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Theology and the Cognitive Science of Religion

Tyler Greenway and Justin L. Barrett

Cognitive science of religion (CSR) is the study of how mental processes interact with and influence the formation and transmission of religious concepts. In this article, we examine how CSR may contribute to theological research and ministry practice. We begin with both an overview of CSR as a field and examinations of religious concepts and cognitive processes. We then address key concepts from Christian theology and scripture – the image of God (*imago Dei*), sense of the divine (*sensus divinitatis*), and ethics – and explore how CSR may contribute to research on these topics. We also consider how findings from CSR may influence everyday Christian life and ministry practice, specifically religious education and worship. Finally, we discuss limitations of and future directions for CSR.

Keywords: Cognition, Psychology, Cognitive science, Cognitive science of religion, Psychology of religion, Theology and science

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1 Cognitive science of religion

Cognitive science of religion (CSR) is ‘the science of understanding how mental processes and religious expression interact’ (Barrett and Greenway 2017b: 96). Mental processes include any aspect of cognition: thoughts, feelings, attention, imagination, learning, memory, and others (see section 1.1.1 on cognitive science, below). Religious expressions may include a variety of beliefs and behaviours: belief in gods and the afterlife, ritual behaviours, and moral reasoning and actions. The science of understanding this interaction attends to how mental processes influence, inform, and constrain beliefs and behaviours considered religious. Cognitive scientists of religion may examine belief in God or gods and investigate how the cognitively natural tendency to distinguish objects from agents and the uniquely human ability to reason about the mental states of other agents influence these beliefs (see section 1.2 on supernatural beingssi, below). They may also consider how beliefs about these supernatural agents influence ritual behaviours in which these agents are acting or being acted upon (see section 1.5 on rituals, below).

CSR overlaps with three neighbouring scientific approaches to the study of religious expression: psychology of religion, evolutionary studies of religion, and neuroscience of religion. Though drawing heavily upon cognitive, developmental, social, and evolutionary psychology, CSR emerged from comparative religion, history of religion, and anthropology of religion rather than psychology of religion (McCauley 2017; Lawson 2022). In keeping with this ancestry, its primary explanatory focus has been the emergence, spread, and stabilization of beliefs, values, practices, and identifications of cultural groups (Barrett 2017). That is, CSR attempts to account for group-level phenomena rather than the individual-level expression that characterizes the focus of most psychology of religion. What CSR and psychology of religion have in common is a search for causes in psychological dynamics (Barrett 2022b).

The group- or culture-level focus of CSR places it in a similar explanatory space to evolutionary studies of religion. Evolutionary studies of religion attempt to account for group-level forms of religious expression by appeal to the dynamics of natural selection working on individuals or groups (Sosis et al. 2022). Such evolutionary approaches may or may not appeal to cognitive dynamics. Though many CSR studies make appeals to evolutionary psychology or speak of the ways in which human psychology seems to ‘select’ for certain cultural forms, many projects in CSR are not evolutionary in a thoroughgoing way.

Neuroscientific approaches have begun contributing to CSR and related evolutionary studies of religion. Neuroscience can provide insights into the brain regions and neural pathways that play an important role in experiences deemed religious, meditative states, and other religion-related phenomena (McNamara 2009). The primary explanatory value

of neuroscience of religion is, however, the individual or even sub-individual level. For this reason, its applications to the cultural level concerns of CSR and evolutionary studies of religion are indirect (Schjoedt and Van Elk 2022).

CSR often identifies pan-cultural patterns of religious expression. Beliefs in the afterlife may share similarities across many religious traditions, and moral systems may share certain foundations across the world. Though these patterns are interesting and may be enlightening for both scientists and theologians, CSR does not (nor can it) explain every aspect of what theorists might regard as 'religion' or 'religiosity' as a whole (McCauley 2017). Indeed, many leading contributors to CSR explicitly reject the idea of 'religion' as a coherent natural kind that could or should be scientifically explained (Whitehouse 2017).

