

Surveying the Field

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Religion is present in virtually all known human societies. In spite of obvious cultural variation, many traits of religious thought and behavior are remarkably consistent across time and space. People around the world interact with superhuman agents—that is, gods, spirits, and ancestors—that are similar to humans in many respects but also display some superhuman abilities, such as invisibility or knowledge of people's thoughts and feelings. In small and large societies around the globe, rituals are performed that are connected to shared themes and occasions, such as communication with the gods, sacrifices, initiation of young people into the community, or depositing dead bodies. Why is religion so widespread (indeed, virtually omnipresent) in human societies and why does it assume fairly consistent forms?

Cognitive studies of religion (often referred to as the cognitive science of religion) examine cross-culturally consistent patterns of religious thought and behavior. Although cognitive scientists study the human mind in general, scholars pursuing cognitive studies of religion ask how the structure of the mind shapes religion. Like cognitive science itself, the cognitive approach to religion is interdisciplinary in the sense that it uses methods and theories from a range of academic fields. Neuroimaging technology is used to observe changes in the functioning of the brain while people engage in religious meditation or bible reading.

Experimental psychology is used to test hypotheses about religious concepts and the influence of religion on ethical behavior, among others. The emerging field of experimental ethnography studies people engaged in religious practices both in the field and in the laboratory. Evolutionary theory is used to make sense of the roots of religion in the distant past of humankind. Computer models help to test ideas and analyze data about religious beliefs and communities. The philosophy of mind inquires about the nature of religious experience, as well as the relationship of the mind to the brain, the body, and the environment. This chapter reviews the intersection between the study of religion, human cognition, and culture, tying together these many approaches to understanding religious cognition and culture.

1. The Cognitive Turn(s)

The study of religion is only one of the many academic disciplines that have been influenced by cognitive approaches. A brief review of the beginnings and history of cognitive science will be helpful in understanding the nature and significance of the cognitive turn in the study of religion.

1.1 Opening the Black Box

The cognitive turn in psychology started in the 1950s, when the ruling paradigm of psychological research was behaviorism. According to the behaviorist method, as noted by Burrhus Frederic Skinner in *About Behaviorism* (1974) and John B. Watson in “Psychology as a Behaviorist Views It” (1994), psychologists must only study an organism’s reactions (responses) to external impulses (stimuli). The behaviorists were not interested in mental processes because studying them was considered impossible or impractical. For example, in the textbook case of classical conditioning, Pavlov’s dog learned to associate a tone (conditioned stimulus) with the presentation of food (unconditioned stimulus), thus salivating (conditioned response) whenever the tone was presented.

One of the impulses for the study of mental structures came from early computer science—see, for example, Michael W. Eysenck and Mark T. Keane’s *Cognitive Psychology* (2005) and William Bechtel et al.’s “Cognitive Science: History” (2001). On the basis of the kinds of internal operations that computers could perform on the data stored in memory, scholars started to theorize about the structure and functioning of the human mind. For example, scholars such as Peter Scott and Rod Nicholson in *Cognitive Science Projects in Prolog* (1991) built tree-like databases, the structure of which was believed to resemble how the human mind stores information, and the distances on the tree were compared with the speed at which human participants made associations between the same items that were stored in the computer’s database. Models of how the mind represents and manipulates knowledge were central concerns for cognitive scientists in the beginning.

1.2 Mind and Body

As R. J. Dolan writing in “Neuroimaging of Cognition” (2008) and Geoffrey K. Aguirre writing in “Functional Neuroimaging: Technical, Logical, and Social Perspectives” (2014) note, however, neuroimaging technology increasingly, has allowed researchers to observe brain activity. The electroencephalograph (EEG) is based on a similar principle as the more familiar electrocardiograph, but instead of measuring electrical impulses in the heart, it picks up electric signals emitted by the cells of the brain (neurons). Other neuroimaging tools measure the energy consumption of brain cells, either by measuring blood flow or sugar consumption, thus allowing us to see how activation in certain parts of the brain changes as people perform some task.

Studies performed with the help of such tools allowed scientists to make inferences about the contribution of various parts of the brain to cognitive functions. These studies contributed to knowledge about the brain gained by other means, such as from the study of patients with brain lesions (damage to the brain caused by illness or trauma). Scholars such as Stephen Michael Kosslyn and Olivier Koenig in *Wet Mind* (1992) speak of wet models of cognition that take into account actual neural structures instead of (or in addition to) what we learn from building artificial minds in computers.

As discussed in Andy Clark’s *Mindware* (2001), John G. Daugman’s “Brain Metaphor and Brain Theory” (2001), and J. J. C. Smart’s “The Mind/Brain Identity Theory” (2014), the relationship between mind and brain has been one of the central themes in the philosophy of mind. Are mental states identical with brain states (identity theory)? Is cognition necessarily bound to the human brain? The details of

these discussions are not important in this context, but the case of computer models provides some insight. If the human mind can be modeled in a computer successfully (through multiple realizability), then it can be argued that cognition can exist independently of the human brain and a mental state cannot be identical with a brain state. It also has been suggested that cognition requires having a body or that the mind extends into the environment. We will become familiar with some important consequences of these arguments in the following section, as well as their significance for the study of religion, setting the stage for more detailed discussions in subsequent chapters of this volume.

2. Bringing Ritual to Mind

Let us turn to the major theories and developments that introduce us to the basic questions of the cognitive study of religion. The study of rituals has occupied many scholars studying religion from a cognitive perspective.

