple

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Buddhism: Constructions of Religion and Religious Identity in Nineteenth- and Early Twentieth-Century Myanmar," in *Casting Faiths: Imperialism and the Transformation of Religion in East and Southeast Asia*, ed. Thomas David Dubois (New York: Palgrave Macmillan, 2009), 23-45; and Charles Hallisey, "Roads Taken and Not Taken in the Study of Theravada Buddhism," in *Curators of the Buddha: The Study of Buddhism Under Colonialism*, ed. Donald S. Lopez, Jr. (Chicago: University of Chicago Press, 1995), 31-62.

[18] McCauley, *Why Religion Is Natural and Science Is Not,* 151-152.

inference systems in ways that are attention-grabbing and memorable), supernatural agents (the product of overactive agency detection modules), and spiritual pollution (which kindle our contagion inference systems), McCauley argues that this evidence all points to the same conclusion: that religion is rooted natural System 1 thinking. "Much about humans' religious propensities," he argues, is the "consequences of the operations of maturationally natural capacities on items outside their proper domains."[19] Most religious thinking, in other words, comes from the misfiring of otherwise-adaptive cognitive mechanisms. Religion is natural, therefore, insofar as it is rooted in maturationally natural cognitive systems, a set of biologically coded, subconscious mental processes that are unaffected by culture.

Over the course of *Why Religion Is Natural and Science Is Not*, McCauley mobilizes CSR scholarship to depict religion as natural in two senses. First and foremost, religion is ontologically natural. McCauley is committed to the modern notion that nature and culture are two distinct ontological zones and works diligently to confine religion exclusively to the domain of nature. This helps to explain McCauley's belabored distinction between "practiced" and "maturationally" natural cognition. Merely aligning religion with System 1 thinking would allow culture to creep in, since learned cultural practices can become intuitive. McCauley solves this problem by dividing System 1 thinking into natural and cultural forms. McCauley's category of maturationally natural cognition—a supposed set of intuitive, automatic responses that are biologically predetermined and totally unaffected by childhood development—aligns with the general assumption in CSR that evolved psychological mechanisms are unaffected by culture. As I argue in the previous chapter, however, this runs against the general consensus in contemporary cognitive psychology that no cognitive modules are fully preprogrammed, but are rather actively

[19] Ibid., 162.

developed during childhood through ongoing interactions with one's environment.[20] I will further address criticisms of McCauley's model later in this chapter, but this particular critique highlights a key element of what I have labeled the microscopic linkage: the construction of an artificially simplified model of the brain to facilitate the reduction of culture to nature.

McCauley also depicts religion as natural in a second sense, describing it as mundane, simple, and primitive. Throughout *Why Religion Is Natural and Science Is Not*, McCauley repeatedly stresses that the wide range of phenomena that we associate with religion—from beliefs and rituals to texts and iconography—all amount to minor variations in the output of a few natural cognitive systems. The seeming diversity of religious traditions is actually "superficial," he argues, since religions all stem from the same limited cognitive constraints.[21] Similarly, almost all "higher-order" religious phenomena—myths, rituals, social traditions, artistic representations—are the relatively simplistic outputs of a few cognitive mechanisms. Religious traditions are predictable and similar, according to McCauley, in part because they operate on simplistic cognitive processes. Religion "employs ideas and forms of thought that are *naturally appealing* to the human mind," he argues, and can be easy understood by "most children by the time they reach school age."[22]

This is a striking example of brain-based reductionism. In chapter one I used the example of so-called gay "dopamine junkies" to demonstrate how contemporary microscopists can take one element from among a massive assembly of interacting, co-determined phenomena and, by assigning it the ontological privilege of being "natural," depict it as the causal prime mover. Here

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[20] Barrett, Dunbar, and Lycett, *Human Evolutionary Psychology*, 276-279.

[21] McCauley, *Why Religion Is Natural and Science Is Not,* 152.

[22] Ibid., 154.

McCauley engages in a similar rhetorical gesture. Thus, in order to essentialize a religious ritual (e.g., a ceremonial dance) as fundamentally natural, McCauley must cast a net around all of its contributing causal forces (thoughts, flesh, norms, goals, family traditions, practiced movements, physical drums, cognitive processes, performative flourishes, social structures, collective and individual narratives, gender dynamics, caloric excess, disciplinary mechanisms, desires, etc.) and reduce them to one or two "natural" cognitive mechanisms without remainder.

McCauley's emphasis on the simplicity and primitiveness of religion could be a rhetorical necessity. If religion were not fundamentally simple and derivative, it could not be essentially natural; thus, the argument goes, the apparent diversity of religious cultures must be merely superficial. Yet there is also an alarming form of cultural chauvinism at play here. Just as the "dopamine junky" argument totalizes a minority group and ignores the reality of their socio-economic conditions, so too McCauley's rhetoric totalizes religious practitioners in ways that forfeit attention to significant issues of class and race. As I will discuss in more detail shortly, McCauley distinguishes between primitive natural religion and elite forms of "unnatural" religious cognition seen in theologians and priests. This tacitly echoes the nineteenth-century notion of the "savage"—a primitive form of man who lacks the intellectual faculties to engage in rational thought or to scrutinize his own beliefs.[23] There is thus an implicit racial contrast in *Why Religion is Natural and Science is Not* between primitive religion, which still carries colonial connotations of African bodies, and priests, who in Anglo-American culture are most frequently imagined as white males. I will discuss McCauley's distinction between priests and primitives in more detail later in this chapter, but first I will summarize McCauley's account of the cognitive unnaturalness of science.

[23] Jonathan Z. Smith, *Map Is Not Territory: Studies in the History of Religion* (Leiden: E. J. Brill,1978), 295-297.

The Cognitive Unnaturalness of Science

Science, McCauley argues, is religion's cognitive opposite. Where religion is a natural byproduct of our evolutionary psychology, science is unnatural and exceedingly rare. Science is rare, McCauley argues, because it depends on cognitively unnatural processes. It bears repeating that McCauley's argument is built on the framework of dual-process theory, which posits two distinct information processing systems within the brain: System 1, an ancient set of unconscious, rapid-fire processes that are cheap but imprecise; and System 2, a more recently evolved set of deliberative, analytic thought processes that require more cognitive resources, but which can override System 1 only when enough mental energy is available. Science, McCauley argues, involves difficult System 2 thinking. It is rare because System 2 is cognitively difficult, requiring tremendous intellectual resources to win out over our automatic System 1 intuitions.

McCauley lists a number of ways that science is cognitively unnatural. First, it conflicts with everyday experience of the world around us. Our ancient System 1 intuitions were not designed to postulate vacuums, molecular bonds, black holes, or quantum entanglement, because we never encountered such strange phenomena during our life in the Pleistocene. "The worlds our scientific theories and models describe often diverge profoundly from the world of our unreflective experience," the author argues; it takes a great scientific mind "to think beyond the appearances."[24] McCauley provides the example of Louis Pasteur, the genius French scientist who came up with the "profoundly counterintuitive proposal" that tiny microscopic organisms could somehow cause human diseases, despite their disproportionately small size.[25] Germ theory

[24] McCauley, *Why Religion Is Natural and Science Is Not,* 106.

[25] Ibid., 108.

is counterintuitive, or cognitively unnatural, because our System 1 intuitions have us assume that small things are too weak to hurt much larger things.

While McCauley does attend to some of the material practices of science—it requires, he argues, rarefied, unnatural environments to hold variables bay—his primary focus is on its intellectual demands.[26] Genuine scientific theories, McCauley argues, must be radically counterintuitive, extendable beyond what is currently known, and empirically falsifiable. This requires scientists to embody rare cognitive virtues; they must embrace criticism, imagine alternative explanations, avoid confirmation bias, check their own motivations and desires, and open themselves up to the possibility of being wrong.[27] Nature, however, "does not groom human minds for carrying out the *disciplined criticism of theories* that is the obligation of science."[28] This capacity is not found in young children or present in cultures where "science never flowered," because it is a System 2 process that requires extensive discipline and training.[29]

If the cognitive and practical skills necessary for science are so challenging and unnatural to the human mind, McCauley posits, how did science ever emerge and why does it stick around? First, the author argues, humans luckily have an innate desire for knowledge and derive pleasure from its acquisition. Second, once science emerges it is recognized for its ability to increase social wealth and prosperity. Third, once science catches on it can be taught to future generations and become integrated into practiced natural cognition, making it cognitively less

[26] Ibid., 121.

[27] Ibid., 114, 122-137.

[28] Ibid., 119, emphasis original.

[29] Ibid.

demanding.[30] Like the spark that lights a stack of kindling, science is difficult to start but easier to maintain. Science is still challenging, McCauley emphasizes, and the social conditions for its emergence are rare, but thankfully it does not need to be continually reinvented. Each generation needs only to accept the torch and maintain the fire.

Thus religion and science stand in stark contrast, occupying what McCauley describes as completely different "cognitive levels":

> [Religion] is primarily dependent on the natural proclivities of human minds and, hence, recurs in every human culture, whereas [science] is a function of comparatively rare social arrangements that require (a) mastery of both norms of reasoning and radically counterintuitive conceptions and (b) the public availability of the pivotal processes, products, and evidence.[31]

Where religions are minor variations of humanity's cognitive constraints, science, on the other hand, "overturns those constraints and regularly produces new, original ideas."[32] Religion, for example, "will always, ultimately, look to agent causality" to explain curiosities in the world due to its dependence on humanity's unreflective intuitions, where science has already overcome such commonsense explanations.[33]

McCauley claims that this new understanding of religion and science as cognitive opposites produces surprising conclusions. Cutting against the atheist utopian vision of a rational post-religion society, McCauley argues that religion is not going away; it is too natural a phenomenon to be eliminated.[34] Like grass or the common cold, religion is virtually impossible

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[30] Ibid., 138-139.

[31] Ibid., 236.

[32] Ibid., 152.

[33] Ibid., 236.

[34] Ibid., 250-251.

to stamp out because it grows, spreads, and expands so rapidly. (Supernatural agents and counterintuitive beliefs will always be more memorable and believable than particle physics, no matter how educated a population.) Conversely, McCauley argues, science is extremely fragile. Science requires rare social circumstances that foster extraordinarily difficult and counterintuitive forms of cognition, and so it is much more likely to disappear.[35]

Cognitive naturalness also offers a more sophisticated alternative, McCauley argues, to Stephen J. Gould's "non-overlapping magisteria" model of religion and science that, as I discussed in the introduction, delimits religion to questions of meaning and science to those of empirical facts. In a rare mode, McCauley criticizes Gould's model by pointing to various examples of overlap where religion and science enter each other's presumed territories. Science raises endless moral questions and is relevant to ethically significant public issues such as climate change. Furthermore, religion is often concerned with the empirical; however one assesses their truth-value, there are plenty of religious beliefs about specific facts of nature.[36] For McCauley, the answer to these problems is to provide a new binary built around cognitive naturalness, which he considers to be a more accurate means of dividing science from religion. One of the main arguments of this dissertation, however, is that any attempt to essentialize religion will necessarily entail the same sort of intellectual gerrymandering.

Artificial Definitions and Cognitive Borders

In her book *Natural Reflections*, Barbara Herrnstein Smith critiques Robert McCauley's cognitive naturalness argument as it is laid out in his earlier 2000 essay, titled "The Naturalness

[35] Ibid., 279-286.

[36] Ibid., 223-226.

of Religion and the Unnaturalness of Science."[37] I am interested in Herrnstein Smith's particular critique and McCauley's subsequent response, so I will quote the authors at length, beginning with Smith's excellent summary of McCauley's project.

> McCauley's argument, as he lays it out, consists of a series of strongly contrastive characterizations appealing to apparently straightforward observations supplemented by references to historical and experimental evidence. Thus from the fact that religion is found in all times and cultures, he argues that we may conclude that it requires nothing but the universals of human nature to spring up; conversely, given the historical and cultural rarity of science, we may conclude that it is essentially contrary to human nature. Or, later, he observes that inasmuch as science requires literacy, complex social arrangements, educated elites, and technical means for preserving and transmitting knowledge, it is fundamentally "cultural" while, conversely, inasmuch as religion requires nothing but "basic cognitive abilities," it is natural. Or again, the fact that religious concepts are easy to learn and to remember and quickly acquired even by young children indicates that such concepts conform to innate intuitions, while the fact that scientific concepts are hard to learn and take specialists years to master is evidence that they are counterintuitive and demand exceptional forms of cognitive discipline.[38]

These contrasts sound plausible because they draw on familiar ideas about religion and science. However, "the distinctions and alignments on which they are based," Herrnstein Smith argues, "involve crucial conceptual oversimplifications and historical obliteration."[39]

For example, Herrnstein Smith continues, there are numerous cognitive similarities between science and religion that McCauley's model overlooks. Although it is indeed the case that many religious concepts are acquired easily by children and many scientific concepts are difficult to master, it is also true that many children can recite multiplication tables and name the

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[37] Robert N. McCauley, "The Naturalness of Religion and the Unnaturalness of Science" in *Explanation and Cognition*, ed. Frank C. Keil and Robert A. Wilson (Cambridge, MA: MIT Press, 2000), 61-85.

[38] Herrnstein Smith, *Natural Reflections*, 130-131.

[39] McCauley, *Why Religion Is Natural and Science Is Not,* 131.

chemical formula for water but find it impossible to explain the Doctrine of the Trinity.[40]

Herrnstein Smith continues:

> What appears to be the case, but is distorted here in the service of a strained contrast, is that certain concepts and verbal routines, religious, scientific, philosophical, and others, are acquired readily while other more complex or sophisticated concepts and formulations, again from any and all domains of thought, require a specialized education and long apprenticeship for their mastery.[41]

Religion and science, in other words, are complex social domains that inevitably both involve both natural and unnatural cognitive processes. McCauley's contrastive categories therefore require a series of conceptual oversimplifications and historical anachronisms. For religion and science to correspond exclusively with cognitively natural and unnatural thought processes, the two must be conceived monolithically and carefully distinguished from any intertwining phenomena.