CSR does, however, provide insights relevant to theologians and ministry practitioners interested in how the human mind thinks about superhuman beings. Why do children's beliefs about the minds and abilities of normal and superhuman agents follow a similar pattern across cultures as children develop? Why are afterlife beliefs common across religious expressions, despite varying beliefs about the nature of that afterlife? Why are some religious rituals repeatable but others are not? CSR offers answers to these sorts of questions, and these answers may inform theological study and ministry practice.

1.1 Overview

This entry begins with an introduction to cognitive science, its application to religion, and some of the major topics or areas of inquiry within CSR including beliefs in supernatural beings, the design and origin of the world, beliefs related to death and afterlife, ritual behaviours, interactions with sacred texts and objects, and morality. Each subsection also includes helpful definitions, research on the development of cognitive processes, and applications to Christian theology and practice. The second section (section 2), then, attends to broader implications for theology and Scripture, specifically implications for the study of the *imago Dei* (section 2.1), *sensus divinitatis* (section 2.2), and morality and ethics (section 2.3). The third section (section 3) builds on the previous sections to highlight applications for the believer and church community, particularly applications related to religious education, rituals, and worship. Finally, this entry concludes with a fourth section (section 4) that highlights limitations of CSR and a fifth section (section 5) that attends to future directions for the field.

1.1.1 Cognitive science

Cognitive science is 'the interdisciplinary study of the mind and intelligence, embracing philosophy, psychology, artificial intelligence, neuroscience, linguistics, and anthropology' (Thagard 2005: ix). The object of study is cognition, which may include all thought processes such as 'attention, conceptualization, decision-making, imagery,

imagination, language, learning, memory, perception, and sensation' (Barrett and Greenway 2017a: 95). Cognitive scientists may focus on a specific cognitive process situated within one of these topics, the interaction of various processes, or how these processes influence a particular domain (e.g. religion and CSR), but '[w]hat earns them all the title "cognitive scientists" […] is that they bring scientific evidence to bear on claims and predictions about how humans think and the character of the human mind, and attempt to discover naturalistic explanations for the phenomena the data reveal' (Barrett 2011b: 12).

1.1.2 Application to religion

As a sub-field of cognitive science, CSR also draws from various disciplines and scientific approaches. CSR typically focuses on pan-cultural human thought processes to generate causal explanations of (usually) recurrent forms of cultural expression regarded as 'religious' (Guthrie 1995), rather than the distinctive beliefs or practices of a specific religious denomination or tradition. CSR also typically takes a piecemeal approach to understanding religion and selecting topics that are considered religious, focusing on those beliefs and practices that occur across the globe rather than attempting to form a singular definition of what might be considered religious. Relatedly, CSR is methodologically pluralistic, employing different research procedures including 'interviews, ethnographies, computer modelling, archaeology, and historiography' (Barrett and Greenway 2017b: 96).

Given this piecemeal approach, various religious topics have received different degrees of attention and study. This entry will focus on topics that have received significant attention from cognitive scientists and are relevant to Christian theologians: how supernatural beings are conceived, understandings of the design and origin of the world, beliefs related to death and afterlife, ritual behaviours, interactions with sacred texts and objects, and morality. CSR scholars have also studied other topics that will not be covered in depth here, including magic (Sorenson 2005), spirit possession (Cohen 2007), splinter cults and initiation rites (Whitehouse 1995), and the formation of religious systems (Whitehouse 2004).

1.2 Supernatural beings

One topic explored extensively by cognitive scientists of religion is how people conceptualize and assent to the existence and activity of supernatural beings. 'Around the world, people talk of all manner of spiritual beings, such as souls, wraiths, gods, and devils [...].Let us call these agents "gods"' (Purzycki 2022: 67). The tendency to see natural phenomena in terms of minded agency of human-like beings, or even in human-like forms, was offered by anthropologist Stewart Guthrie as the cognitive core of religious systems (Guthrie 1980; 1995). This seminal work in the cognitive study of gods became diversified to include such topics as how various kinds of gods, angels, and invisible companions are conceptualized by children (Burdett, Wigger and Barrett 2021; Greenway et al. 2017;

Knight et al. 2004), how gods might help regulate social behaviour (Johnson and Bering 2009; Norenzayan et al. 2016), why belief in ghosts and spirits is so attractive (Bering 2006; Bek and Lock 2011), and how different gods seem to be associated with different environments and ecologies (Purzycki 2022; Barrett et al. 2019). The study of belief in supernatural beings may include beings with varying abilities, ranging from the omniscient, omnipresent, omnipotent God of the Abrahamic faith traditions to beings with fewer or less extensive superhuman abilities, such as Sun Wukong from the Buddhist tradition, angels and demons, or ghosts (Greenway et al. 2017; Barrett 2008b).