2.1 *The Ritual Form Theory*

The interdisciplinary research program that eventually became known as the cognitive science of religion started with an inquiry about the structure of rituals. In their monographs entitled *Rethinking Religion* (1990) and *Bringing Ritual to Mind* (2002), E. Thomas Lawson and Robert N. McCauley asked how the human mind represents rituals and what this implies for their structure. They answered these questions by putting forward the ritual form theory. According to Lawson and McCauley, the human mind represents actions in terms of an agent acting on a patient with the help of an instrument (see Table 1). For example, John (agent) hits (action) the ball (patient) with a bat (instrument).

Table 1. The Representation of Ritual as Action

| Agent | Action (by instrument) | Patient |
|--------------|-------------------------------|----------------|
| John | hits (with a bat) | the ball. |
| The priest | baptizes (with water) | the infant. |

Unlike in ordinary actions, however, in a ritual, one of these components is connected to a superhuman agent (god). For example, in baptism a priest (connected to God by ordination) baptizes an infant (or adult in certain denominations) with the help of water. This is an example of a special-agent ritual because the agent of the action (the priest) is connected more directly to a superhuman agent than either the infant or the water. According to Lawson and McCauley, special-agent rituals have long-lasting effects and are performed only once with the same participants (i.e., a priest performs many baptisms, but only one baptism on any infant). Special-agent rituals generate intense emotions and people invest considerable time and resources into performing them.

2.2 *The Modes Theory*

In *Inside the Cult* (1995), *Arguments and Icons* (2000), and *Modes of Religiosity* (2004), Harvey Whitehouse presented a different account of rituals after

studying the formation and dissolution of a religious revival group in Papua New Guinea. Whitehouse observed that the religion of a number of traditional villages was highly routinized and included tenuous sermons and gatherings. As a response to the tedium of the rituals, three of the villages formed a splinter group that performed intense, emotionally arousing rituals, such as nightly gatherings in a special ancestral hut and mass celebrations. The ever-increasing intensity of the rituals led to exhaustion and the group eventually rejoined the mainline community.

According to Whitehouse's theory of the modes of religiosity (see Table 2), some religious groups operate in the imagistic mode, performing intense rituals that generate personal but not theologically consistent memories. With reference to memory studies, Whitehouse classified these memories as episodic memories (memories of concrete events of one's life). In contrast, groups in the doctrinal mode perform rituals that repeatedly transmit information with low emotional intensity. Such information is stored as semantic memories, that is, in the form of lexical information and facts without direct connection to a concrete time and place in the individual's life. Whitehouse also suggested that groups operating in the imagistic mode are small-scale and exclusive, whereas groups operating in the doctrinal mode are large-scale, uniform, and efficiently missionizing.

Table 2. Whitehouse's Modes of Religiosity

| Variable | Doctrinal | Imagistic |
|--------------------------------|-----------------------------------------|----------------------------------------|
| <i>Psychological Features</i> | | |
| 1. Transmissive frequency | High | Low |
| 2. Level of arousal | Low | High |
| 3. Principal memory system | Semantic schemas and implicit scripts | Episodic/flashbulb memory |
| 4. Ritual meaning | Learned/acquired | Internally generated |
| 5. Techniques of revelation | Rhetoric/logical integration, narrative | Iconicity, multivocality, multivalence |
| <i>Sociopolitical Features</i> | | |
| 6. Social Cohesion | Diffuse | Intense |
| 7. Leadership | Dynamic | Passive/absent |
| 8. Inclusivity/exclusivity | Inclusive | Exclusive |
| 9. Spread | Rapid/efficient | Slow/inefficient |
| 10. Scale | Large scale | Small scale |
| 11. Degree of uniformity | High | Low |
| 12. Structure | Centralized | Noncentralized |

Source: Whitehouse, Harvey. *Modes of Religiosity: A Cognitive Theory of Religious Transmission*. Lanham, MD: AltaMira Press, 2004, page 74.

2.3 Why Ritual?

Another line of ritual theories focused on the connection between rituals and group cohesion. In "How Did Morality Evolve?" (1991) and "Religion as a Hard-to-Fake Sign of Commitment" (2001), William Irons suggested that religious behavior sends reliable signals of one's commitment to social cooperation, an idea that has been further elaborated by Richard Sosis in "Religion and Intragroup Cooperation" (2000) and "Religious Behaviors, Badges, and Bans" (2006), Joseph Bulbulia in "The

Cognitive and Evolutionary Psychology of Religion” (2004), and Bulbulia and Sosis in “Signalling Theory and the Evolution of Religious Cooperation” (2011). In his 2000 empirical study and his 2003 work with Eric R. Bressler, Sosis found that among utopian societies (communes) established in the United States between 1663 and 1937, secular (e.g., anarchist) communes were three times more likely to dissolve in any year than religious communes and the number of requirements in religious communities was a strong predictor of longevity. Sosis (2000) also found that religious kibbutzim in Israel fared better economically than nonreligious ones.

It has been suggested by Emma E. A. Cohen et al. in “Rowers’ High” (2010), and Ivana Konvalinka et al. in “Synchronized Arousal between Performers and Related Spectators in a Fire-Walking Ritual” (2011) that rituals enhance group cohesion by creating synchrony (such as in communal dances or processions). Bulbulia in “Charismatic Signalling” (2009), as well as Bulbulia and Sosis in “Signalling Theory and the Evolution of Religious Cooperation” (2011), argued that ritual practices also maintain unified beliefs in large populations. On the basis of studies and theories of the connection of religion and pro-social behavior, Ara Norenzayan suggested in *Big Gods* (2013) that religion (more specifically, the concept of high gods or big gods) holds the key to the formation of large-scale societies.