At the risk of redundancy, I will underscore a crucial point of Herrnstein Smith's critique: that McCauley is imposing a theoretical framework upon religion and science that requires each to be distorted and pigeonholed. One of the methodological tenets of this dissertation is that essentializing religion involves work: since religion is a category without any fundamental referent, any attempt to ascribe religion an essence will involve active processes of selection, delimitation, and justification. It is also often the case that those who essentialize religion are motivated by an ideology that can be discerned in these rhetorical maneuvers. This is true for Robert McCauley, I will argue, whose selective oversimplifications of religion and science are most likely motivated by the ideology of the conflict thesis. This is particularly apparent when considering two anomalies in McCauley's cognitive framework: theology and technology.

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[40] Herrnstein Smith, *Natural Reflections*, 131.

[41] Ibid.

Robert McCauley dedicates a significant portion of *Why Religion Is Natural and Science Is Not* to the act of distinguishing: between religion and science; between "maturationally" and "practiced" natural cognition; between religion and theology; between theology and science; and between science and technology. These distinctions seem to haunt the entire book. The author continually revisits them, straining to contain anomalies and maintain clear cognitive boundaries between the four interrelated entities of religion, theology, science, and technology. These rhetorical efforts can be read as a struggle to isolate religion and science into stable elements for microscopic reduction. They also reveal the fundamental instability of, and ideological motivations behind, McCauley's intellectual project.

First, there is McCauley's crucial distinction between religion and theology. Halfway into *Why Religion Is Natural and Science Is Not*, McCauley notes that he has been using the simplified term "religion" for convenience when in fact his argument is concerned with what he calls "*popular* religion."[42] The author does not explicitly define popular religion, but instead indicates what it is not. Popular religion is not theology, since theologians generate "convoluted, abstract religious representations that are no easier to understand than esoteric scientific ideas are."[43] Using System 2 thought processes, McCauley admits, theologians are "experts at conceptual analysis and at carrying out the same forms of deductive inference that play such a noteworthy role in science."[44] This may seem like a straightforward distinction at first glance—one could argue that theologians, like scientists, occupy a group of historically rare educated elites who have the time and resources to engage in System 2 thinking. This addendum, however,

[42] McCauley, *Why Religion Is Natural and Science Is Not,* 152 (emphasis original).

[43] Ibid., 153.

[44] Ibid.

amounts to a thin patch over some significant holes in McCauley's argument about the cognitive naturalness of religion.

It is not clear, for example, why literate Judeo-Christian theologians (McCauley's tacit focus) should be the only religious persons considered to engage in systematic deliberate reasoning. Anthropologists have been documenting the cognitive sophistication of indigenous peoples— whose thought styles are variously argued to either participate in or effectively undermine the notion of a universal rationality—for close to a half-century.[45] In order for religion to be natural, however, McCauley needs theology to be a minor and rare part of religion. This ignores the fact that everyday people, not just elites, engage in deductive logic and analytic thinking on a daily basis, on topics ranging from moral dilemmas to complex household chores to social conflicts. Thus, upon closer reflection, McCauley's distinction between religion and theology does not seem reflective of actual cognitive practices on the ground. Rather, McCauley is attempting to use theology as a catchall for religious System 2 thinking, effectively relegating it to a rare historical occurrence.

McCauley draws a second strained contrast between theology and science. Here the author once again tries to contain anomalous religious System 2 thinking, but this time from a different direction, protecting science as the truer, more exceptional use of deliberate and rational thought processes. The author names three fundamental differences between theology and science. First, theology is abstract and uninterested in the empirical world, unlike science which actually studies physical nature and can therefore conduct legitimate experiments. Second,

[45] Mihai Stelian Rusu, "Hermeneutics of reason: the principle of common rationality as premise of understanding the Other(s)," *Journal of Comparative Research in Anthropology and Sociology* 4, no. 1 (Summer 2013): 63-83. See, for example, Michael T. Taussig, *The Devil and Commodity Fetishism in South America* (Chapel Hill, NC: University of North Carolina Press, 1980); and Gananath Obeyesekere, *The Apotheosis of Captain Cook: European Mythmaking in the Pacific* (Princeton: Princeton University Press, 1997).

theology is concerned with supernatural agents and therefore falls prey to System 1 biases towards agency detection. Science, on the other hand, has been wise to limit its focus to mechanistic description.[46] Third, theologians have historically "supported and aligned with powerful ecclesiastical and political leaders," whereas science does not depend on political powers for its patronage—except for some rare counterexamples, McCauley admits, like President Barack Obama's appointment of physicist Steven Chu as the U.S. Secretary of Energy in 2009.[47]

It does not take much consideration to see that these distinctions are tenuous at best. The argument that theology is essentially abstract and science is essentially empirical ignores numerous counterexamples from both domains. For empirical theology McCauley would need to look no further than the birth of the modern scientific movement that he so vigorously celebrates, since most scientific revolutionaries were devout Christians who viewed natural philosophy as an extension of theological investigation.[48] There is also an entire branch of modern science—the formal sciences—distinguished for their concern with formal systems instead of empirical procedures. (The formal sciences include some disciplines that have in fact been crucial to the cognitive science of religion, including theoretical linguistics, computer science, systems theory, and game theory.) McCauley's second argument—that, unlike science, theology is poisoned by a System 1 bias towards agency—ignores substantial bodies of work including a- and post-theistic Christian theologies and a variety of Buddhist theologies.

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[46] McCauley, *Why Religion Is Natural and Science Is Not,* 213-214.

[47] Ibid., 214.

[48] John Henry, "Religion and the Scientific Revolution," in *The Cambridge Companion to Science and Religion*, ed. Peter Harrison (Cambridge: Cambridge University Press, 2010), 39-58.

Finally, and with all due respect to the Nobel Prize-winning former Energy Secretary, Steven Chu's salary was small potatoes compared to the other $54.8 billion that the federal government spent on science during Chu's first year on the job.[49] Numerous historians and science studies scholars have identified symbiotic relationships between scientific and political institutions. Hiromi Mizuno, for example, describes in *Science for the Empire* the interrelationship between science, nationalism, and anti-mythological ideologies in mid-twentieth century Japan. Science was not merely a "patron" of the Japanese government, Mizuno argues, but a participant in a mutual exchange: wartime economic and cultural promotion of science helped to produce a rationalistic nationalism that, in turn, benefited the state.[50] Thus it again seems that the boundaries McCauley outlines do not reflect commonsense observations of theology and science in action, but are instead artificially drawn to correspond to his theoretical framework.

The third of McCauley's crucial distinctions is his separation of science from technology. Science, he argues, is rare and new, whereas technology—like religion—is ancient and primitive and can even be found in the animal kingdom. Furthermore, science is solely concerned with explaining nature for its own sake, whereas technology is used to manipulate the world for humanity's benefit. Finally, the author frequently associates technology with "practiced natural cognition," his non-natural category of System 1 thinking. Inventing a new technology may require unnatural System 2 thought processes, he argues, but the use of technology can be

[49] This sum, based on the 2009 federal budget, is representative of surrounding years. It does not include science funding associated with military research and development, which itself takes up the lion's share of the U.S. federal budget. See Mark Fischetti, "Money for Science: US Funding over the Years," *Scientific American*, January 1, 2011, accessed March 10, 2017, https://www.scientificamerican.com/article/money-for-science/.

[50] Hiromi Mizuno, *Science for the Empire: Scientific Nationalism in Modern Japan* (Stanford: Stanford University Press, 2009), 4-5.

practiced until it is automatic.[51] It takes genius to invent the wheel, one could say, and moderate focus to learn how to ride a bicycle, but after enough practice riding a bike becomes second nature.

As Barbara Herrnstein Smith argues, however, these distinctions between science and technology require a significant amount of anachronistic tinkering:

> Most of the specialized pursuits we now associate with Western science, including anatomy, botany, chemistry, and physics, developed in close conjunction with technical problem-solving in such perennial human activities as healing, agriculture, navigation, and warfare. A tradition and image of gentlemen investigators interested in understanding the workings of nature "for its own sake" emerged in the seventeenth century, largely in the science academies of England and Europe. But the conjunction of such investigative pursuits with practical activities continued and, with the dominance, since World War II, of large-scale scientific ventures funded mainly by governmental, industrial, and commercial agencies, any effort to mark off a realm of pure science pursued independent of "a practical orientation toward technology" can only be arbitrary and artificial.[52]

Thus, once again, McCauley is making a seemingly straightforward distinction that, upon closer investigation, in fact depends on tendentiously narrow definitions that run against contemporary scholarship. Like theology, technology represents another anomaly that McCauley is working to contain. McCauley's dubious separation of pure scientific thought from practical technological work is necessary to isolate science from natural System 1 thinking. Technology operates in this model as a container for any "natural" elements of modern science. Religion is natural and science is not, McCauley argues, because unnatural religion is theology and natural science is technology.

Another function of McCauley's distinction between technology and science is that it creates a space for "bad" science. Contemporary philosophers and sociologists of science have abandoned what Andrew Pickering calls the "representational idiom," the nineteenth-century

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[51] McCauley, *Why Religion Is Natural and Science Is Not,* 90-100.

[52] Herrnstein Smith, *Natural Reflections*, 135.

notion that proper science, done correctly, amounts to the unadulterated discovery of truths that perfectly mirror nature.[53] Our current understanding of scientific knowledge, based on both historical and anthropological investigations into scientific practice, is that it is made by human agents maneuvering within networks of material agency (including physical resources, dynamic objects of study, bodily techniques, and fabricated instruments that require constant upkeep and calibration) and socio-economic power (including economic resources, social institutions, communal norms and practices, shared paradigms, and a patchwork of fragmented social collectives).[54] Thus, according to contemporary understandings of scientific knowledge-making, there is no way to be absolutely sure that any given scientific practice is "pure" or "good" science; there are indeed better and worse methods and theories, but failed hypotheses will nonetheless emerge out of the best possible scientific practices. Science, in other words, is not just a matter of using rationality and mental discipline to arrive at pure truth.

Furthermore, as Hugo Mercier and Christophe Heintz argue in their 2013 essay, "The place of evolved cognition in scientific thinking," there are a number of evolved System 1 thought processes that are crucial to scientific practice, including analogical thinking, model-based reasoning, language, and representational re-description.[55] According to the argumentative theory of reasoning, the basic function of reasoning is to argue—to convince others that you are

[53] Andrew Pickering, *The Mangle of Practice: Time, Agency, and Science* (Chicago: University of Chicago Press, 1995), 5-9.

[54] See also Karin Knorr Cetina, *Epistemic Cultures: How the Science Make Knowledge* (Cambridge: Harvard University Press, 1999).

[55] Hugo Mercier and Christophe Heintz, "The place of evolved cognition in scientific thinking," *Religion, Brain, and Behavior* 3, no. 2 (Summer 2013): 10-16.

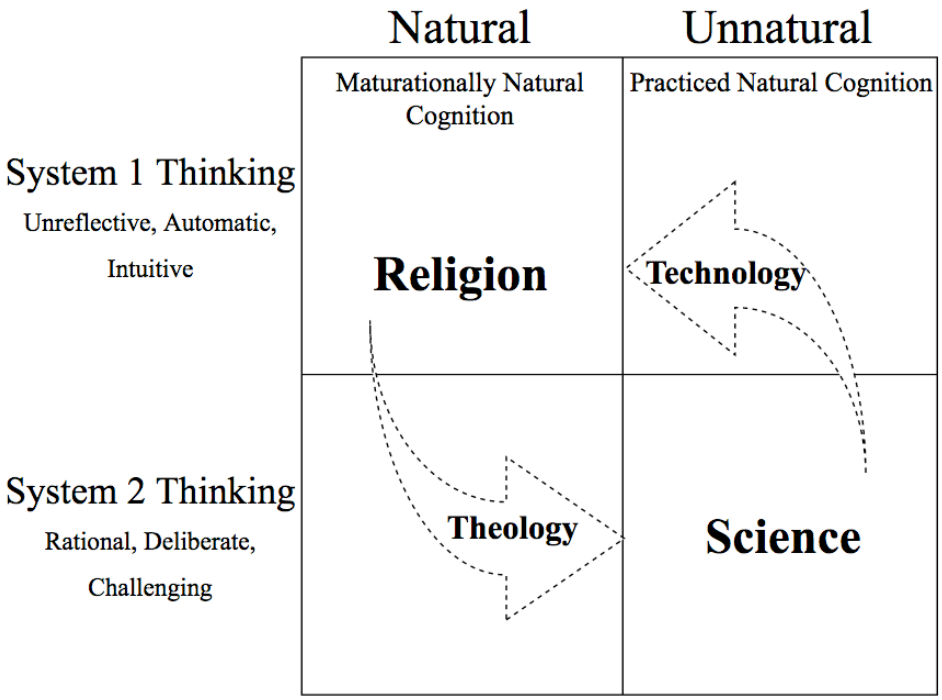
right and to evaluate counter-arguments skeptically. This aligns with wide-ranging research on embodied cognition that has revealed the role of emotion in seemingly rational processes.[56]

These two facts of scientific practice—that it produces falsehoods and requires emotions and other evolved cognition processes—pose a problem for McCauley unless they are swept under the rug of technology. By radically limiting science to difficult forms of unnatural cognition, such as the imagining of counterintuitive worlds, McCauley is able to take up the abandoned "representational idiom" and dismiss the resulting anomalies as iterations of technology.