1.2.1 Agency detection

One cognitive ability believed to contribute to and influence belief in supernatural beings is the human capacity to distinguish agents from other objects. Agents are special objects that have an internal, renewable force that enables them to initiate action; they act in pursuit of goals, and they do so by virtue of their mental states with regard to those goals (Leslie 1995). The capacity to distinguish agents from objects, though likely taken for granted by adults, is important, as it couples with other cognitive processes and enables social interactions. Even at a young age, children understand that people and animals respond differently than trees, rocks, or other inanimate objects. Once agents are identified, various beliefs are readily applied to agents. Though objects and agents may share certain properties (e.g. cohesion and tangibility), agents act in ways consistent with their goals and may cooperate if help is needed (Barrett 2008a).

The distinction between agents and objects, though typically automatic and accurate, is not always made without difficulties. Computers may be treated as agents when they freeze unexpectedly and appear guilty of sabotage, and people may be treated as objects and shoved aside when someone is moving quickly through crowds (Greenway and Barrett 2017). This distinction may be particularly difficult in religious settings when objects possess agential qualities. Though made of natural materials and unable to move on their own, a statue that weeps or an icon that bleeds may be ascribed select agential qualities and religious practitioners may interact with these objects accordingly (Greenway 2022). This easy tendency to see agents and agency everywhere is at the core of Guthrie's anthropomorphism theory of the origins of gods (Guthrie 1980; 1995).

The human ability to detect agents is believed to both enable the identification of natural agents and also encourage belief in supernatural agents. More specifically, agency detection among humans is hypothesized to be easily triggered even with scant or ambiguous 'evidence' (leading some to describe this capacity as a hypersensitive agency detection device or HADD), encouraging the attribution or consideration of agency for otherwise non-agential stimuli. Some scholars argue that the tendency to err toward attributions of agency was adaptive, in that perceiving agency where none existed bore fewer costs than failing to identify an agent when one was present (e.g. running from

the sound of a snapping twig believed to be a lion when no lion is present bears fewer costs than failing to run when a lion is actually present). This tendency to attribute agency may lead individuals to consider the existence of unseen, supernatural agents when no cause for an activity can be identified (e.g. a falling tree narrowly missing an individual may lead them to consider the existence of an unseen agent). Though agency detection may increase the likelihood of belief in the existence of supernatural agents, many scholars believe additional thought processes are required for further development of these beliefs, and a sensitive tuning of agency detection systems in humans may be insufficient to account for the spread of god concepts (Greenway and Barrett 2017). Likewise, there is little evidence to date that individual variation in human-like agency detection sensitivity is associated with varying commitment levels to the existence of a particular god (Van Leeuwen and Van Elk 2019), but this is not a prediction entailed by Guthrie's theory or the related agency detection hypothesis (Van Eyghen 2022).

1.2.2 Theory of mind

Another cognitive ability connected to agency detection is the capacity to reason about the mental states of other beings, often known as theory of mind, 'mind-reading', or mentalizing (Baron-Cohen, Tager-Flusberg and Cohen 2003). Theory of mind enables humans to consider the thoughts, beliefs, emotions, goals, and other cognitions present within the minds of others and act based on those considerations. Theory of mind is important for a variety of reasons, including cooperation, joint attention, and the inference of intentions (related to 'teleological reasoning', see section 1.3.1; Greenway and Barrett 2016; Tomasello 2019).

Precursors to what is typically considered a fully developed theory of mind (or *higher-order theory of mind*, see below) include agency detection and the ability to identify goals, desires, and beliefs. Other species may consider the desires and goals of conspecifics and other species (e.g. a pet dog may understand that it and a child are looking at and chasing the same ball), but the human capacity and use of theory of mind is believed to be unparalleled. A fully developed theory of mind is often believed to have developed when children can identify false beliefs (e.g. Anne knows that Sally believes the toy is in a basket, but Anne also knows that the toy is actually in a box). The identification of false beliefs suggests an understanding that the beliefs of others may differ from reality, and often develops around the age of four (Wellman, Cross and Watson 2001).