2.4 Magic

Although magic has been long considered an ethnocentric and pejorative term, since the late 1990s, some scholars argued that the history of misuse of the term does not necessarily render it useless in the study of religion. In *A Cognitive Theory of Magic* (2007), Jesper Sørensen used conceptual blending theory to examine how people reason about rituals. He distinguished two types of magic: in transformative magical action, essential qualities are transferred from elements belonging to one domain to elements belonging to another domain (e.g., the bread becomes the body of Christ). In manipulative magical action, magical practices change the state of affairs inside a domain by manipulating elements in another domain (e.g., sunset is delayed by placing a stone on a tree). Here the relation between elements is changed, whereas their essential qualities remain the same. With the help of blending theory, Sørensen explained how people establish a link between two domains (spaces), relying on either part-whole structures or conventional and perceptual likeness.

In *Magic, Miracles and Religion* (2004), Ilkka Pyysiäinen argued that sympathetic magic (such as manipulating a voodoo doll to affect a real person) is based on essentialist thinking: magical effects are mediated by imperceptible essences. He also suggested that magic is about effects in known reality, whereas in religion natural actions affect supernatural reality. Thus magic and religion support each other: on the one hand, magic is easier to falsify (its results are visible), and therefore it needs the support of religious explanations; on the other hand, magic supports religion by offering individual motivation. Finally, István Czachesz writing in “Magic and Mind” (2007a), “Explaining Magic” (2011), and “Cognitive Perspective on Magic” (2013) proposed a model in which magic results from the interaction of three components. First, by operant conditioning (an example of conditioned learning discussed earlier), people learn superstitious manipulations of things (such as an athlete’s gestures to influence a released ball’s path) that are in fact independent of their actions. Second, miracle stories are persistent because of their memorable features, including minimal counterintuitiveness and emotional details. Miracles provide inspiration and justification for magical practices. Third, magic is

solidified by a web of explanations rooted in intuitions (such as the feeling that cheering in front of a television screen helps our sports team) and culturally supported beliefs (such as beliefs in demonic and spiritual influences).

2.5 Are Rituals an Accident?

Pascal Boyer and Pierre Liénard writing in “Why Ritualized Behavior?” (Boyer and Liénard 2006) and “Whence Collective Rituals?” (Liénard and Boyer 2006) reframed the cognitive study of rituals as a study of ritualization. The main characteristics of (human) action ritualization are compulsion, rigidity (adherence to a script), goal-demotion, and internal repetition (and redundancy). Boyer and Liénard located the origins of ritualization in the so-called hazard-precaution system, a cognitive system that evolved to detect signs of potential threats and set off precautionary behavior.

One of the characteristics of the resulting ritualization is that the individual loses sight of the connection between the purpose of the overall action (if there is such) and the elementary steps that are carried out, a phenomenon called goal-demotion. The concentration on the disconnected subgoals of the script results in an overload of the individual’s attention, which, in turn, provides temporary relief from the anxiety that elicited the ritualization. Further research by Uffe Schjoedt and Sørensen in “Cognitive Resource Depletion in Religious Interactions” (2013) elaborated on the consequences of overloading working memory, suggesting that it makes participants of collective rituals susceptible to accept information uncritically.

Applying Sperber’s theory of the epidemiology of culture (see below) to rituals, Boyer and Liénard argued that many aspects of collective rituals activate the hazard-precaution system. In particular, the occasion for the ritual is often directly related to concerns that activate the hazard-precaution system. On this account, rituals are accidental by-products of the structure of the human mind.

2.6 Cognitive Theories of Ritual: Some Reflections

The relationship between cognitive science, on the one hand, and cognitive studies of religion, on the other, can be confusing. The ritual form theory can be called a cognitive theory in the classical sense because it accounts for various features of rituals in terms of how they are represented in participants’ minds. The modes theory, in contrast, is an extension of former sociological theories of religion with the addition of insights from memory studies.

Other theories of rituals and social cohesion avoid the problem of cognition altogether. Even if they are discussed in the framework of cognitive studies of religion, in fact, they are not cognitive theories in a traditional sense. As we will see in later parts of this chapter, some cognitive studies of religion are only loosely committed to classical cognitive theories and perspectives; they focus on behavioral, social, or neural processes instead of traditional cognitive issues.

Scholars are divided on the question of the origins of rituals. In particular, it is debated whether rituals (and religion in general) represent an adaptation in human evolution. On the one hand, the hazard-precaution theory claims that people perform collective rituals not because they are adaptive but because they engage a mental structure (hazard-precaution system) that itself evolved as an adaptation in human ancestors. In other words, people learn ritual behavior easily because they have an

evolved mental structure that is sensitive to clues about hazards and hazard precaution. Thus, collective rituals are by-products of evolution.

On the other hand, scholars who endorse theories of rituals as tools to increase the cohesion of human groups tend to agree that ritual (and religion) should be understood as an adaptation in human evolution. The adaptive nature of rituals, however, is not to be understood in the framework of classical Darwinian (after Charles Darwin; 1809–1882) evolution, in which traits that are inherited and that help an individual to have more offspring will spread in the population. In fact, Darwinian evolution should result in the extinction of pro-sociality, because any resources not spent on enhancing the fitness of the organism or its offspring are missed opportunities for passing on the organism's genes and genes that compel the organism to behave in such a way will disappear from the gene pool in the long run.

Religion is needed, according to these scholars, to explain why people behave pro-socially. In particular, scholars such as Joseph Henrich in "Cultural Group Selection, Coevolutionary Processes and Large-Scale Cooperation" (2004) and Peter J. Richerson and Robert Boyd in *Not by Genes Alone* (2005) invoke theories of group selection to explain the connection between religion and pro-social behavior. Group selection is an evolutionary process in which groups rather than individual organisms are selected based on their different cultural traits. Using group selection theory, scholars argue that some groups thrive better on account of their rituals and religion, and these groups will replace others that have less adaptive behaviors or other groups will copy their practices. In either case, the respective cultural traits will spread in the overall population.