To be fair, McCauley's specious distinctions between religion, theology, science, and technology are not wholly representative of his intellectual caliber; there are better sections of *Why Religion Is Natural and Science Is Not*. I would not be trotting out these passages if they were not so helpfully indicative of an inherent tension within his work. By attempting to define religion as natural and science as unnatural, McCauley faces the inevitable problem that comes with essentializing reified categories that lack fundamental referents: an endless stream of anomalies, hybrids, and counterexamples that need to be ordered and contained. Most thinkers would likely take these problems as evidence that their essential definitions were faulty, but McCauley doubles down. His considerable rhetorical efforts merit consideration. Why would the author commit to such a strained set of contrasts? What purpose do these artificial distinctions serve?

[56] Ibid.

Figure 3.1 Anomalies in McCauley's Naturo-Cognitive Matrix.



In Figure 4.1 above I illustrate McCauley's central argument in *Why Religion Is Natural and Science Is Not* as a 2x2 matrix. The columns represent "natural" and "unnatural" (or cultural) cognition and the rows represent System 1 and System 2 thinking, the former being divided into McCauley's bifurcated "maturational" and "practiced" forms of natural cognition. McCauley's main argument is that religion belongs in the top left quadrant and science belongs in the bottom right quadrant of this naturo-cognitive matrix. Religion is natural insofar as it is primarily rooted in System 1 thinking (the natural variety); science is unnatural insofar as it is primarily the product of a particularly rare sort of System 2 thinking.

As the arrows labeled "theology" and "technology" indicate, however, this is not so tidy a division. There are boundless examples of religious System 2 thinking. McCauley attempts to contain such anomalies with the category of theology, artificially minimizing them to a rare

group of elites. Yet even this raises a problem: what separates theology from science? McCauley's strained attempt to contrast the two should be read, I argue, as an attempt to police the border between the lower two quadrants of his naturo-cognitive matrix. The fragility of McCauley's distinctions and the fervor with which he makes them together speak to the critical problem that religious System 2 thinking poses for his model. Essentializing religion requires work. Within McCauley's intellectual project, much of this work occurs in the bottom left quadrant of Figure 4.1, the artificial category of theology.

Technology represents a similar rhetorical gesture. As we have seen, scientific practice involves a wide range of System 1 thought processes, which McCauley expels into the category of technology. McCauley's incoherent and anachronistic distinctions between theology and science can be read, in this light, as an attempt to purify science of "natural" cognition. Like theology, technology operates within McCauley's model as a container for any anomalies that do not correspond to the author's presumed essences of science and religion.[57]

With Figure 4.1 I hope to illustrate the larger context of McCauley's tendentious distinctions between religion, theology, science, and technology—a rhetorical project that occupies a significant portion of his book. Herrnstein Smith, Mercier and Heintz, and others have productively criticized particular examples of McCauley's various artificial binaries. Building upon their criticism, my interest is in the construction of this framework as a whole. Every quadrant of McCauley's nature-cognitive matrix represents a strained set of distinctions, exceptions, and anachronisms. The fundamental instability of this system is significant for two reasons. First, as my close reading has sought to demonstrate, this instability speaks to the

[57] Interestingly, McCauley is not concerned with policing the divide between religion and technology. This perhaps seems more obvious, and less threatening, than the distinction between theology and science.

impossibility of essentializing religion within the brain. One of the central tenets of this dissertation is that it is a category mistake to essentialize religion, since "religion" is an inherently ambiguous category. This argument is not new, but my analysis of McCauley's selective definitions vividly demonstrates of the rhetorical work necessary to the project of imposing and maintaining essentialist definitions of religion.

The second significant feature of McCauley's unstable matrix is its context. McCauley's work runs against contemporary scholarship that the scholar accessed and yet, as I will demonstrate shortly, the author's response to criticism is to double down. *Why Religion Is Natural and Science Is Not* therefore represents a significant intellectual effort. In chapter one I analyzed the rhetoric of "microscopy," describing how the brain is being formulated as a bridge between elements of culture and an imagined fundament of absolute truth. In chapter two I described how CSR scholars have welcomed this fundament as a means for getting beyond the "miasma" of post-modern scholarship. *Why Religion Is Natural and Science Is Not* serves as a valuable case study because its author echoes this sentiment but goes farther than any other prominent CSR practitioners in attempting to essentialize religion within the brain. Furthermore, as I will argue shortly, McCauley's work also illustrates the fundamental risk of microscopy: of smuggling ideology into the brain and mistaking it for objective fact. In the next section I will argue that McCauley's work is rooted in the ideology of the conflict thesis, making it a particularly useful example of how historical ideologies about religion and science reproduce themselves in contemporary scholarship.

Defending the Conflict Thesis

I have demonstrated thus far that *Why Religion Is Natural and Science Is Not* depends on artificial definitions of religion, science, theology, and technology. Its framework of "cognitive

naturalness" is simultaneously too broad and too specific. It is too broad to make sharp distinctions between religion and science unless one is arbitrarily selective about what counts as religion and what counts as science. Cognitive naturalness also points to too specific a set of phenomena to serve as an essential or foundational attribute of either religion or science. As I document in the introduction, recent trends in religious studies and science studies have emphasized multiplicity and disunity of both science and religion. Religion has no essential referent because it is a reified category that has been developed and retooled to apply to almost every dimension of human life and experience, including beliefs, rituals, identity formations, material practices, clothing, commodities, ethical propositions, origins stories, hermeneutic practices, types of space, and all sorts of things dead, alive, and in-between. Science ranges so widely in its conceptual paradigms, empirical approaches, instrumental practices, and epistemic values that any meaningful discussion of its associated cognitive processes would need to be limited to local investigations of particular scientific networks.

McCauley's account does not reflect observations of religion and science in action, so to speak, but rather imposes a set of arbitrary definitions that each overlook significant counterexamples and contradictions. Another fundamental flaw of McCauley's theoretical framework is that his selective definitions are tendentious, committed as they are to debunked and abandoned idioms about religion and science. Furthermore, *Why Religion Is Natural and Science Is Not* produces little in the way of original insights. The majority of the book is spent pigeonholing religion and science into separate modes of thought and addressing early critics of this approach. Its few self-consciously innovative insights—for example, that religion is here to stay—are not particularly novel. This raises an important question: Why?

This is not an ironic question. Given the readily apparent flaws of this model, paired with its inability to generate significant insights, why would an author devote so much time and energy to outlining and defending it? I propose that it is due to specific ideological commitments about religion and science. *Why Religion Is Natural and Science Is Not* makes little sense as a work of creative scholarship, but it almost perfectly resembles a last-ditch defense of the conflict thesis and its dual depictions of a transcendent, pure science and a primitive, naturalized religion.

The conflict thesis posits a foil between irrational religious beliefs and sober, logical scientific knowledge. One of the central values promoted by the ideology of the conflict thesis is scientific exceptionalism, or the notion that science uniquely transcends the human biases and limitations that beset other modes of inquiry. As Francisca Cho argues in her 2013 essay, "Unnatural Comparisons: Commentary on Robert McCauley's *Why Religion Is Natural and Science Is Not*," McCauley's selective definitions of religion and science reflect an ideological commitment to scientific exceptionalism.[58] As Cho points out, it is unclear what epistemological principles like empirical scrutiny, testability, falsifiability, and predictability have to do with the cognitive nature of science. It seems, rather, that it is the products rather than the methods of scientific investigations that violate our cognitive inclinations and require System 2 thinking.[59] Even still, the argument that certain scientific facts are fundamentally counterintuitive, she argues, requires an overemphasis on the roles of intuition and psychology in producing mental content and selective omission of the role of cultural and social influences.[60] (As any tourist can

[58] Francisca Cho, "Unnatural Comparisons: Commentary on Robert McCauley's *Why Religion Is Natural and Science Is Not,*" *Religion, Brain, and Behavior* 3, no. 2 (Summer 2013): 1-7.

[59] Ibid., 3.

[60] Ibid., 3-5.

attest, what seems natural and obvious to members of one culture can seem utterly counterintuitive to an outsider.)

For Cho, McCauley's narrow emphasis on science's "unnatural" cognitive processes (e.g., "radically counterintuitive" representations that go "beyond the appearances") therefore seems designed to perpetuate the notion that scientific knowledge somehow uniquely transcends the cognitive structures, symbolic systems, and social dynamics involved in traditional human knowledge-making. This, she argues, effectively imports the conflict thesis into the brain itself, justifying a Western-centric, triumphalist view of science by using a selective model of its constitutive cognitive processes.[61]

Indeed, *Why Religion Is Natural and Science Is Not* is rife with brazen science- and Western-centric claims. For example, McCauley frequently reduces all religious cultures—that is, every society throughout history with the exception of the modern West—to superficial variations of a few basic cognitive patterns. According to McCauley, no matter how "peculiar" certain fantasies or myths may seem, none in fact vary from "ordinary understandings of the world imposed by our maturationally natural cognitive systems"; "in the history of human thought," he continues, "science, mathematics, and some philosophy and science fiction are, virtually, the only human endeavors that strike out in such completely fresh directions towards unexplored conceptual spaces."[62] McCauley's confidence in the cognitive simplicity of all other cultures is astounding. It is also telling that even Western science fiction makes the author's list of truly "fresh" conceptual work, yet the collective artistic, intellectual, architectural, agricultural, and social achievements of all non-Western peoples do not make the cut.

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[61] Ibid., 6.

[62] McCauley, *Why Religion Is Natural and Science Is Not,* 113.

Proponents of the conflict thesis generally describe science and religion as either at war or in a state of detente, with each side having retreated to its own separate social domain. McCauley's position on this issue is perhaps his most novel intellectual stance. What a cognitive comparison of religion and science teaches us, McCauley argues, is that they are neither at war nor at peace. Religion and science are not at war because they simply operate at different cognitive levels. McCauley argues that science poses no threat to the persistence of religion because it will never be able to replace or stymie religious cognition. Unless humans one day fundamentally alter their brains as a species, religious beliefs will always pop up as a natural consequence of our evolved psychology.

As noted earlier, McCauley is equally critical of Stephen J. Gould's attempt to put religion and science at peace by separating them into the respective domains of public facts and private values. Science, McCauley argues, raises moral questions, and religious persons are concerned with facts.[63] McCauley's main issue with the notion of "non-overlapping magisteria," however, is not that it creates artificial distinctions between religion and science. It is that the theory ignores the inevitable tensions between religion and science in terms of the kinds of explanations, thoughts, and cognitive processes that they favor.[64] Facts and values are intertwined, McCauley argues, and this can have significant social effects. It is important, for example, that members of a society appreciate the accuracy and social value of science, yet many religious practitioners balk at consequential truths (like global warming and vaccines) because they understand science to conflict with their values.[65] One way of reading McCauley here is that

[63] Ibid., 223-229.

[64] Ibid., 229.

[65] Ibid., 245.

he is shifting the locus of the conflict between religion and science. Religion and science are not fundamentally at war or peace at the social level, he argues, but there are still fundamental differences between religious and scientific cognition that produce various types of social discord, especially in secular society. McCauley still echoes the conflict thesis here with the argument that religion and science's essential differences produce discord, but his position is relatively nuanced.

A third tenet of the conflict thesis that the book reiterates is the notion that religion and science are fundamentally distinct—that they share nothing in common as social institutions, as bodies of knowledge, or as modes of human thought and existence. As I discussed in the introduction, the conflict thesis requires religion and science each to be monolithic entities that never intermix. As contemporary historians have thoroughly demonstrated, however, this overlooks and obscures the diversity within, and overlap between, science and religion: religious traditions often involve annual cycles of rituals coordinated with the solar year, and must therefore have recourse to astronomical knowledge; scientific communities have a long history of modeling aspects of religious practice, such as the use of "witnessing" to establish the public character of early experimental science;[66] and religion was even integral to the early modern study of nature in England, where natural history was frequently pursued from religious motives, based on religious presuppositions, and internally ordered according to theological principles of design.[67]

One way of reading *Why Religion Is Natural and Science Is Not* is as a response to these contemporary historiographical trends—a renewed effort to purify religion and science once and

[66] Olson, *Science and Religion, 1450-1900*, 4-5.

[67] Harrison, "'Science' and 'Religion': Constructing the Boundaries," 84-85.

for all. If religion and science seem to have been historically intertwined, McCauley indicates, this is because we are confusing theology for religion and technology for science. Early natural scientists were not religious, in this view; they were elite theologians who had already liberated themselves from religious cognition. Seemingly scientific practices amongst religious groups, like astronomical calculations, are actually commonsense enough to qualify as mere technology. To be clear, there are indeed differences between the social traditions that we generally refer to as religions and those that we generally label as modern sciences. At issue is whether there are *essential* differences, or sets of fundamental, distinct, non-overlapping characteristics that are true for every iteration of each phenomenon. It is against the overwhelming evidence that religion and science are not essentially distinct that McCauley offers his gerrymandered cognitive boundaries. Within this context, the author's artificial definitions of religion and science cannot be read as accidental or uninformed anachronisms.

Artificial Definitions and Epistemological Traps

Barbara Herrnstein Smith's 2009 critique of McCauley's artificial definitions were based on an article that preceded *Why Religion Is Natural and Science Is Not*; we are therefore able to see McCauley grapple with Herrnstein Smith's criticism in his 2011 book. Interestingly, in the book the author effectively doubles down on his artificial definitions by not only defending his categorical distinctions but also arguing that artifice is not even a damning accusation:

> I am not clear what Smith means by "artificial," but to the extent that the distinction I draw between science and technology is not perceptually manifest and depends on a variety of different considerations… perhaps it is artificial. Artificiality in that sense, however, makes the distinction no less useful. Artificial distinctions— such as those between retail and wholesale [or] between novels and novellas…—abound and are far from meaningless.[68]

[68] McCauley, *Why Religion Is Natural and Science Is Not,* 89-90.