Importantly, the human capacity to consider the mental states of others enables humans to reason about and act upon their understanding of varying abilities. Humans understand that some people have better eyesight or memory than others (e.g. a child may know her grandmother cannot see well or that some things slip from her memory), or that some animals have better hearing than others (e.g. a child may understand their dog hears noises they cannot). This cognitive flexibility can be extended to beliefs in

superhuman agents as well. An individual may understand their actions are not visible to any other people, but belief in a deity may lead them to consider the oversight of that deity and whether there may still be consequences for their actions. Various studies have investigated children's development of theory of mind including their application to various supernatural beings, and some research provides evidence that younger children may err toward attributing superhuman ability until theory of mind develops further and agents provide evidence otherwise (Greenway and Barrett 2017; Barrett, Richert and Driesenga 2001; Knight 2008; Knight et al. 2004; Greenway et al. 2017; Burdett 2013; Wigger, Paxson and Ryan 2013; Burdett, Wigger and Barrett 2021). Such a developmental pattern may further enable and encourage beliefs in supernatural agents.

1.2.3 Application to Christian theology and practice

The study of agency detection and theory of mind bear applications for Christian theology and practice, particularly related to theological arguments for a *sensus divinitatis* (or sense of the divine; see section 2.2, below) and for Christian education that aims to influence belief in God (Greenway and Barrett 2018; Wigger 2016).

Relatedly, Christian educational practices may be nuanced and informed by CSR. CSR suggests that belief in some sort of supernatural being may be quite natural, especially for children, and may require little instruction or argument. Stated differently, the existence of God and angels may be readily adopted by children due to natural cognitive processes, casual talk about these entities, and participation in religious practices. Formal religious education or indoctrination may be unnecessary (Wigger 2016; Richert 2022). Christian teachers and pastors may accordingly focus on details concerning Christian belief in a supernatural being (who God is, rather than evidence for his existence), and particularly on details that may be less cognitively natural (e.g. the trinitarian nature of God; Greenway and Barrett 2018).

1.3 Design and origin of the world

Another set of beliefs related to supernatural beings are beliefs about the design and origin of the world (Kelemen 2004). Cognitive scientists have identified a natural human tendency to consider purpose when encountering a new artifact. When encountering a new tool, humans may assume the tool was made for a purpose and then readily begin to reason about that purpose. This natural tendency may be 'promiscuous' as well, extending to natural objects such that humans, particularly children, may consider the purpose of the natural world and question why nature was designed in a particular way (Kundert and Edman 2017; Kelemen 1999). Further consideration may in turn extend to the existence of an active agent sustaining and maintaining the natural world (Greenway and Barrett 2017).

1.3.1 Teleological reasoning

This natural propensity to consider design and purpose when examining novel objects, both natural and human-made, and the preference for such explanations is often termed teleological reasoning (Kelemen 1999). Various studies led by Deborah Kelemen (e.g. Kelemen and Rosset 2009; Kelemen and DiYanni 2005) confirm children's preference for both purpose-based explanations for human-made artifacts, natural objects, and animals, and a connection between such teleological reasoning and beliefs about the origins of natural objects. These intuitions extend into adulthood, even among non-theists, though adults often suppress such explanations when considering natural objects and when given enough time to reason further (Kelemen, Rottman and Seston 2013; Järnefelt, Canfield and Kelemen 2015). This ability to consider design and purpose (and an inclination towards such considerations) may be adaptive as it enables humans to infer the purpose of tools, use them accordingly, and improve them.

1.3.2 Application to Christian theology and practice

Though agency detection and theory of mind may increase the likelihood of belief in an active, supernatural agent, the human tendency to see design and purpose in the world may build on and shape such beliefs (Greenway and Barrett 2018; Scott and Barrett 2022). Coupled with other cognitive processes, teleological reasoning may then incline the human mind towards beliefs in supernatural agents that designed the natural world with purpose, and may continue to sustain and influence the world according to those purposes.