3. God Concepts

Different cognitive theories of religion try to answer the question of why people believe in gods and spirits in virtually all cultures.

3.1 Religion as Cultural Epidemiology

Soon after the publication of *Rethinking Religion*, another influential research project was presented by Boyer first in *The Naturalness of Religious Ideas* (1994a) and later in *Religion Explained* (2001). Boyer's explanation of religious ideas applies the theory of cultural epidemiology, developed by Dan Sperber in *Explaining Culture* (1996). Sperber suggested that certain ideas can be found consistently across cultures because they have features that correspond to the structure of the human mind. To explain why religious ideas appear in a limited set of varieties that are found in virtually every human society, Boyer argued that religious concepts are rooted in cross-culturally consistent ontological categories. The human mind makes use of such categories because they allow people to deal with their environment quickly and efficiently: once we know that the thing we see is an animal, we will expect it to move on its own, look for food, and have offspring like itself, but we will not expect it to talk, for example.

A number of experiments reported by Boyer and Charles Ramble in "Cognitive Templates for Religious Concepts" (2001), Justin L. Barrett and Melanie A. Nyhof in "Spreading Non-Natural Concepts" (2001), and Norenzayan and Atran in "Cognitive and Emotional Processes in the Cultural Transmission of Natural and Nonnatural Beliefs" (2004) have shown that concepts that violate the expectations we

attach to these ontological categories are more memorable than ordinary concepts or concepts that are only strange but not in a way that violates our related ontological expectations. A rock that eats people (we do not expect objects to have biological features) or an animal that talks (we do not expect animals to have mentality including language) are examples of such ideas. If such counterintuitive features multiply, however, the respective ideas lose their advantage in being remembered. Some minimally counterintuitive ideas, Boyer suggested, are especially relevant, because they refer to human-like beings (agents) who have particularly interesting abilities: they can see what we think and feel, especially about socially relevant topics. The gods and spirits of religious traditions are such minimally counterintuitive agents, with access to socially strategic information.

3.2 *Do Gods Come from Within?*

Experimental psychologist Jesse Bering, who studied intuitions about the dead, developed a different line of argument in “Intuitive Conceptions of Dead Agents’ Minds” (2002), “The Folk Psychology of Souls” (2006), and *The God Instinct* (2011). Bering found that people generally are ready to attribute mental states to the dead, that is, they intuitively believe that death does not put an end to people’s thoughts and beliefs. Furthermore, he found that people make a distinction between two types of mental functions when it comes to mental states after death. On one hand, they are inclined to accept that psychobiological and perceptual states stop: for example, people do not typically expect a dead person to feel hunger or see. On the other hand, emotions, desires, and epistemic states are believed to continue after death. Indeed, everyday experience also confirms this conclusion: most of us have had friends or family members who kept talking to a dead relative and had strong feelings about how he or she would think or speak in a given situation.

The mental structure that is responsible for our continuing intuitions about dead people’s thoughts and feelings is called theory of mind. Bering suggested that we cannot easily switch off our theory of mind with respect to people we know when they die, which yields intuitions about spirits and ancestors.

3.3 *God Concepts: Some Reflections*

Minimal counterintuitiveness has received the status as a central theory of the cognitive science of religion. Indeed, the theory seems to capture something important about god concepts and religious concepts in general. Being both memorable and fascinating, minimally counterintuitive ideas have a good chance to be transmitted in culture. Being strange and illogical, they prompt reflection and contribute to the development of rich theological traditions. It is notable, however, that counterintuitiveness is not limited to religious ideas. Science includes counterintuitive notions, such as lifeless matter transforming into living creatures, animals having descendants that eventually become radically different from them, or particles occupying more than one location.

Other scholars studied cross-culturally recurrent features of the high gods. Deborah Kelemen writing in “Why Are Rocks Pointy?” (1999) and with Evelyn Rosset in “The Human Function Compunction” (2009) found that children believe that many natural things were made in particular ways for a purpose. For example, children tend to prefer the explanation “rocks are pointy so elephants do not sit on them” to

explanations based on weather or other impersonal causes. That is, we are happy to apply teleological reasoning, which is one of the intuitions supporting god concepts.

Finally, in “God in the Fractals” (2012), Czachesz argued that the high gods’ boundless qualities (omniscience, omnipresence, eternal existence) are derived from the human fascination with recursive, self-similar structures. For example, the Hebrew Bible writes that God has been with Israel “from generation to generation” and a thousand years are like a day in God’s eyes (Psalm 90). Similar arguments are found in Hindu and Buddhist traditions. These texts invoke the repetition of finite patterns to approach the idea of infinity, which is the gods’ attribute.

The cognitive theories of god concepts and religious concepts briefly presented in this section do not address whether the gods and spirits really exist. All they claim is that we use the same mental structures to think about gods and spirits as we use to think about more mundane problems. Indeed, cognitive studies of religion do not usually aim to verify or disprove the ontological claims of religious beliefs, although they sometimes are invoked in such contexts, both for and against religion.

4. Subjective Religious Experience

Advances in neuroimaging technology made the empirical study of religious experience an important research topic since the 2000s.