Here McCauley argues that artificial distinctions are useful tools for inquiry, and this is certainly correct in many contexts. After all, one of the hallmarks of contemporary science is the experimental method, whereby a phenomenon is artificially divided into component parts that can be isolated, measured, and tested.[69]

Yet McCauley is also correct about his being unclear about what Herrnstein Smith meant by "artificial." McCauley seems unaware that, if he were artificially defining religion and science, *Why Religion Is Natural and Science Is Not* would amount to a three-hundred-page tautology. This is because McCauley is not engaged in scientific experimentation or some other mode of investigation, where the artifice of initial distinctions is accounted for by subsequent retesting. The author's defense of his artificial distinctions would be more effective if his book produced novel, testable hypotheses or conclusions.[70] Yet the bulk of McCauley's book is spent outlining and defending his artificial distinctions; only the final chapter is dedicated to exploring the "surprising consequences" of his model, and even those amount to what one might deem "merely superficial variations" on a few fundamental idioms about religion and science.

What McCauley seems to miss is that his artificial definitions are foundational to, and necessary for, his ultimate conclusions. It is only by defining religion exclusively as a set of thoughts, beliefs, and cultural outputs rooted in System 1 thinking, for example, that McCauley can subsequently argue that religion is essentially natural. An artificial distinction between

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[69] See, for example, Wolff-Michael Roth and G. Michael Bowen, "Digitizing Lizards: The Topology of 'Vision' in Ecological Fieldwork," *Social Studies of Science* 29, no. 5 (October 1999): 724-725.

[70] This would nonetheless represent a flawed methodology. Any hypothesis based on the premise that religion refers exclusively to a bounded set of folk beliefs and repeated behaviors that closely correspond to recurring cognitive patterns, or that science is the largely cognitive process of using disciplined thinking to posit strange but empirically falsifiable worlds, would necessarily distort subsequent investigations by privileging one set of elements as essential and transhistorical and thereby ignoring others.

novels and novellas is indeed useful for certain tasks (say, organizing a bookshelf or pricing goods at a garage sale), but it would not be a meaningful way to establish the fundamental differences between novels and novellas.

After its publication, *Why Religion Is Natural and Science Is Not* provoked further criticism of its artificial definitions, and in a 2013 symposium response to Francisca Cho and other critics, we can see McCauley take up a new defensive strategy:

> Definitions are overrated (except in the formal sciences). Empirical researchers sort out workable characterizations of concepts in the process of investigating the merits of theoretical proposals. I am a philosophical naturalist. Thus, I subscribe to [Willard Van Orman Quine's] wariness about any strong distinction between conceptual and empirical knowledge. [Otto] Neurath's… famous analogy got the semantics of empirical inquiry right. He held that such a project was like mariners having to rebuild their ship at sea, without any available dry dock.
>
> Definitions matter to some of my commentators, who fail to understand that nowhere in *WRINASIN* do I propose the definitions that they presume… I eschew definitions not just because discretion is the better part of valor, but because in naturalistic inquiries words get their meanings in the course of the continuing research about the theories in which they appear and under such circumstances proposed definitions reliably prove—sooner or later—only partial, at best.[71]

Compared to his 2011 response to Herrnstein Smith, here McCauley seems to be taking the opposite tack. Rather than defend artificial distinctions as a meaningful way to begin an investigation, McCauley argues that definitions do not inform one's inquiry whatsoever, but instead develop over the course of continued research.

In this second defense McCauley implies that he self-consciously eschewed pre-existing definitions of "religion" and "science" during his investigation so as to mitigate the risk of artificially limiting or biasing his results. This would have been a wise methodological consideration indeed, since narrow definitions of religion or science would lead to crucial

[71] Robert McCauley, "Why science is exceptional and religion is not: A response to commentators on *Why Religion is Natural and Science is Not,*" *Religion, Brain, and Behavior* 3, no. 2 (Summer 2013): 47.

omissions. A staunch commitment to defining religion as transcendent, for example, would cause an investigator to overlook a vast array of social, economic, and material forces that are constantly at play in religious cultures. Similarly, if one were to rigidly equate science solely with reductionism, that would forfeit consideration of a wide range of scientific and mathematical discourses concerned with properties of emergence. If definitions can artificially narrow and thereby distort our inquiries, then McCauley is right to argue that they are "overrated."

Yet, as McCauley's recapitulation of conflict ideology demonstrates, it is extraordinarily difficult to bracket one's assumptions about phenomena as wide-ranging, complex, and ideologically fraught as religion and science, especially while attempting to draw essentialist distinctions between them. The danger, as *Why Religion Is Natural and Science Is Not* illustrates, is that one can easily lose track of the artificial distinctions that already precede one's colloquial understanding of religion. The category of religion is a lens that arrives already focused: on individual beliefs and worldviews that can be compared against the scientific gold standard; on cross-cultural patterns that embed religion into nature; and away from the power dynamics that continuously flow between religion and other economic, social, and political forces. McCauley argues that artificial distinctions can be productive if they are conscious methodological choices and that definitions ought to be eschewed or at least delayed until the serious work of an investigation has been completed. But this is especially difficult if one's objects of analysis—in this case, both religion and science—are already reified intellectual categories.

In this light, *Why Religion Is Natural and Science Is Not* is a prime example of why scholars must be critically aware of the concepts that they purport to investigate. Had McCauley taken such precautions he would have learned that, as I outlined in the introduction, the very task

of defining religion as "natural" harkens back to seventeenth and eighteenth century investigations of "natural religion." This could have helped him avoid quite a few epistemic traps that scholars of religion have been aware of for decades. McCauley would have learned, for example, that assuming religion to be a coherent, natural phenomenon requires one to universalize it across cultures, which in turn entails choosing what religion is and what it is not. Given the inherent ambiguity of "religion," however, this kind of essentializing is necessarily Sisyphean. Before long the would-be naturalizer of religion finds themselves negotiating an endless stream of anomalies that require alternative essences and new distinctions. As McCauley's struggle with theology and technology demonstrates, essentializing religion is like dividing a puddle with a fork: an incompletable task that will go on indefinitely until it is finally abandoned as futile.

Another epistemic trap that McCauley could have avoided is one that I have described as an upshot of microscopy: the perceived discovery, in the brain, of what is in fact smuggled-in ideology. I have defined microscopy as an explanatory technique that subverts and exploits the assumed ontological divide between nature and culture. Microscopy explains elements of culture according to the workings of nature using a simplified model of the brain. In chapter one I analyzed a research study by psychologists Will Gervais and Ara Norenzayan to show how microscopists can bungle this operation. Basing their research, like McCauley, on dual-process theory, Gervais and Norenzayan argue that analytic thinking reduces religious belief, presumably because System 2 thinking can override a person's religious intuitions. Gervais and Norenzayan claim to have observed this effect in a laboratory setting, where individuals prompted to engage in System 2 thinking self-reported lower levels of religiosity.

Yet, as I demonstrate in chapter one, the psychologists were in fact prompting their undergraduate test subjects with cultural connotations about rationality before surveying them about their religiosity. (Unlike control subjects, test groups were shown images of Rodin's *The Thinker*, for example, or words like "analyze," "reason," and "ponder.") Thus Gervais and Norenzayan did not measure the effects of System 2 thinking upon religious belief, but rather discovered that Canadian undergraduates self-report lower levels of religiosity if you prompt them in a psychology class with images that they associate with science. Analyzing their survey results, these two microscopists confused culture for nature, unaware that their own ideological assumptions had reproduced themselves in the seemingly naturalized space of the human brain.

McCauley falls into the same trap in *Why Religion Is Natural and Science Is Not*. He claims to have discovered objective essences for religion and has found them within the naturalized brain. Yet, like Gervais and Norenzayan, McCauley seems unaware of how deeply his investigation is informed by flawed ideological commitments, from his initial definitions of religion and science to his rhetorical efforts to contain theology and technology to his Western-centric and chauvinistic conclusions. The ideology of conflict sets McCauley unwittingly into a tautological loop: having already selectively defined religion as a naturalistic phenomenon and science as a transcendent one, the author then finds evidence that each social institution corresponds to essentially natural and unnatural cognitive processes. Thus, like Gervais and Norenzayan, McCauley unwittingly smuggles the ideology of conflict into the brain and then confuses tautology for discovery. McCauley laboriously cuts religion to fit into the cognitive category of naturalness and then, once he has successfully pigeonholed culture into nature, suddenly suffers microscopists' amnesia. Like Gervais and Norenzayan, McCauley sees his work as if for the very first time and confuses it for an objective natural truth that had been lying there

awaiting discovery. In both cases, microscopists' amnesia seems to be a function of ideology. Gervais, Norenzayan, and McCauley are all so deeply committed to the conflict thesis that they perceive its distorted effects as natural, commonsense reality.

Robert McCauley's *Why Religion Is Natural and Science Is Not* exemplifies how a contemporary biocognitive account of religion can be configured by the ideology of the conflict thesis and the epistemological framework of the nature/culture divide. McCauley essentializes religion and science as distinct, oppositional entities and assigns them to separate ontological zones. Religion, he argues, is essentially a natural phenomenon since it is rooted in natural cognitive processes, whereas science is essentially unnatural— a set of cognitive processes so difficult that it takes rare cultural settings to make them possible. While McCauley does not argue that religion lacks cultural elements or that science is distinct from nature, he does assign their origins and essences to nature and culture, respectively.

Why Religion Is Natural and Science Is Not also exemplifies the ease with which ideologies about religion and science can reproduce themselves in a purportedly objective investigation of religious cognition. McCauley's book was doomed at the very onset by a category mistake. In an attempt to reiterate some central tenets of the conflict thesis, the author attempted to establish essential differences between reified intellectual categories that can never be anchored to any fundament. Yet, perhaps due to the commonsense ubiquity of the conflict thesis, McCauley was critically unaware that his discoveries were in fact the direct products of his artificial distinctions. McCauley thereby unwittingly smuggled the conflict thesis into the brain and then mistook his cultural baggage for an object of nature.

CHAPTER 4: RELIGION'S COGNITIVE DEFENDERS

In the preceding chapters I have analyzed how concepts from the contemporary brain sciences have been mobilized in various efforts to naturalize religion. CSR defines religion as a cognitive byproduct—a set of concepts, beliefs, and experiences that arise and persist due to the idiosyncrasies of humanity's evolved psychological mechanisms. CSR practitioner Robert McCauley and psychologists Gervais and Norenzayan take up similar projects that attempt to essentialize religion as a set of primitive, unreflective beliefs that stand in stark contrast to the deliberative and rational cognitive processes associated with the sciences. These naturalistic biocognitive accounts have also seemed to be aimed at debunking religion, or at least denying it any transcendent status. Gods, we have been told, are the product of overactive mental systems. There is no supernatural realm above us; these are merely the illusory projections of a cognitive fundament below. These reductionist biocognitive accounts of religion have also reiterated a central assumption of the conflict thesis—that religion and science are distinct, oppositional entities competing for adherents and social power—and taken the side of science. It is no surprise, therefore, that these authors seem so proud. From within the ideology of the conflict thesis, successful biocognitive reduction would represent an epistemological deathblow to religion, extending scientific explanation into that private phenomenological space that has long been guarded as the realm of the soul. For would-be naturalistic debunkers of religion, the brain thus represents the ultimate conquest.

In this chapter I will investigate two distinct intellectual strategies that have been taken up by defenders of religion who aim to resist biocognitive debunkery. First, I will analyze works

by Lluís Oviedo and William Grassie, two theological scholars who defend religion's status as an irreducible, *sui generis* phenomenon and attack biocognitive science for what they consider to be an act of unjust epistemological overreach. I will then turn to two works of popular science, *How God Changes Your Brain* by Andrew Newberg and Mark Robert Waldman and *Super Brain* by Deepak Chopra and Rudolph Tanzi, which take an entirely different tack.[1] These authors appeal to the scientific concept of neuroplasticity, which they argue offers proof of religion's physical—and therefore ontological—reality. I will argue that these two responses to CSR represent contrasting rhetorical strategies: one that defends religion as transcendent, and another that attempts to make the immanent absolute. Finally, I will turn to a set of philosophical and theological projects that have taken up neuroplasticity with the aim of critiquing the nature/culture divide and the limited role of religion in secular modernity.

Sui Generis Religion and the Two-Headed Monster

Taking conference panels at the American Academy of Religion as a measure, biocognitivism grew rapidly over the course of the first decade of the twenty-first century. During the early 2000s there were only a few scattered sessions relating to the brain, on topics such as neuroscience and personhood, the potential applicability of cognitive science to the study of religion, and the science of Buddhist conceptions of the mind. Over the course of the decade, however, CSR rose quickly to prominence and the brain suddenly seemed relevant to almost any

[1] Andrew Newberg and Mark Robert Waldman, *How God Changes Your Brain: Breakthrough Findings from a Leading Neuroscientist* (New York: Ballantine Books, 2009); and Deepak Chopra and Rudolph Tanzi, *Super Brain: Unleashing The Explosive Power Of Your Mind To Maximize Health, Happiness, And Spiritual Well-Being* (New York: Three Rivers Press, 2012).

religious phenomenon. During the 2010 meeting alone, seven sessions at the AAR were focused on biocognitive themes.[2]

Two of the earliest critics of this trend were Lluís Oviedo and William Grassie, who in 2008 were featured as critical voices in a CSR-focused issue of the academic journal *Zygon.*[3] Oviedo's "Is a Complete Biocognitive Account of Religion Feasible?" and Grassie's "The New Sciences of Religion" represented two of the first theological rejoinders against biocognitive explanations of religion.[4] Oviedo's and Grassie's articles are remarkably similar, taking up three main strategies that I will analyze below. Both authors argue that religion is *sui generis*, or self-caused and totally unique, and therefore impossible to fully capture with scientific explanations. Nonetheless, science appears to be at the gates, and so Oviedo's and Grassie's second strategy is to depict this enemy strategically in both transcendent and immanent terms, portraying it as a dangerous force that can nonetheless be tamed. Finally, Grassie and Oviedo both deploy a rhetorical tactic that Barbara Herrnstein Smith has labeled *tu quoque*, or the "you too" argument: a common theological rejoinder to naturalistic accounts of religion that operates by turning an argument against religion back against science. (Thus the priest who is charged with mindless conformity to received ideas responds that the accusing atheist is doing the exact same thing.)[5] Grassie and Oviedo argue that if religion can be reduced to psychological mechanisms, then

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[2] "Past and Future Annual Meeting Dates and Sites," American Academy of Religion, accessed March 20, 2017, https://www.aarweb.org/annual-meeting/past-future-meetings.