Interestingly, cognitive science investigating teleological reasoning may offer an explanation for why evolutionary theory is at times difficult for children (and adults) to believe and understand (Evans 2000). Evolutionary science offers no explanation of a creator, so for children who perceive purpose and design in the world, religious explanations for the origins of the universe may be more intuitively satisfying than scientific explanations that cannot point to some creative being.

Because teleological reasoning is an easy tendency, but not necessarily truth-aimed, Laird Edman and Myron Penner suggest that believers should exercise caution when tempted to attribute ordinary events to special divine action, such as weather-related events, election outcomes, or even finding a good parking space. Greater scrutiny of what God's purposes might be in those moments and whether such purposes are credible may be prudent (Edman and Penner 2022).

1.4 Death and afterlife

Another set of beliefs common to many religious traditions are beliefs related to the existence of an immortal soul and an afterlife. Afterlife beliefs typically share a common understanding that some aspect of humans (and sometimes other agents) is distinct

from ordinary physical bodies and can continue after physical bodies die and cease to function. Characteristic of CSR, the recurrence of such ideas is proposed to arise from natural tendencies in how humans conceptualize humans and human death, even if the particular details are culturally filled in and context dependent (Richert and Lesage 2022). Are humans naturally inclined to a kind of intuitive dualism or is a tripartite view of human composition the default? Does this intuitive concept of human composition make belief in some kind of post-death existence a default assumption or just very easy to adopt? These are the kind of questions that animate CSR research in this area (White 2021). It has been suggested, for instance, that intuitive dualism may lead to various beliefs, including beliefs common in the Christian tradition (e.g. belief in a human soul that goes to heaven) and other common cultural beliefs (e.g. ghosts, imaginary friends; Bering 2011).

1.4.1 Intuitive dualism

Some scholars argue that the belief in some dichotomy between body and non-material aspects of the self, such as a soul (or mind), is cognitively natural, often termed intuitive dualism (Bloom 2005; 2007). This intuitive dualism is believed to result from two distinct cognitive systems that separately address physical objects and the minds of agents (see object-agent distinction in section 1.2.1, above). According to this line of thought, objects typically trigger the cognitive system that addresses physical objects, but humans (and other agents) often trigger both systems because humans have both physical and psychological properties. Similar to the cognitive system that addresses physical objects, the cognitive system that addresses the minds of agents may also operate independently. When this occurs, the system addressing psychological stimuli may consider various agents that possess souls or minds but lack bodies. These agents could include beliefs in imaginary friends (Wigger, Paxson and Ryan 2013), spirits, or ghosts. This intuitive dualism may also support or encourage belief in the afterlife (Barrett 2022b; see also Barrett et al. 2021). The cognitive system that addresses physical objects may recognize that a human is no longer animated after death, but the cognitive system addressing psychological processes may continue operating independently, even though a corpse may no longer house the mind or soul of an individual (e.g. the cessation of physical activity does not necessarily require the recognition of a cessation of psychological activity). More complex accounts also suggest that an additional cognitive system concerns whether an object has a life force or spirit that is also distinguishable from mere physicality (Richert and Lesage 2022).

1.4.2 Application to Christian theology and practice

As with beliefs concerning supernatural beings, CSR can offer insight into difficulties educators may encounter when teaching about the human mind or soul. Educators may find that teaching monism faces greater obstacles than some versions of dualism due to monism being less cognitively natural. Similarly, little convincing may be required to instil

belief in the afterlife or spirits of various sorts, and so non-orthodox beliefs about ghosts, ancestor-spirits, and other afterlife beliefs may emerge even in Christian contexts that do not theologically encourage such beliefs (Boyer 2020).

1.5 Rituals

One of the oldest areas of study within CSR is the study of ritual behaviour (Lawson and McCauley 1990). Rituals considered by CSR range extensively to include funerary rituals (White 2022), cleansing and purification rituals (Liénard and Boyer 2006), rituals that include firewalking or self-punishment and mutilation (Xygalatas 2022), and rites of passage or initiation (Whitehouse 1996). This section will highlight two particular theories – ritual form hypothesis and divergent modes of religiosity theory – which are applicable to Christian traditions.