4.1 What Is Religious Experience?

In “Qualia” (2008), Michael Ties says to imagine that you look at a bright turquoise color patch in a paint store and then look at a dull brown color patch. Although the quality of the experience is different in each case, for both states there is something it is like to be in them, which is why these mental states involve subjective experience. Mental states that involve subjective experience include (1) perceptual experiences (such as seeing green or handling a piece of fur), (2) bodily sensations (such as feeling pain), (3) felt reactions or emotions (such as feeling love or jealousy), and (4) felt moods (such as feeling calm or miserable). Given the philosophical concept of subjective experience, we can define religious experience as subjective experience with a religious quality. What constitutes a religious quality is not at all straightforward.

4.2 A Special Kind of Experience

According to Ann Taves in “Religious Experience” (2005), in the academic study of religion, it has been usual to consider religious experience to be of a special kind (*sui generis*), emphasize its unmediated character, and describe it as an encounter with the divine (the holy, the wholly other, or the sacred). Some neuroscientists, as well, argued that religious experience is a special type of experience mediated by dedicated brain structures or neural mechanisms. Eugene D’Aquili and Andrew Newberg in *The Mystical Mind* (1999) and “The Creative Brain/the Creative Mind” (2000) put forward a complex theory of how brain parts interact to yield an experience of “absolute unitary being.”

Fred Previc developed a model in “The Role of the Extrapersonal Brain Systems in Religious Activity” (2006) that connects religious belief with a particular system of the brain that is responsible for processing information in the extrapersonal

space, that is, space that surrounds the individual outside of arm's reach but still close enough to be immediately relevant for thoughts and actions. In *The Neuroscience of Religious Experience* (2009), McNamara described how neural processes result in the reduction of intentionality or a turning over of the will to God.

4.3 Experience Deemed Religious

In contrast, in “Ascription, Attribution, and Cognition in the Study of Experiences Deemed Religious” (2008) and *Religious Experience Reconsidered* (2009), Taves used a psychological concept of experience. She argued that religious experience is not a special kind of experience but some experience that is deemed religious by the subject. Commenting on Newberg et al.'s observations in “Cerebral Blood Flow during Meditative Prayer” (2003) about brain activations in Buddhist meditation, Taves (2008) remarked that some experiences (such as some dreams) might surface to consciousness already carrying a sense of *portent* or *meaningfulness*, whereas certain types of experiences may have characteristics that lend themselves to being deemed religious or mystical more readily than others, even across cultures.

4.4 Thinking That Feels Like Something

Among the neuroscientific approaches to religious experience, Nina Azari and Dieter Birnbacher's “The Role of Cognition and Feeling in Religious Experience” (2004) drew most directly on the philosophical discussion of experience. Their argument was built on neuroimaging studies reported by Azari et al. in “Neural Correlates of Religious Experience” (2001), in which religious experience was not associated with arousal, yet experience was felt uniquely religious. Azari and Birnbacher argued that the feeling aspect of the experience in these experiments was bound up with the thinking aspect: religious experience, they concluded, emerges as “thinking that feels like something,” without a temporal or logical order of feeling and thinking.

4.5 Religious Experience: Some Reflections

In “The Religious Brain” (2009), Schjødt emphasized the great cultural differences with respect to what people consider religious experience and speculated that different cognitive contents probably mean different neural states, as well. It is quite possible that the cross-cultural variation of religious experience is not more of a problem than the variation of other elements of religion, such as god concepts. Perhaps a more structured theory of religious experience (possibly rooted in the theories of subjective experience we hinted at earlier) can result in a cross-culturally valid typology on which cognitive and neuroscientific studies can be based.

5. Cognitive Approaches and Historical Studies

By the nature of the enterprise, cognitive studies of religion address the problem of religion in a timeless and universal framework. It is not the task of this chapter to defend such an approach in general, but we can note that sociologists or psychologists also study humans in a cross-cultural framework and as long as *homo sapiens* is considered to be a single species, such universalistic approaches should be

taken for granted. More nuanced arguments could involve the pace of genetic evolution (which is too slow to change human brains and bodies so that comparison between geographically distant populations would be problematic) and the relationship between cognition and culture (with basic cognitive structures limiting the range of possible cultural forms).

One also can address the relationship between cognitive approaches and history from a different perspective. Cognitive studies of religion are mainly interested in the origins, long-term survival, and large-scale development of religious phenomena, as well as the connection of such phenomena to human evolution, brain structures, and social formations. Can we apply cognitive theory to study particular historical and textual data on a more detailed level? An explanation of why religion exists might use such data in general ways, yet it fails to address the necessary historical and philological nuances with which historians and philologists work.

Scholars working on particular religious traditions experimented with cognitive theories, both testing and complementing the existing cognitive tool kit. The study of the religions of the ancient Mediterranean world has been a particularly fertile ground for experimentation. For example, *Past Minds*, edited by Martin and Sørensen (2011), as well as *Mind, Morality and Magic*, edited by Czachesz and Uro (2013) contain numerous cognitive studies on Roman religions, ancient Judaism, and early Christianity.

6 Rethinking Cognition

Thus far we have reviewed some pioneering work in the cognitive study of religion as well as questions, criticisms, and debates related to these theories. This part of the chapter considers some broader issues in cognitive science that have ramifications for the study of religion.

The human mind takes in a staggering amount of information and performs a huge number of tasks. As you sit on a bench in the park, you notice the color, shape, smell, and texture of plants and objects, see and hear people walking and talking, and ponder some problem from your work, all at the same time. Beyond what you notice consciously, your mind deals with subtle cues such as the temperature of your environment, various processes in your body, and memories that shape your ongoing experience even without you taking notice of them. These processes are handled by a brain apparatus that consists of nearly a hundred billion neurons (in addition to other tissue).