[3] Lluís Oviedo, "Is a Complete Biocognitive Account of Religion Feasible?" *Zygon* 43, no. 1 (February 2008): 103-126; and William Grassie, "The New Sciences of Religion," *Zygon* 43, no. 1 (February 2008): 127-158.

[4] Lluís Oviedo is a theologian. William Grassie is a scholar whose work might be described as pseudo- or crypto-theological, since it operates from Christian theological presuppositions without self-identifying as religiously oriented.

[5] Herrnstein Smith, *Natural Reflections*, 22.

science can too. This, the authors argue, prove that biocognitivism is ultimately self-refuting. I will analyze these strategies shortly, after briefly placing Grassie's and Oviedo's *sui generis* defenses of religion within the broader context of nineteenth- and twentieth-century intellectual history.

Debates about religion and reductionism are nothing new. As I describe in the introduction, thinkers going as far back as David Hume have posited naturalistic accounts of religion by appealing to underlying mental causes. Reductionist explanations characteristically describe complex phenomena as the articulation of a more basic set of causal relationships. (For example, the blooming of a flower might be reduced to the biological operations of cells, and the operation of cells might be further reduced to the language of chemistry or physics.) Reductionist theories of religion were particularly popular during the nineteenth and early twentieth centuries, in part due to the intellectual currency of the physical sciences, which relied heavily on reductionism, and partly because reductionist approaches were an effective intellectual strategy for ordering and systematizing an influx of data about exotic cultures. Scholars including Marx, Durkheim, Freud, and Frazer offered theories of religion that isolated underlying primary causes, such as economics, society, psychology, or faulty human reasoning.[6] Thus, while some degree of reductionism is inevitable in any field, in religious studies reductionism is particularly controversial because it is associated with naturalistic explanation, and therefore with historical attempts to debunk religion.

The popularity of reductionist accounts of religion, paired with the rise of positivist beliefs in the inevitable triumph of science over religion, led a number of nineteenth- and twentieth-century scholars to defend religion as irreducible to materialistic explanations. Many

[6] For an overview of the turn towards naturalistic explanations, see Preus, *Explaining Religion.*

such scholars, including Max Müller and Mircea Eliade, conceived of religion as *sui generis*, or unique and self-caused. Advocates of religion's *sui generis* status generally argue that religion is irreducible to economics, psychology, sociology, or politics. Religion transcends these particular explanatory perspectives, they argue, and therefore requires its own experts and discipline of study. This argument proved both intellectually fruitful and tactically useful: comparative religion and the phenomenology of religion both found justification in the claim that religion was irreducible to material explanations; and the claim that religion is a unique dimension of study was instrumental to the establishment of religious studies as a discipline. With religion's *sui generis* status came the related notion of a so-called "insider/outsider divide," an epistemological border between scholars, who study religion objectively based on its outward phenomena, and religious practitioners who have unique access to phenomenological experiences of religion.[7]

When combined, the insider/outsider distinction and the notion that religion is *sui generis* can resemble a distinctly secular metaphysics. Locating the transcendent elements of religion in the subjective experiences of "insiders" effectively collapses the heavens into the skull. Religious believers may understand their beliefs and experiences in transcendent terms, but this subjective "insider" view can be rendered private and personal. Religion's transcendence is no longer ontological, but phenomenological. This, I argue, is why biocognitive accounts of religion represent such a serious threat to contemporary *sui generis* advocates. According to their particular modern conception of religion, the brain is religion's last stand. This is also the perceived territory that Lluís Oviedo and William Grassie aim to defend.

[7] I am admittedly painting with broad brush strokes here. The insider/outsider divide is a methodological issue informed by more than just the conception of religion as a *sui generis* phenomenon. Many secular scholars have embraced this model and find it valuable, for example, for framing ethnographic inquiry. For present purposes I am referring to a specific theological version of the insider/outsider divide, which I will discuss shortly.

Oviedo and Grassie both begin their articles by carefully positioning themselves as authorities over—and ambassadors between—religion and science. Oviedo establishes his scientific authority at the beginning of "Is a Complete Biocognitive Account of Religion Feasible?" by positioning himself as a meta-observer of the sciences. In a paternalistic overture, the author first congratulates CSR for "maturing" so quickly despite some foundational weaknesses and then provides an overview of "the results so far," a broad list of discoveries and research agendas associated with biocognitive inquiry.[8] As Oviedo renders them, however, biocognitive accounts of religion seem clunky and internally inconsistent. This seems to be by design. By purporting to summarize all of the noteworthy "achievements" in cognitive science, the author is able to draw selectively from a number of distinct and sometimes disparate research programs. The result is a cacophonous assortment of principles and claims that seems rife with inconsistencies. (In Oviedo's rendering, for example, CSR would seem to posit a mind that is both modular and non-modular at the same time.)[9] William Grassie opens with a similar overview, beginning with a history of science itself and then focusing specifically on the concept of a hyperactive agency detection device. Grassie further demonstrates his scientific bona fides by outlining his own scientific hermeneutic based on "altruistic fidelity" to the phenomenon that is being represented.[10]

Oviedo establishes his religious authority directly, stating at the onset of his essay that "as a professional theologian," he considers himself "entitled for the present endeavor."[11]

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[8] Oviedo, "Is a Complete Biocognitive Account of Religion Feasible?" 103, 107-110.

[9] Ibid., 107-110.

[10] Grassie, "The New Sciences of Religion," 156.

[11] Oviedo, "Is a Complete Biocognitive Account of Religion Feasible?" 106.

Grassie, too, speaks primarily as a representative of religion whose purpose is to "welcome [biocognitive] approaches but also delineate some of their philosophical and theological limitations."[12] Both authors cast themselves as representatives of religion, imagining that science has recently knocked on religion's door. In "The New Sciences of Religion," Grassie frames this threshold in terms of the insider/outsider divide. Studying religion from the "inside," Grassie argues, deals with holistic questions about the "self, society, and cosmos," whereas studying it from the "outside" involves naturalistic and reductive theories that are certainly valuable, but cannot exhaust the complexity of religion's inner circle.[13] In a section of his essay titled "User Instructions," Oviedo similarly imagines a sacrosanct inner boundary of religion that science cannot cross. Science, he argues, is only "productive" when it "limits its application to its own field."[14] Both authors frame their projects, in other words, as efforts of border protection. With biocognitive reductionism, science has overstepped its bounds and crossed into the territory of religion.

A key similarity between these authors is that both engage in what I will call a "double-formulation of science"—the alternating depiction of science as either immanent or transcendent. As Bruno Latour argues in *We Have Never Been Modern*, one of modernity's operating paradoxes is that nature is at once transcendent and immanent, discovered and made. Moderns oscillate between these two understandings of nature—they believe both formulations, but never at the same time. This, Latour argues, allows them to construct nature with their own hands, spin

[12] Grassie, "The New Sciences of Religion," 127.

[13] Ibid., 129, 140.

[14] Oviedo, "Is a Complete Biocognitive Account of Religion Feasible?" 120.

around, and then believe themselves to have discovered what they in fact just made.[15] As a result, moderns have a paradoxical view of science. In his 1987 book *Science in Action*, Latour likens our modern understanding of science to Janus, the two-faced Roman god who looks both forwards and backwards. Science, moderns believe, is an ordered process for discovering transcendent truths and, at the same time, an immanent project of actively constructing knowledge. Moderns—including, Latour argues, scientists themselves—see both of science's faces, though never at the same time.[16] In their *sui generis* defenses of religion, Oviedo and Grassie operationalize this modern paradox. The authors portray science as both a threatening transcendent agent and an immanent, workable tool. Oviedo and Grassie deploy these two conceptions of science strategically to construct the perfect enemy: a terrifying god that can be defeated with human hands.

Oviedo and Grassie formulate science, on the one hand, as a transcendent, self-animated agent that is bent on naturalizing any and all phenomena in its purview. Drawing on stereotypes rooted in the conflict thesis, the authors describe science as a valueless and hegemonic explanatory force that operates on its own accord. Oviedo, for example, argues that the core motivation of science is the ultimate disenchantment of religion. Thus, in order to protect religion, we need to "make science admit transcendent causes" and establish a "statute of limitations" around the study of religious cognition.[17] In Oviedo's formulation, science is a powerful, singular entity that can be forced to admit its limitations. Grassie, too, argues that barriers need to be constructed between science and religion in order to defend against scientism,

[15] Latour, *We Have Never Been Modern*, 32.

[16] Bruno Latour, *Science in Action* (Cambridge: Harvard University Press, 1987), 1-17.

[17] Oviedo, "Is a Complete Biocognitive Account of Religion Feasible?" 104.

which he defines as science's deeply entrenched aim to "replace religion with a scientific and rational view of the self, society, and cosmos."[18] Grassie and Oviedo both depict science as a singular, aggressive force in need of taming. This resonates with the commonly-held belief that science and technology are outpacing important human values. The atomic bomb, stem cells, and cloning all seem to point to science's lack of normative considerations or moral boundaries. Since it portrays the enemy as vast, autonomous, and threatening, this formulation of science also justifies the construction of defensive barriers around religion. Furthermore, this formulation of science actually makes an overwhelmingly difficult project seem much more tenable: to convince every cognitive scientist, evolutionary psychologist, and layperson to abandon scientific explanations of religion would be virtually impossible, but making a monolithic, agent-ified "Science" respect the transcendent status of religion seems much more simple. By describing science as a transcendent agent itself, Grassie and Oviedo construct a monstrous but singular enemy.

Where Oviedo's and Grassie's transcendent formulation of science depicts it as a sovereign cultural force that animates individuals, institutions, and resources, their immanent formulation portrays science as a mere tool, or a value-neutral set of techniques and procedures that happen to have been weaponized against religion by its cultural despisers. Science, Grassie argues, has been harnessed by modern research universities, which were "founded with an explicit agenda of getting rid of religion."[19] Science is a tool that modern universities deploy in their anti-religious warfare, he maintains, but in proper use science would be fair to religion. Oviedo echoes this sentiment and extends the metaphor of fair play, describing science as one

[18] Grassie, "The New Sciences of Religion," 132.

[19] Ibid., 134.

player within a larger epistemological game. Science is equal in stature to any other discipline, he argues, despite the fact that its practitioners sometimes try to be both player and referee at the same time.[20] The benefit of these immanent formulations of science is that it transposes science from the transcendent realm of absolute epistemological power down into the mundane world of techniques and procedures, where rule-breaking humans can be more easily stopped. Oviedo's metaphor of a "fair game" makes it seem that the dangers of science can be averted so long as everyone just follows the rules. Similarly, Grassie's portrayal of science as an epistemological weapon shifts agency onto those who misuse it—namely, the denizens of modern academia. Where the transcendent formulation mystifies and reifies science in order to justify the defense of religion, the immanent formulation simplifies science to a set of mundane procedures that will reflect the values of the individuals who use it. This furthers the authors' goal of defending religion from biocognitive debunkery by reducing science's authority and power. As Oviedo's "fair game" metaphor illustrates, an immanent science would occupy a more humble position among other discourses. It could be made to follow certain meta-epistemological rules, such as the insider/outsider boundary for the study of religion, if it wants to keep playing in this game where Oviedo and Grassie are the referees.

To be clear: there are valid ways to describe elements of science as both immanent—at the level of methods and technologies—and as transcendent, in the sense that it produces natural facts deemed transcendent and in the additional sense that, like any social institution, science exhibits unique forms of agency. My reason for highlighting Oviedo's and Grassie's paradoxical double-formulation of science is not to critique it and offer an alternative essential definition of science, but rather to highlight a key rhetorical strategy that they share. The authors need science

[20] Oviedo, "Is a Complete Biocognitive Account of Religion Feasible?" 105.

to be many things at once: powerful and defeatable, hegemonic and subservient, singular and diffuse, monstrous and mundane. They need an epistemological dragon that can also be tamed, and only by oscillating between transcendent and immanent formulations of science can they create such a monster. Once our *sui generis* defenders have completed their double-formulation of science, they attack biocognitivist explanations of religion by claiming that they are ultimately self-refuting.

Transcendence Chicken

In *Natural Reflections*, Barbara Herrnstein Smith describes a common rhetorical strategy in theological rejoinders to naturalistic accounts of religion: the "you too" argument, which accuses the naturalist of having committed the same intellectual sin that they had leveled at religion. Thus, to paraphrase one of Barbara Herrnstein Smith's examples, a priest might accuse an atheist, too, of mindlessly conforming to received ideas. In theological arguments, Herrnstein Smith argues, "the charge is often produced as a *coup de grace*, exposing… an implicit self-accusation and, with it (or so it is maintained), a conclusive self-refutation."[21] Oviedo and Grassie both employ this technique, responding to biocognitive reductionism with the rejoinder that science itself could be reduced to a naturalistic account of evolutionary psychology. I will focus on Oviedo's use of this strategy. Towards the end of "Is a Complete Biocognitive Account of Religion Feasible?" the author offers the "you too" argument as final proof of science's epistemological limitations. The "notorious case of paradoxical inclusion," as he deems it, tells us that even "biocognitive science may be deconstructed as a survival strategy and as a by-product of other cognitive domains."[22] Thus, Oviedo concludes, "cognitive science cannot settle

[21] Herrnstein Smith, *Natural Reflections*, 23.

[22] Oviedo, "Is a Complete Biocognitive Account of Religion Feasible?" 121.

what ultimately stands and what falls without risking self-destructive consequences."[23] Here is the *coup de grace* Herrnstein Smith describes: a triumphant demonstration of biocognitive reductionism's self-refuting contradiction. If you want to reduce religion to evolutionary psychology, Oviedo taunts, you will have to reduce your precious rationality and scientific inquiry as well. No one escapes the biocognitive reduction!

The goal of Oviedo's "you too" argument, it seems, is to have the scientist imagine what a truly comprehensive naturalistic reduction of human knowledge and culture would look like. This, Oviedo believes, would reveal to the biocognitivist that their intellectual project is ultimately "self-destructive," since it would reduce not just religion but also science itself to material causes. Although Oviedo's "you too" argument does establish that it would be contradictory for a biocognitive accounts of religion to claim some ultimate truth unadulterated by cognitive mediation, it does so by entertaining a hypothetical that forfeits the transcendent. In effect, Oviedo imagines an ontology of immanent materiality for the sake of a thought experiment. His argument is that this is clearly impossible—that there must be absolute truth, he thinks, is the one point science and religion can agree upon—but a fear of relativism haunts Oviedo's essay. For example, Oviedo laments the double standard that, of our numerous evolved cognitive operations, only religion seems to be denigrated. He concludes hopefully that "religion's being a by-product of evolution does not necessarily mean that it is useless or even harmful; it…at least can play a function of positive value for the entire species or for many of its members—as happens with art, for example."[24]

[23] Ibid.

[24] Ibid.

Here Oviedo has found himself temporarily working within an immanent metaphysics and, in an act of panic, advocates for religion a social status similar to art. This is a brief but revealing moment in his article that illustrates the double-edged nature of his "you too" rejoinder to biocognitive reductionism. The operating assumption of Oviedo's argument is that science will want to maintain a hold on transcendent truth. If one assumes that religion makes unique truth claims which reach beyond our embodied cognitive, cultural, political, and social practices, and that scientific theories of religious cognition undermine those claims while simultaneously making their own transcendent truth claims, then the "you too" argument should send biocognitivists running to the hills; they would not want to lose their vaunted access to the ultimate reality that lies beyond human perception and linguistic constructs.

The problem, however, is that science may not retreat. As Barbara Herrnstein Smith argues, the claim that scientific knowledge is itself a product of evolved cognitive tendencies does not dispute the operational validity of scientific techniques.[25] The perception that science pertains to transcendent truths, in other words, is not in fact essential to the construction of scientific knowledge. It may be essential to the modern habit of purification, Latour would argue, but science could go on without it. Oviedo's "you too" argument may disturb the biocognitive "consiliators" of chapter two, who most resemble this caricature, but, as Oviedo's momentary struggle with relativism illustrates, even this would not be worth the cost. Oviedo's "you too" argument temporarily surrenders the possibility of absolute truth in order to entertain a world where science assumedly cannot exist. If this presumably impossible leveling is affirmed, however, this would fundamentally undermine the status of religion as a *sui generis* phenomenon

[25] Herrnstein Smith, *Natural Reflections*, 23.

that transcends language, culture, and history. Religion can never beat science in the game of transcendence chicken.

Lluís Oviedo's and William Grassie's defenses of religion are at times creative and interesting, but they also reveal the inherent limitations that come with the epistemological stances that they occupy. Both authors are committed to a number of outdated or dubious assumptions about religion and science: that religion and science are monolithic and separate entities; that religion has a unique and universal essence; that science produces (and is existentially dependent on) transcendent truths; and that the "insider" realm of religious subjectivity represents a last stand against total and complete reductionism. By operating within a modernist and conflict-oriented ideology Oviedo and Grassie have accepted a stacked deck—an inherently unfair epistemological game, to extend Oviedo's metaphor.

For example, Oviedo and Grassie find themselves in the impossible position of defending transcendence as the necessary grounds for religion's legitimacy. With their double-formation of science and "you too" arguments, the authors attempt to deflect this struggle onto science, pointing to its own immanent elements. They do not realize, however, that this is a trap. The double-formation of science endows it with quasi-transcendent epistemological status and then the "you too" argument threatens to yank those heavens away, but religion all the while remains a fragile entity. A better strategy would have been to cede that biocognitive reductions of certain religious concepts and experiences were certainly possible, but respond that religion is too diverse, complex, and multitudinous for reductionism to explain it in its entirety. If religion has no essence, then its essence cannot be captured. Ironically, it is Oviedo's and Grassie's commitment to transcendent truth—housed, as they see it, in the privatized skull of the secular believer—that puts their conception of religion at risk in the first place. Rather than battling with

microscopists for control over the cognitive fundament, they could have taken up the strategy of our next defenders and done away with the transcendent all together.

From Computation to Connection

In this dissertation I have focused primarily on the cognitive science of religion and its critics. Thus, with a few exceptions, most of thinkers featured thus far operate within a shared intellectual paradigm that conceives of the brain as a modular computational device whose conscious experiences are the epiphenomena of evolved psychological systems. The thinkers that we have encountered so far—CSR practitioners and *sui generis* guardians alike—have also shared the assumption that religion primarily dwells in the mind, an interior psychological space that has been cordoned off for beliefs about the transcendent. According to this perspective, biocognitive explanations of religion seem particularly threatening. To explain religious experiences and beliefs as the byproducts of psychological modules is, effectively, to reduce the religious mind to the naturalized brain. Next, I will explore an emerging paradigm that posits a strikingly different vision of religion and the brain. As Nikolas Rose documents in his 2007 book *The Politics of Life Itself*, conceptions of the brain and mind have changed considerably over the past two decades, shaped by developments in brain imaging, neuroscience, psychopharmacology, and the neoliberal economization of health.[26] Modular, computational models are being displaced by what I will call a "connectionist" paradigm, which depicts the brain as an array of widely-distributed, dynamic processes. I will analyze this connectionist paradigm and explore how it has been applied to religion by a few key thinkers, but first I will contextualize it within a larger shift in Western biopolitics.

[26] Nicholas Rose, *The Politics of Life Itself: Biomedicine, Power, and Subjectivity in the Twenty-First Century* (New Jersey: Princeton University Press, 2007), 187.

The term "biopolitics" was coined by Michel Foucault to describe a form of politics that emerged with the European nation state in the eighteenth and nineteenth centuries. For Foucault, biopolitics is a specifically modern form of power that operates by conceiving of life as a vital force that can be measured, improved upon, and channeled.[27] The rise of nineteenth-century disciplinary institutions, as I discussed in chapter two, is one example of how modern governmental power sought to organize, monitor, and foster life. During this period new discourses, such as statistics and pathological medicine, were established for the measurement and management of the social body. These discourses did not emerge in a vacuum, nor were they simple discoveries of better ways of describing collective and individual life. The newfound concern with life and its management was made possible by a radical shift in European conceptions of "life" as a hidden process (one of the mutations, Foucault argues, that disrupted the classical *episteme*), as well as emerging social concerns over the newly-formed urban masses of the European city.

During the eighteenth and nineteenth centuries, Nicholas Rose argues, biopolitics was first and foremost a "politics of health."[28] Nation-states, for example, became concerned with birth and death rates, epidemics, and the policing of sewage, water, and food. Disciplinary institutions operated through the instantiation of norms, which served as singular ideals of life and health. However, during the twenty-first century, Rose argues, new forms of biopolitical power emerged in response to political and economic changes. Nation-states and their disciplinary institutions are slowly being surpassed by other forms of power, including multi-national corporations and global non-governmental organizations. Sciences and technologies

[27] Thomas Lemke, *Biopolitics: An Advanced Introduction* (New York: New York University Press, 2011), 33.

[28] Rose, *The Politics of Life Itself*, 3.

associated with life have also changed significantly: genetic mapping and engineering, the use of stem cells, and the informational turn in biomedicine have all occurred in the handful of years since Foucault's death. In response, Rose argues, biopolitical power has mutated and is no longer delimited by the poles of illness and health. The goals of twenty-first century biopolitics have shifted from protecting nations from pathological risks to the control, manipulation, and management of the vital capacities of human beings—it has become, in short, a politics of "life itself."[29] This, Rose argues, has informed a number of distinct shifts in the way that we understand the human brain.

Contemporary biomedicine envisions life at the molecular level, as a set of vital mechanisms that can be identified, isolated, and recombined.[30] The brain, correspondingly, has been increasingly understood in molecular terms, as an assemblage of tissues, chemicals, and organic processes that can be visualized, modified, and rearranged. The deep, interior psychological space of the "mind," Rose argues, is being displaced by a model of the brain that resembles a "flattened field of open circuits," where personhood and identity can be mapped directly onto the flesh of the brain.[31] This has given rise to what Rose calls a "neurochemical way of sensing ourselves," where individuals "recode variations in moods, emotions, desires, and thoughts in terms of the functioning of their brain chemicals, and to act upon themselves in the light of this belief."[32] This contrasts significantly with the paradigm of neurobiological reductionism and the notion of a mind influenced by subconscious modules. Within the new

[29] Ibid.

[30] Ibid., 6.

[31] Ibid., 15, 26.

[32] Ibid., 223.

connectionist paradigm of the twenty-first century, the interior psychological space of the mind has been collapsed into the distributed elements of the material brain. Rose attributes much of this shift to the rise of brain imaging technologies and their promise of real-time visualization of the physical matter that we usually associate with the mind. "When the mind seems visible within the brain," Rose argues, "the space between person and organ flattens out—mind [becomes] what the brain does."[33] This epistemological shift is reflected in the ways that individuals understand themselves. When the pharmaceutical patient says that a pill "fixes" a malfunctioning part of their brain, for example, they effectively bypass that inner space traditionally associated with the mind.

The connectionist paradigm also emphasizes the malleability of the brain. Where computational models of the brain tend to view brain development as fixed, with mental traits corresponding to hard-coded physical structures, connectionist models highlight the plasticity of the brain and, by correspondence, the malleability of the human subject. The malleable subject imagined within the connectionist paradigm has a brain that is constantly changing with every minute interaction with its environment. It therefore has the ability to enhance itself without end, always changing itself for the better. Where nineteenth-century medicine was geared towards arresting illnesses or correcting abnormalities, Rose argues, contemporary biomedicine has become unmoored from the poles of illness and health and now articulate life in the open-ended register of "optimization." As Davi Johnson Thornton demonstrates in her 2011 book *Brain Culture*, optimization is a theme that runs through popular neuroscience.[34] Thornton documents the recent rise of brain-based self-help books, brain training video games, popular magazine

[33] Ibid., 198.

[34] Thornton, *Brain Culture*, 2.

features on improving cognitive function, and manuals for improving baby brain health. The author argues that these texts reflect "brain-based healthism," a new value system that emphasizes continuous work on the brain to make oneself a better parent, worker, and citizen.[35] Brain health, Thornton argues, is no longer a guaranteed, natural state that might be damaged by outside forces. It is, rather, a temporary but calculable state that can be improved upon and maintained through self-supervision and management.[36]

Thornton warns that connectionist popular neuroscience promulgates distinct and troublesome elements of biopolitical power. Thornton cites Gilles Deleuze's account of a recent transition between disciplinary power and what he calls "societies of control." We are experiencing the end of disciplinary power as it existed in the eighteenth and nineteenth centuries, Deleuze argues, as disciplinary institutions—prisons, hospitals, schools, and factories—are being surpassed by a wider variety of global capitalist institutions.[37] This has made disciplinary institutions less effective at containing individual subjects, Deleuze argues, and disciplinary society operates most effectively if its subjects are transferred directly from one institution to another—from family to school to factory or barracks, with prisons, asylums and hospitals at hand to capture the dysfunctional. In each new institution, Deleuze argues, the individual starts "from zero," subjected to a new generic set of norms, expectations, and measurable standards. (The admonishment that "You are not at home any more!" is spoken by schoolteachers and drill instructors alike because disciplinary institutions operate by resetting each subject at their moment of entry.) Over the course of the twentieth century, however,

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[35] Ibid.

[36] Ibid., 7.

[37] Gilles Deleuze, "Postscript on the Societies of Control," *October* 59 (Winter 1992): 3-5.

disciplinary institutions have weakened in their grasp. Thus, Deleuze argues, Western societies are transforming into "societies of control," where "free-floating" subjects remain incorporated into systems of power through mechanisms of modulation and self-management.[38] By implanting individuals with certain power mechanisms, societies of control can shift the onus of regulation from disciplinary institutions onto subjects themselves.

Popular neuroscience, Thornton argues, is complicit in this project of training subjects to regulate themselves. Brain training manuals and video games encourage endless improvement and careful maintenance of mental health. Brain-training manuals like *Brain Age,* for example, render brain health calculable by translating a series of evaluative performances into a specific number—one's brain age—that can be lowered with regular mental exercises. This portrays brain health as a value that must be continually measured and maintained, argues Thornton, and thereby calls the user to participate in an endless project of self-optimization that is "unconstrained by any definitive, predetermined standard of health."[39]

Furthermore, Thornton argues, popular neuroscience commonly likens brain health to capital that can be stored up and reserved for future use.[40] Brain-training manuals call on users to build up a "neural reserve" that they can draw on later to buffer against aging or risky behavior. In her 2007 book *Train Your Mind, Change Your Brain*, for example, popular science writer Sharon Begley explains neuroplasticity using metaphors of money and labor. "Through neuroplasticity, the brain's structures are in no way stuck with the career their DNA intended,"

[38] Ibid., 4-5.

[39] Thornton, *Brain Culture*, 21.

[40] Ibid., 17.