Thanks to neuroimaging studies, we understand many details of how those cells are organized in the brain and what different brain areas do. But our ever-growing knowledge of brain structures has not yet yielded an understanding of the big picture of human cognition. How does the mind manage to deal with the tasks just mentioned and much more? What kind of mental organization is capable of such performance? How does the human mind work, where are its boundaries, and how important is the evolutionary past for the study of cognition?

6.1 Modularity of Mind

One of the answers to the astounding versatility and efficiency of the human mind is the theory of the modularity of mind. We have to mention at least three important versions of the modularity hypothesis.

6.1.1 Fodorian modularity.

In *The Modularity of Mind* (1983), Jerry Fodor suggested that the mind includes a number of modules that deal with different kinds of information. The modules are loosely related to the senses. They are domain specific, that is, they deal with some aspect of the world and process only information that is relevant to that aspect. Some modules are dedicated to elementary tasks such as recognizing shapes or rhythms. Others perform more abstract tasks such as recognizing faces or processing language. Thus, in our previous example, some module would process all kinds of shapes and colors around you, but a specific module would be activated as soon as that information appears to be related to a human face rather than to the vegetation in the park or when you realize that some sound is not just a dog's barking but rather is human speech.

Fodor also thought that the modules broadly correspond to brain regions, that is, a particular region in the brain performs the task of a particular module. In Fodor's theory, central systems in the mind also operate in a domain general way, enabling us to integrate information related to different aspects of the environment.

6.1.2 Massive modularity.

A different theory of modularity has been put forward by evolutionary psychologists. Evolutionary psychologists study the human mind from the perspective of evolution, theorizing about the kinds of minds that helped the survival of our ancestors. John Tooby and Leda Cosmides in "Origins of Domain Specificity" (1994) and "Toward Mapping the Evolved Functional Organization of Mind and Brain" (2000) reasoned that evolution created specialized cognitive systems in the human mind that coped with specific cognitive tasks in the environment of our ancestors. The modules they propose in "Resolving the Debate on Innate Ideas" (2005) deal with specific problems such as food, sexual attraction, parenting, kinship, incest avoidance, coalitions, disease avoidance, friendship, predators, provocations, snakes, spiders, and so on.

If we now return to our example of sitting on a bench in the park, we can say that a different module in your mind will be triggered when you notice a spider on the bench, hear the voice of a friend, or sense a foul taste as you bite on your sandwich. This version of modularity is called massive modularity, or the "Swiss army knife" model of the brain.

6.1.3 The cathedral model.

Specialized cognitive modules are useful for dealing with specific tasks efficiently, but they make it difficult to learn new things, innovate, or develop a unified sense of self and consciousness that humans have. Steven Mithen in *The Prehistory of the Mind* (1996) addressed this problem by suggesting a three-phase evolution of the mind: a general-intelligence mind capable of learning and decision making, a mind of specialized intelligences (a simpler version of the Swiss army knife model) that deal with different domains efficiently, and a mind with flow of knowledge and ideas (cognitive fluidity) between domains. He compared the mind to a cathedral that has many chapels (specialized modules) as well as a central nave (general intelligence), doors connecting the chapels (flow of information between

domains), and perhaps a *superchapel*, a module specialized in combining knowledge derived from other modules.

6.2 *Extended Mind*

Making a shopping list or taking notes at a meeting is daily routine for most of us. Now recall what happened when you forgot to take your list or displaced your notes. In modern life, most of us use such external memory stores routinely, without even noticing how much we depend on them for performing cognitive tasks. In *Origins of the Modern Mind* (1991), Merlin Donald created the concept of exogram to denote external traces that carry information outside the brain. Exograms are attested to in all human cultures, including body markings, grave decorations, notations, paintings, and writing systems.

Some cognitive operations involve tight and complex interactions with external objects, such as performing multiplication with the help of pen and paper, jotting sketches to solve spatial problems (will this couch fit into the living room?), or using drawings and diagrams to reason about abstract problems. According to Clark and David Chalmers in “The Extended Mind” (1998), humans and their thinking tools form coupled systems so that it is justified to speak of an extended mind in many cases. Since the time Clark and Chalmers formulated the concept of the extended mind, computers of all shapes and sizes (smartphones and tablets and also computers in cars and household appliances) were integrated into many cognitive tasks we perform daily. Data available on the web are dynamically changing (through tiny contributions by each of its users) and these changes also modify our perception and beliefs.

6.3 *Distributed Cognition*

Notice that the last example, accessing the Internet to perform a cognitive task, involves the active contribution of other people, who also use and change the web. Such interaction in performing cognitive tasks, however, is not a novel phenomenon. In “Cognition in the Wild” (1995), Edwin Hutchins described how navigating a ship involves complex interactions among the crewmembers as well as between people and instruments. Hutchins called this type of cognitive performance distributed cognition, suggesting that cognition does not take place in any individual part of the system (consisting of the ship and its crew in the above example) but rather it emerges from the interaction of the parts.

Although “extended mind” and “distributed cognition” often are seen as interchangeable labels referring to the same approach, in “The Cultural Ecosystem of Human Cognition” (2014), Hutchins identified two important differences. In the extended mind view, Hutchings argues, the involvement of external parts is optional and cognition can take place without extended elements. Furthermore, the extended mind view still identifies a central element in the cognitive process, that is, the brain of the individual.

In the distributed cognition paradigm, all instances of cognition are distributed; only the limits of the system are chosen differently. The cognition of an entire ship would be an example of a fairly large cognitive system. The brain itself is also a distributed system, in which cognition emerges from interactions of a large number of neurons. The modular mind, as Hutchins notes in “The Cultural Ecosystem

of Human Cognition” (2014), would be an example of a distributed cognitive system, as well, in which the modules constitute the interacting parts of the system.