Begley argues, describing the process whereby "unemployed" neurons are assigned to other functions.[41]

These broad intellectual developments are significant because they mark a fundamentally new way of understanding ourselves. The emerging connectionist paradigm posits a particular type of subject, whose molecular, malleable brain can be endlessly reconfigured to optimize profit and happiness. With this freedom, however, comes the obligation to constantly measure and regulate one's brain in an endless regimen of self-improvement. Thus, as Victoria Pitts-Taylor argues, the brain has become a social problem. On the one hand, Pitts-Taylor point out, the malleable, plastic brain of the twenty-first century offers a valuable challenge to the separations of mind and body, and culture and nature, that characterized twentieth-century thought. Yet, on the other hand, it also can be seen as a trope of the contemporary social order that justifies biotechnical interventions into everyday life. Brain plasticity is thus, at the very least, a "biological condition to be reckoned with."[42]

But how, exactly, should plasticity be reckoned with? For feminist theorist Cynthia Kraus, the question is not whether plasticity offers a more accurate scientific account of the brain; she asks rather, "what kind of social order and conceptions of human agency are being co-produced through knowledge claims about brain plasticity?"[43] In this chapter I raise a similar question: what conceptions of religion and selfhood are emerging at the interface of the connectionist paradigm and contemporary religious thinking? If CSR's computational paradigm models the brain as an information processor and thereby participates in and reinforces the

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[41] Sharon Begley, *Train Your Mind, Change Your Brain* (New York: Ballantine, 2007), 84, 87.

[42] Pitts-Taylor, *The Brain's Body*, 18.

[43] Cynthia Kraus, "Critical Studies of the Sexed Brain: A Critique of What and for Whom?" *Neuroethics* 5, no. 3 (2012): 253.

depiction of religion as a cognitive error, then how might brain plasticity inform alternative understandings of religion? What potential exists for thinking beyond essentialist definitions of religion, and what dangers should be avoided? Turning to *How God Changes Your Brain* and *Super Brain,* which both emphasize the brain's malleability and molecularity, two patterns stand out that are particularly noteworthy. First, both texts highlight the concept of neuroplasticity and argue that, since thoughts and experiences alter the flesh of the brain, religion is physically real. Second, these popular texts portray religion as a resource for endless cognitive enhancement.

Neuroplasticity, Reality, and Enhancement

"If you contemplate God long enough," Andrew Newberg and Mark Robert Waldman write in *How God Changes Your Brain,* "something surprising happens in the brain. Neural functioning begins to change. Different circuits become activated, while others become deactivated. New dendrites are formed, new synaptic connections are made, and… if God has meaning for you, then God becomes neurologically real."[44]

Newberg and Waldman are referring, here, to the process of neuroplasticity. The brain's neural pathways are continuously strengthened or pruned based on ongoing changes in our behavior, environment, emotions, and experiences. It therefore follows that, if you hear a sermon or learn how to juggle, your physical brain will change in minute but measurable ways. Newberg and Waldman, as well as *Super Brain* authors Deepak Chopra and Rudolph Tanzi, make neuroplasticity the cornerstone of their connectionist accounts of religion. Both sets of authors marvel at the complexity of our brains and the strange fact that our thoughts and experiences actually alter our neural flesh. Your brain contains "anywhere from a trillion to perhaps even a quadrillion connections called synapses," Chopra and Tanzi write at the onset of their book, and

[44] Newberg and Waldman, *How God Changes Your Brain*, 30.

these connections "are in a constant, dynamic state of remodeling in response to the world around you."[45] For Chopra and Tanzi this amounts to a stupendous "marvel of nature."[46]

It is easy to empathize with these authors' wonder. Neuroplasticity has been a hot topic for the last decade because it is, at first glance, so counterintuitive. According to the dominant computational paradigm of cognitive science—and, in turn, of CSR—the mind is a mere epiphenomenon of the brain. According to the reductionist metaphysics of consilience, it is impossible for the mind to exert downward agency onto the material world. Neuroplasticity marks the liminal space where mind becomes matter and subverts the modern nature/culture divide and its corresponding human subject by showing that our cultural environment has ongoing effects on our physical brains. The most interesting consequence of neuroplasticity for Newberg, Waldman, Chopra, and Tanzi, however, is that religious thoughts must affect the physical world. Just *thinking* about God, Newberg and Waldman argue, changes your neural circuitry, which means God (or the concept thereof—the authors conflate the two) can change your physical brain whether you are a Christian, a Hindu, or even an atheist.[47] These authors repeatedly emphasize religion's effects on the flesh, implying that neuroplasticity legitimizes religion by establishing its anatomical existence at the level of physical, empirical reality.

Furthermore, the connectionists argue, neuroplasticity promises spiritual empowerment. "Neuroplasticity is better than mind over matter," write Chopra and Tanzi, it is "mind turning into matter as your thoughts create new neural growth."[48] Because thought affects physical

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[45] Chopra and Tanzi, *Super Brain*, 3.

[46] Ibid.

[47] Newberg and Waldman, *How God Changes Your Brain*, 4.

[48] Chopra and Tanzi, *Super Brain*, 22.

matter, these accounts promise, anyone can learn to harness this power and actively construct reality. "Perception isn't passive," Chopra and Tanzi emphasize, "You create everything about how the world looks and feels."[49] Thus every individual is empowered, they argue, to make God real simply by acting as if God were real. If one meditates, prays, services the needy, or finds a path to personal fulfillment, Chopra and Tanzi argue, that person will train their brain to create a reality where God is real.[50] Since every human's perception of reality is constructed, in other words, we each have the ability to "make" God—not just in our imaginations but, through the alchemy of neuroplasticity, in the physical world as well.

Of course, if the only criterion for being real is to be an object of thought, what our connectionists say about "religion" and "God" could equally apply to "atheism" or "Walter White." The argument that neuroplasticity legitimates religion by establishing its physical reality is not particularly persuasive, but it is nonetheless an interesting rhetorical gesture when compared to the strategy taken up by Lluís Oviedo and William Grassie in *sui generis* defenses of religion. Oviedo's and Grassie's arguments hinge on the common notion that there is an "inside" to religion—a phenomenological reality that cannot be objectively observed or verified because it transcends the empirical domain of the material world. Oviedo and Grassie perceived biocognitive accounts of religion as an existential threat because such accounts purport to explain this subjective interior of religion in naturalistic terms. In accordance with these assumptions, Oviedo and Grassie attempt to defend religion's fragile transcendent status by shoring up the insider/outsider divide. Our connectionists take the opposite defensive approach. Newberg, Waldman, Chopra, and Tanzi embrace the porousness between mind and body and

[49] Ibid., 78.

[50] Ibid., 267.

privilege the interior space of individual minds as the ultimate source of reality because, they argue, neuroplasticity makes our thoughts and beliefs physical and therefore real. If CSR uses the naturalized brain to refute the reality of gods, these connectionists use neuroplasticity to make gods real by inscribing them into flesh. Where religion's *sui generis* guardians aim to protect the divide between thought and nature, these connectionists affirm and exploit it. Thought *is* nature, they argue, and so religious beliefs are physically real.

Another significant feature of *How God Changes Your Brain* and *Super Brain* is that both connectionist texts approach religion as a resource for cognitive optimization. Each offers a personalized "brain enhancement" program that claims to draw from the tried-and-true techniques of religious rituals. Newberg and Waldman prescribe meditation, which they promise will reduce stress, increase peacefulness and social awareness, and generally improve the overall functioning of one's brain.[51] They admit that secular meditation would have similar beneficial effects, but argue that it is even better to include religious contemplation into one's practice because this "strengthens a unique neural circuit that specifically enhances social awareness and empathy while subduing destructive feelings and emotions."[52] In Newberg and Waldman's rendering, what makes religion valuable is that it has, over the millennia, developed a number of brain-enhancing techniques and practices. Brain-based healthism, which associates selfhood with accrual of health reserves and endless projects of self-optimization, is here made spiritual. For Newberg and Waldman, religious practices like meditation are sacred insofar as they are beneficial to the brain. Sacred practices are, in their view, like putting money in the bank. Meditation techniques "strengthen" neural circuits of the prefrontal cortex, they claim, slowing

[51] Newberg and Waldman, *How God Changes Your Brain*, 9.

[52] Ibid., 14.

down the deterioration of mental disease and buffering the practitioner "from the deleterious effects of aging and stress."[53]

For Newberg and Waldman, the process of making God real also requires constant neural adjustments, since different parts of the brain produce different experiences of God. The frontal lobe produces the "logical concept of a rational, deliberate loving God," they argue, while our limbic system "creates an emotionally meaningful experience of God."[54] Problems occur when these get out of balance. An overactive limbic system could make a person ruminate on original sin, they argue, where too much frontal lobe activity might make them obsess over proving God. Bad religion can also cause neural damage: "fear-based religions," they maintain, might damage the anterior cingulate and make a person more aggressive and less empathetic.[55] This represents yet another example of the way that the brain can be used to naturalize ideology. In a microscopic flourish, Newberg and Waldman have snuck cultural norms—in this case, Protestant Christian values—into the seemingly objective realm of physical anatomy.

Chopra and Tanzi also articulate brain health in the language of optimization and risk, as one might guess based on their book's subtitle: *Unleashing the Explosive Power of Your Mind to Maximize Health, Happiness, and Spiritual Well-Being.* The authors frame their book as a manual for achieving a "super brain." To achieve "maximum longevity," for example, one should avoid risk factors, like alcohol, tobacco, anger, and stress.[56] Chopra and Tanzi go so far as to equate cognitive enhancement with spiritual development. The authors differentiate between the

[53] Ibid., 21, 149-150.

[54] Ibid., 49.

[55] Ibid., 49-53.

[56] Chopra and Tanzi, *Super Brain*, 8.

"baseline brain" of common people and the "super brain" that can be achieved by harnessing neuroplasticity. "Super brain," they write, "stands for a fully aware creator using the brain to maximum advantage. Your brain is endlessly adaptable, and you could be performing [in life] with far more fulfilling results than you now achieve."[57] With sufficient enhancement one can achieve the level of an "enlightened brain," a transcendent state where you are no longer controlled by your brain's activity.[58] Neuroplasticity, it seems, can quite literally make gods.

For religious readers who appreciate neuroscience but are skeptical towards the reductionist claims of CSR, these connectionist accounts might initially seem quite attractive. Whereas *sui generis* defenses of religion represent a strategy of entrenchment, Newberg, Waldman, Chopra, and Tanzi offer a creative alternative model that taps into the cultural prestige of neuroscience and offers material proof of the reality of God. The authors also promise scientifically verified "good religion" that will rewire the reader's brain for the better. Their model of religion and the brain flips the anti-reductionist insider/outsider model on its head, privileging subjective religious beliefs and experiences as the prime movers of physical reality. Yet, upon further inspection, *How God Changes Your Brain* and *Super Brain* represent a faulty strategy for mobilizing the connectionist paradigm in defense of religion. These authors crucially mishandle the connectionist brain in two ways. Rose describes the brain of contemporary biopolitics as a "flattened field of open circuits," where interiority and personhood have collapsed into a tangle of flesh.[59] Newberg, Waldman, Chopra, and Tanzi make use of this collapse, embracing the possibility of an immanent single plane of thought and matter. Their first

[57] Ibid., 5.

[58] Ibid., 10.

[59] Rose, *The Politics of Life Itself*, 15, 26.

mistake, however, is that in order to legitimize religion they overemphasize the reality-making power of the individual, positing a solipsistic metaphysics where any thought, concept, or wish has equal bearing on physical reality. As a result, these connectionist authors engage in the kind of hyper-relativism that Oviedo and Grassie attempt to avoid, where there can be no meaningful distinctions between good and bad, or truth and untruth.

Second, as if the expulsion of transcendence created a vacuum of power, the connectionist authors establish a new absolute with the pan-value of optimization. While this empowers the individual subject—to the extent that, in Chopra and Tanzi's model, it might literally become a god—it also dooms it to endlessly scrutinize and maintain its own vital forces. The absolute value of optimization was also reflected in Newberg and Waldman's normative claims about good and bad religion. Objectively good religion, in this model, is that which enhances the brain and thereby maximizes the individual's happiness and productivity.

Neuroplastic Explosives

As these close readings demonstrate, the danger of neuroplastic models of the brain is that their emphasis on flexibility resonates with some of the demands and virtues of late capitalism. Numerous scholars have noted what Dimitris Papadopoulos describes as neuroplasticity's "dual association" with freedom and control.[60] As Emily Martin maintains, the global marketplace demands a manic plasticity where individuals are always adapting, innovating, and self-modifying. Such mania is particularly prominent in the United States, she argues, since it is a country that sees itself as the center of a global system of power and wealth. When markets are treated as a "life force," Martin argues, and, paradoxically, "people are treated

[60] Dimitris Papadopoulos, "The Imaginary of Plasticity: Neural Embodiment, Epigenetics and Ectomorphs," *Sociological Review* 59, no. 3 (2011): 432.

as an ever more disposable source of inefficiency," a person's worth and survival are determined by his or her productivity.[61]

Yet, as Victoria Pitts-Taylor points out, neuroplasticity seems to offer a crucial conceptual tool for thinking about the brain in new terms, not as the interior locus of agency within sovereign individuals, but rather as an interactive element within multiple overlapping dynamic systems. Neuroplasticity, Pitts-Taylor argues, could help the humanities catch up with recent paradigm shifts in the sciences that "treat the social world as formative for the biological, see organisms as reflecting the diversity of their environments, and understand history and biology as coconstituted."[62] The idea of organisms as fixed, static, and determined by natural selection is being challenged across many scientific disciplines, she points out, and neuroplasticity offers resources for understanding how human brains—and, by extension, human subjects—are patterned by epigenetic, morphological, environmental, and self-organizational processes.[63]

Similarly, Samantha Frost points to an emerging view in the sciences that the embodied human is constituted through a "matrix of biological and cultural processes that shape one another over various time scales in such a way that neither one nor the other can be conceived as distinct."[64] Neuroplasticity, she continues, is one of many scientific resources that can help to

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[61] Emily Martin, *Bipolar Expeditions: Mania and Depression in American Culture* (Princeton: Princeton University Press, 2007), 53. See also Emily Martin, "Mind/Body Problem," *American Ethnologist* 27, no. 3 (2000): 3-20; and Emily Martin, "Self-Making and the Brain," *Subjectivity* 3, no. 4 (2010): 366-381.