6.4 Embodied Cognition

It goes without saying that the work of a judge involves complex and demanding cognitive functioning. But who thought that the variable whether the judge is hungry or satiated could play a significant role in his or her decision? In “Extraneous Factors in Judicial Decisions” (2011), an empirical study by Shai Danziger et al., judges granted parole in 65% of the cases after breakfast and lunch but in almost no case before lunch. Proponents of embodied cognition suggest that we think with our bodies as much as with our brains. Theories of embodied cognition come in many flavors.

6.4.1 Perception and action.

Scholars defending embodied views of cognition often contrast their approach with computational models of the mind. A computational model implies that the mind carries out operations on symbols that are stored in memory, much like a modern computer functions. The main activity of an embodied mind, in contrast, consists of connecting perception with action. As we move through the environment, we perceive new opportunities for action, writes Francisco J. Varela et al. in *The Embodied Mind* (1991); actions, in turn, lead to new perceptions, creating what is called the perception-action loop.

For example, you would seldom use abstract search operations on a memorized list of items and their positions in your fridge when you get hungry during the day; rather, you would walk to the fridge, open the door, browse its contents, and assess items as candidates for lunch. Important arguments for such models of cognition are their efficiency and low cost. For example, as Lawrence A. Shapiro explains in *Embodied Cognition* (2011), one could perform abstract geometric calculations to follow the shortest path toward an object in sight, but keeping the image of the object always sharply in one’s field of view while walking toward it is a simple and effective solution.

6.4.2 Rethinking mental representations.

Another issue in embodied theories of cognition is the nature of mental representations. In a broad sense, says Pete Mandik in “Representation: Introduction” (2001), a mental representation means something in the mind that stands for something external. In classical cognitive science, mental representations are symbolic and abstract: for example, the same representation “table” is used to mean different kinds of table. According to Robert A. Wilson and Lucia Foglia in “Embodied Cognition” (2011), these representations are also amodal in that the same representation can be employed when “table” is written or spoken about. In embodied cognition, either the entire existence of mental representations or at least their symbolic and amodal character is denied. For example, the embodied accounts of navigating your environment mentioned earlier do not require mental representations (at least in a classical sense).

Some embodied approaches retain the concept of mental representations but fill it with new content. In their theory of conceptual metaphors, *Metaphors We Live*

by (1980), George Lakoff and Mark Johnson argued that abstract thought is inherently dependent on bodily experience. We learn basic concepts from direct physical experience (by virtue of our embodiment) and build all other concepts by metaphorical extensions of basic concepts. For example, directions such as “front” and “back” are basic concepts that can be used for conceptualizing trajectories and ultimately can be used to create abstract concepts such as life as a journey.

In “Perceptual Symbol Systems” (1999) and “Grounded Cognition” (2008), Lawrence W. Barsalou developed a model of perceptual symbols, emphasizing that concepts retain the modes of perception. Thus the mental representation of an apple is not an abstract symbol with attributes of color, shape, smell, and taste attached to it. The representation of an apple rather consists of a combination of the color, shape, smell, and taste that we perceive. In “Abstraction in Perceptual Symbol Systems” (2003) by Barsalou and “Situating Abstract Concepts” (2005) by Barsalou and Katja Wiemer-Hastings, the authors also suggested ways to build representations of more complex concepts and beliefs based on the combination of perceptual symbols.

6.5 Rethinking Cognition: Some Reflections

Divergent perspectives on the nature of human cognition often lead to rhetorically heated discussions. It is not unusual to apply straw-man arguments in the debate, creating a risk that newcomers are informed about a position from its opponents’ characterization. Moreover, there is a tendency to combine arguments based on (speculative) evolutionary history, empirical evidence, and philosophical reasoning, which is sometimes useful but not always necessary.

For example, evolution, domain specificity, and modularity are interconnected questions in the history of scholarship, yet it is not necessary to discuss them in the same breath to appraise the cognitive science of religion. For most purposes, it is enough to realize that human beings around the globe are sufficiently similar so that a cross-cultural cognitive study of religion is a viable project. Although some theories of the cognitive science of religion (particularly minimal counterintuitiveness) have been developed in the context of massive modularity, the validity and power of the theories do not depend strictly on the modularity hypothesis. It is an empirical question whether people have shared ontological expectations across cultural boundaries and whether the violation of such expectations makes concepts memorable.

Subsequent chapters will deal with extended and embodied cognition exhaustively, thus it will suffice to add three short remarks on the subject at this point. First, let us note that on a practical level, embodied perspectives often imply a shift of emphasis rather than a complete revolution in cognitive science. Perception, dynamic adjustments to the environment, and interactive behavior have been considered in many cognitive models. Second, as Clark noted in *Mindware* (2001), embodied theories can be strong when it comes to understanding some aspects of cognition but less consequential when addressing others. Human cognition could be revolutionary precisely because it uses a new kind of cognitive machinery that understands the world in conceptual terms.

Third, extended, distributed, and embodied theories often imply a different choice of the boundaries of the system. Thus, it could be meaningful to study the mind in the context of the brain for some purposes and to consider perceptual information (including messages to and from parts of the body) as external inputs and outputs. At

the other end of the spectrum, a group of humans and objects (and artifacts) can be studied as a single system if this yields new insights.

7 Religion and Situated Cognition

The term *situated cognition* often is used as a broad category to include the extended mind hypothesis, as well as distributed and embodied cognition. The final part of this chapter surveys some examples of using situated approaches to cognition in the study of religion. Programmatic statements about the use of situated cognition in the study of religion—such as those by Armin W. Geertz in “Brain, Body and Culture” (2010); Sebastian Schüler in *Religion, Cognition, Evolution* (2011); and Gabriel Levy in *Judaic Technologies of the Word* (2012)—often have included a rejection of classical cognitivist approaches. We have seen, however, that it is not necessary to conceive of the embodied cognition paradigm as a replacement of other cognitive perspectives.