[62] Pitts-Taylor, *The Brain's Body*, 7.

[63] Ibid.

[64] Samantha Frost, *Biocultural Creatures: Toward a New Theory of the Human* (Durham: Duke University Press, 2016), 18.

highlight what William Connolly describes as "our manifold entanglements with nonhuman processes, both within the body and outside humanity."[65]

For Catherine Malabou, the problem with neoliberal capitalist readings of neuroplasticity is that they "grasp only one of the semantic registers of plasticity: that of receiving form."[66] There is a second important attribute of plasticity, Malabou argues, which is the capacity to annihilate, explode, and create.[67] Malabou frames the flexibility demanded by neoliberal capitalism as a partial and distorted reading of neurobiology that overlooks the transformative and revolutionary potential of plasticity. Neuroplasticity, she argues, upends Western philosophical assumptions about identity by positing a dialectical play between the emergence and annihilation of form. The ongoing historico-cultural fashioning of selfhood, she argues, is a process made possible by the "ontological explosion" of the plastic brain, which annihilates the boundaries between nature, culture, society, and self.[68]

One of the few theologians to have taken up Malabou's "explosive" reading of neuroplasticity is Clayton Crockett, who underscores the value of Malabou's work for thinking against ideologies of global capitalism. "Malabou's account of plasticity offers ways to think not simply the brain," Crockett argues, "but the organization of our thoughts and our lives in a material and egalitarian way."[69] In its explosive form, he continues, neuroplasticity offers a way

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[65] William Connolly, "The 'New Materialism' and the Fragility of Things," *Millennium—Journal of International Studies* 41, no. 3 (2013): 401.

[66] Catherine Malabou, *What Should We Do with Our Brain?* trans. Marc Jeannerod (New York: Fordham University Press, 2008), 12.

[67] Ibid., 5.

[68] Ibid., 72.

[69] Clayton Crockett, *Radical Political Theology: Religion and Politics After Liberalism* (New York: Columbia University Press, 2011), 106.

to generate other possible worlds. Unlike Newberg, Waldman, Chopra, and Tanzi, whose accounts of neuroplastic world-generation are ultimately solipsistic, Crockett sees potential here for creating new forms of democracy that push back against neoliberal and neoconservative forms of governmentality. In the context of Crockett's "radical" theology, religion is "the eschatological commitment to democracy and to the need to revolt in order to create and recreate democracy anew, at every moment."[70] This offers an opportunity to understand religion in fundamentally new ways. Within liberal modernity, Crockett argues, religion was largely associated with invocations of an external transcendence and thereby restricted to the domain of private belief. Explosive plasticity, he maintains, can transform religion into a project that is committed to material equality and willing to experiment with the deployment of "an immanent, nonsovereign power directly to life and thought."[71]

Time will tell whether Crockett's neuroplastic political theology can become a motivating resource for social action, but his intellectual project stands as an illustrative example of how neuroscientific concepts can inform a nuanced approach to religion that thinks beyond the nature/culture divide, the conflict thesis, and other modernist ideologies that configure contemporary debates about religion and the brain. Crockett also offers a glimpse at how "religion"—understood self-consciously as an ambiguous category and a polymorphous set of social systems, beliefs, actions, communities, concepts, and material cultures—can be recreated rather than defended. By clinging to the transcendent status of religion, Oviedo and Grassie were forced into an untenable intellectual position that would sacrifice almost everything that is powerful and interesting about religion (for example, its unique position as an institution capable

[70] Ibid., 107.

[71] Ibid. See also Clayton Crockett and Jeffrey W. Robbins, *Religion, Politics, and the Earth: The New Materialism* (New York: Palgrave Macmillan, 2012), 111-126.

of critiquing both the nation-state and global capitalism). By choosing transcendence over immanence, essence over multiplicity, these *sui generis* defenders dealt themselves a losing hand. Crockett, on the other hand, reimagines religion as something that is in the process of becoming. A religion without essence has no inevitable Achilles heel—no single core element that could be naturalized and thereby negated.

In this chapter I have analyzed three distinct intellectual projects that engage with the brain sciences in order to defend or reimagine religion: the *sui generis* defenses of Lluís Oviedo and William Grassie, which guard religion's status as an irreducible phenomenon; the connectionist accounts of Andrew Newberg and Mark Robert Waldman, and Deepak Chopra and Rudolph Tanzi, which argue for the absolute ontological reality of religion by appealing to neuroplasticity; and critical theoretical works by philosophers and theologians including Catherine Malabou and Clayton Crockett, which approach the brain and religion without appealing to transcendence or the absolute. As these close readings have demonstrated, many biocognitive defenses of religion fall into the same epistemological traps as CSR due to their shared commitments to absolute truth and the conflict thesis. Those who instead approach religion as an immanent and dynamic phenomenon, on the other hand, are better equipped to describe and rethink religion as both culture and flesh.

CONCLUSION

This dissertation has argued that contemporary biocognitive accounts of religion are largely configured by nineteenth-century assumptions about nature, culture, religion, and science. Through close readings of a series of key biocognitive texts, I have demonstrated how the ideology of the conflicts thesis has been reproduced in contemporary scholarship by shaping researchers' investigative methods, explanatory objects, and perceptions of new data.

In chapter one I outlined how the brain is conceptualized in contemporary efforts to naturalized human subjectivity. When the brain is conceived as a bridge between culture and nature, I argue, and nature is uncritically assumed to yield absolute truths, it is easy for modern day microscopists of the soul to smuggle ideologies about religion into the seemingly objective realm of neuroanatomy. In chapter two I analyzed the cognitive science of religion as an intellectual paradigm and demonstrated how its model of the brain helps it to construct a "cognitive fundament" where the fundamental truth of religion resides. I framed the quest for consilience as a nostalgic quest for the transcendental truths of a bygone metaphysics.

In chapters three and four I surveyed various, and sometimes disparate, attempts to essentialize religion. In chapter three I analyzed Robert McCauley's *Why Religion is Natural and Science is Not* as an example of how artificial definitions of religion can reiterate nineteenth-century stereotypes about religion and science in the vocabulary of cognitive science. By critiquing McCauley's argument I demonstrated the categorical impossibility of essentializing religion with the brain. In chapter four I turned to theological defenses against biocognitive reductionism, including *sui generis* defenses of religion's transcendence. I also analyzed a few

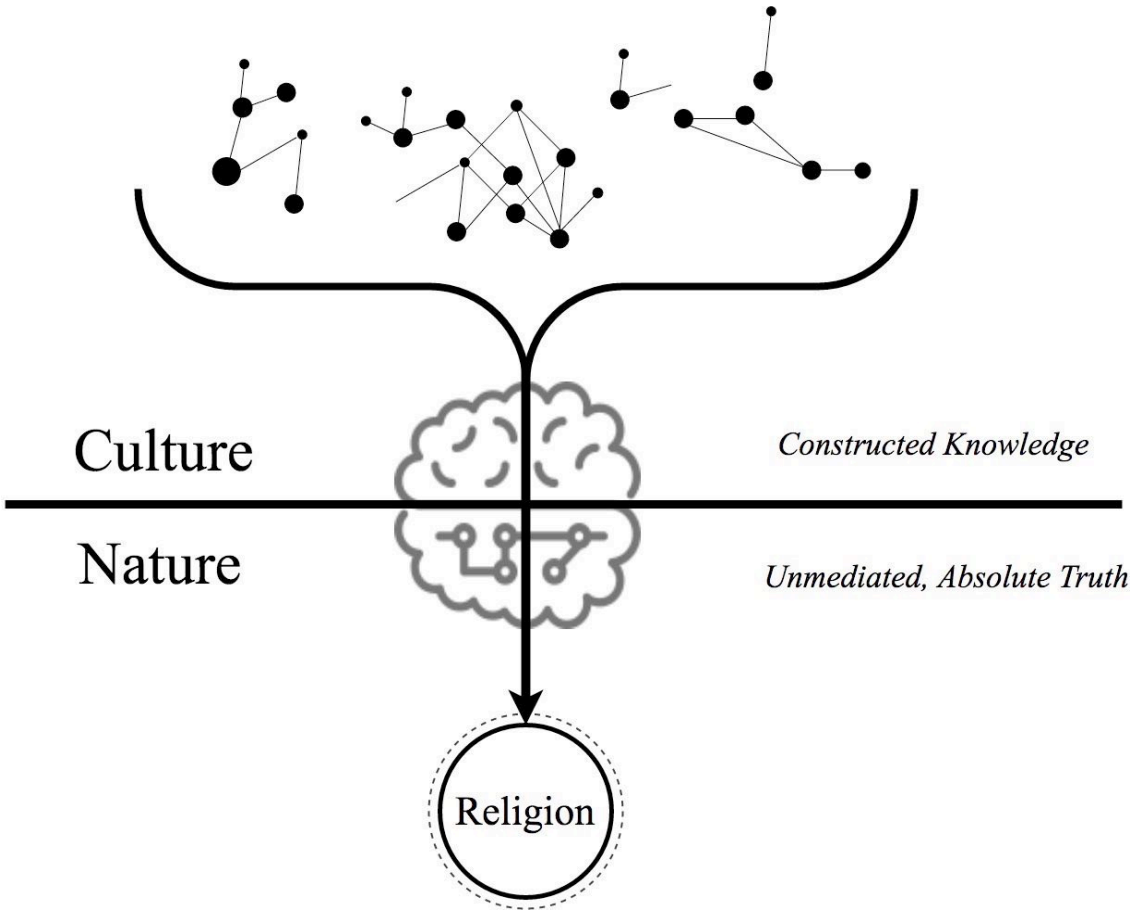
key uses of neuroplasticity as a conceptual tool for rethinking religion, attending to the concept's dual associations with explosive freedom and biopolitical control.

Taking a broad view of the intellectual projects that I have analyzed in this dissertation, the most persistent theme across contemporary biocognitive accounts of religion is the representation of the brain as a site for discovering the fundamental truth about religion, as it "really is" in nature. For BBC presenter Alex Riley, MRI images of the brain offer objective proof of the religiosity of Apple fandom. For psychologists Will Gervais and Ara Norenzayan, dual-process theory represents a culture-free cognitive landscape where the fundamental relationship between religion and analytic thinking can be observed. For CSR practitioners, ancient cognitive modules are the purely natural causes of religion's various culture manifestations. For advocates of consilience and vertical integration, neurobiological reductionism can legitimize religious studies by anchoring it to the intellectual bedrock of nature. For Robert McCauley, the true essences of religion and science lie in the brain, to the extent that theology must not be genuinely religious since it violates what he considers a natural cognitive order. Even religion's would-be defenders from biocognitive reductionism assent to the notion that the natural world is where absolute truth resides. This forces them into untenable intellectual positions, like Lluís Oviedo's double-edged "you too" argument or Deepak Chopra and Rudolph Tanzi's relativistic neuroplastic materialism.

As illustrated in Figure 5.1 below, contemporary biocognitivists generally seek to essentialize religion by reducing its constituent concepts, beliefs, and practices to the operation of simpler mechanisms within the naturalized brain. Within this framework, the brain represents a "cognitive fundament": a truer, more genuine order of reality that lies concealed beneath the seemingly chaotic world of everyday experience. This corresponds to what Feyerabend describes

as Western science's search for an "ultimate reality" and to Nietzsche's description of the Apollonian dream of a higher, more perfect order of truth. If a cognitive fundament of religion were to exist, it would unify what otherwise seems to be a sprawl of concepts, beliefs, rituals, identity formations, cognitive-perceptual processes, material practices, ethical propositions, origin stories, textual practices, and spatial typologies that happened to have been cordoned off by an ambiguous and shifting intellectual category. Furthermore, such a fundament would, as advocates of consilience argue, undergird a singular theoretical framework for the study of religion.

Figure 5.1. A Cognitive Fundament for Religion.



In this dissertation I have aimed to demonstrate the categorical impossibility of essentializing religion by deconstructing recent attempts to locate such an essence in the naturalized brain. To be clear, however, the problem with contemporary biocognitive theories of religion is not that they mix nature and culture. Rather it is that, in their search for absolute truths and fundamental essences, our modern-day microscopists have dreamt up an impossible cognitive fundament. They have taken dynamic, entangled causal networks of nature/culture hybrids and found a few interesting causal linkages—for example, between supernatural agents and a hyperactive agency detection module—but then declared themselves to have succeeded in a much larger conquest. In an effort to make their new knowledge into absolute truth, they have made essences out of mere elements and redirected causal traffic towards just one direction. In Feyerabend's terms, biocognitivists have claimed to "possess positive knowledge about Ultimate Reality… only by excluding large areas of phenomena or by declaring, without proof, that [those phenomena] could be reduced to basic theory."[72]

Had contemporary biocognitivists heeded Nietzsche's advice and sacrificed their "desirability to truth," they may have abandoned the search for a fundamental essence to religion and instead recognized the potential of their method.[73] If microscopy links nature and culture through the brain, then I hope from my heart that more microscopists cultivate a desirability to multiplicity—to trace the dynamic interplay between nature/culture hybrids within those assemblages that we call religion. Our discipline certainly needs more microscopists. After all: religion, like the brain, consists of both culture and flesh.

[72] Feyerabend, *Conquest of Abundance*, 215.

[73] Nietzsche, *The Genealogy of Morals*, 25.

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