7.1 Conceptual Metaphor Theory

The most widely used situated approaches in the study of religion may be conceptual metaphor theory and its extended version, conceptual blending theory, developed by Gilles Fauconnier and Mark Turner in *The Way We Think* (2002). For example, in *Effortless Action: Wu-Wei as Conceptual Metaphor and Spiritual Ideal in Early China* (2003), Edward Slingerland used the theory to analyze the concept of effortless action in ancient Chinese philosophy. Sørensen used conceptual blending theory to develop a cognitive theory of magic. Two book-length studies analyzed the thought-world of gnostic literature and the concept of resurrection in Pauline literature: Hugo Lundhaug’s *Images of Rebirth* (2010) and Frederick Tappenden’s *Resurrection in Paul* (2015), respectively. The connection of these theories to more traditional literary and philosophical studies of metaphors perhaps explains why they gained currency in the study of religious texts.

7.2 Extended and Distributed Approaches

Extended and distributed models of cognition have been embraced by other scholars of religion. For example, drawing on theories of distributed cognition and dynamic systems, in “The Emergence of Early Christian Religion” (2007b) and “The Evolution of Religious Systems” (2013), Czachesz experimented with models of emergent group behavior (where local rules governing individual behavior yield unexpected collective behaviors) in studying aspects of religious rituals and beliefs. In *Religious and Spiritual Experiences* (2011), Wesley Wildman used system theory to discuss the origin and function of religious and spiritual experiences.

In *Judaic Technologies of the Word* (2012), Levy examined the role of literate education in creating Judaic bodies and minds as well as the interaction of attitudes and practices in Judaic systems with human organisms as they develop over time. He suggested that rituals (such as the festival of weeks, functioning as a rite of passage for boys entering school) as well as other institutionalized arrangements (such as the marriage system) presented evolutionary pressures that shaped the genome of the Jewish people.

7.3 Rituals and Embodiment

Rituals offer many possibilities to study aspects of embodiment. For example, in “Embodiment in Religious Knowledge” (2005), Barsalou et al. argued for the importance of embodied knowledge in three aspects of religious experience: religious visions, religious beliefs, and religious rituals. They suggested, in particular, that in religious rituals, embodiments convey religious ideas metaphorically and establish them in memory. For example, kneeling activates submissive attitudes in believers and thus creates or reinforces relationships of submission to the divine.

In “Macht-Tod-Leben-Körper” (“Power-Death-Life-Body”) (2007), Christian Strecker examined ritual practices in the gospels against the backdrop of embodied cognition. In *Religion, Cognition, Evolution* (2011), Schüler defended the primacy of social processes in the evolution of religion, arguing that cognitive processes result from a dynamical bodily adaptation. Schüler highlighted the use of synchrony (the movement of groups in joint phase) in religion, which also has been studied empirically in different projects including Cohen et al.’s “Rowers’ High” (2010) and Konvalinka et al.’s “Synchronized Arousal between Performers and Related Spectators in a Fire-Walking Ritual” (2011). In *Ritual and Christian Beginnings* (2016), Risto Uro used embodied cognition to study early Christian baptism, suggesting that rituals generated and conveyed bodily knowledge that was not consciously accessible to participants. In particular, he argued that baptism generated knowledge about power relations by initiates submitting themselves to the liturgists of a special agent ritual.

8 New Methods

Before concluding this chapter, we have to mention some important methodological shifts in the cognitive study of religion. In the early history of the field, most studies were based on some combination of anthropological fieldwork, philosophical theorizing, and experimental testing. In recent years, two major trends emerged. First, there have been suggestions to make empirical studies the dominant method of the field. For example, in “The Experimental Study of Religion” (2014), Sørensen and Kristoffer Nielbo called for a new experimental study of religion. Experimental ethnography, described by Dimitris Xygalatas in “Přenos Laboratoře Do Terénu” (“Bringing the Lab into the Field”) (2013), takes the lab to the field, arguing that reproducing religious phenomena in the lab always causes distortions and actual religious behavior can be best observed in its original setting.

Second, computer models and computational tools in general have gained currency in the cognitive study of religion. Some models test basic assumptions and provide heuristic insights about theoretical and historical problems, such as the models that William Sims Bainbridge presents in his *God from the Machine* (2006). Other ambitious projects have been launched with the goal of modeling large-scale historical developments based on actual data from past and present societies, such as the “The Database of Religious History” at the University of British Columbia (Slingerland and Sullivan 2015) and the “Generative Historiography of Religion Project” at Masaryk University in Brno (Chalupa 2015). Computer models contributed to the development of cognitive science and have a role to play in the cognitive study of religion, as well. They force scholars to specify their theories as

well as isolate important features of real-world phenomena and capture patterns in data that cannot be easily recognized by human observers.

Summary

This chapter discussed the beginnings of cognitive science, some of its classical issues (modularity), as well as recent developments (situated cognition). Against this backdrop, we surveyed pioneering work in the cognitive study of religion (particularly on rituals and god concepts) as well as discussed some new trends and contributions. We focused especially on work that inquires about the relationship of religion to the structure of the human mind and were less concerned with behavioral and social studies that (although they are loosely related to cognitive studies) do not have such interests. Finally, we mentioned some methodological developments (experimental studies and computer modeling) that might take the cognitive project into new directions in the years ahead.

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