1.5.1 Ritual form hypothesis

Philosopher Robert N. McCauley and religious studies scholar E. Thomas Lawson (2022), both cognitive scientists of religion who have studied religious rituals extensively, specify that religious rituals involve a supernatural being, but note the role of that supernatural being in the ritual informs the characteristics and perceived effects of that ritual. Each ritual typically includes an active agent who acts upon a patient (usually another agent), sometimes using an instrument. A supernatural being may be directly present or implicated in any of those roles (agent, patient, or instrument), and McCauley and Lawson label religious rituals accordingly (special agent, special patient, or special instrument rituals). Depending upon this ritual form, they hypothesize that participants and observers will have convergent intuitions regarding certain other features of the religious ritual that, in turn, impact the performance of these rituals. That is, it is ordinary human cognition working on various ritual forms that leads to some recurrent features of religious rituals across traditions and cultures.

Special agent rituals (SARs) occur when a supernatural being is believed to be acting upon some patient. An example of a special agent ritual in the Christian tradition is baptism. God (or God's ordained representative, a pastor or priest) acts upon some patient (the one being baptized), using an instrument (water). The effects of SARs are typically believed to be potentially reversible, in that a special agent can undo them (e.g. through excommunication, in this example), and non-repeatable, in that the effects are lasting and need not be performed again. Because these rituals involve the action of a supernatural being and typically happen once in any individual's lifetime, these rituals are often accompanied by a high degree of sensory pageantry ('bells and smells'), including special clothing and other celebratory elements. The SARs of the Christian tradition – most commonly baptism and marriage – match the theorized effects of ritual form hypothesis (Hornbeck and Barrett 2020). Both of these rituals are believed to have lasting effects such

that the rituals need not be repeated (i.e. baptism as it is traditionally understood is not performed multiple times). These rituals may be reversed, though, when the supernatural agent or their representative acts (e.g. divorce).

Special patient rituals (SPRs) occur when a supernatural being is believed to be acted upon by another agent. An example of a special patient ritual in the Christian tradition is communion or the Eucharist. Christians act upon the patient, the body and blood of Christ. The effects of SPRs are typically believed to be irreversible but repeatable, in that the ritual can be performed many times over the course of one's life, but you cannot undo it ritually or otherwise. Examples of special instrument rituals (SIRs) within the Christian tradition may include the use of holy water or holy oil for cleansings and blessings. Because SPRs and SIRs are not focused on the initiating action of a supernatural being (ordinary humans are in the initiating agent role) and occur more regularly, these rituals are often accompanied by less sensory pageantry.

1.5.2 Divergent modes of religiosity theory

Harvey Whitehouse has developed a psychologically informed account of how different sorts of rituals, rites, and ceremonies can yield different psychological consequences and, hence, encourage different sociopolitical arrangements. He has dubbed this account divergent modes of religiosity (Whitehouse 2004; Whitehouse and Kavanagh 2022). In brief, Whitehouse proposes that through a process of cultural evolution, religious traditions often gravitate towards an emphasis on one of two primary modes. The imagistic mode features rarely performed, highly evocative, often dysphoric rites at its core that fuse the identity of relatively small groups of participants into a tightly cohesive community. Identity is not defined so much by right beliefs, doctrine, or orthodoxy, but by shared memories of a common formative experience. In contrast, the doctrinal mode is characterized by a focus on frequently performed, relatively staid events that allow for the reinforcement of doctrinal propositions. Instead of episodic memory taking centre stage, semantic memory takes the lead and helps develop large communities who share common belief commitments. Many traditional Christian groups are clear examples of the doctrinal mode tradition.

1.5.3 Application to Christian theology and practice

Cognitive approaches provide new ways of categorizing religious practices aside from theological meanings attributed to these events (Malley and Barrett 2007). For instance, Whitehouse's theory uses a broad sense of 'ritual' to include many possible types of religious rites (Whitehouse 2004), whereas Lawson and McCauley circumscribe 'religious ritual' much more tightly and identify subtypes (Lawson and McCauley 1990; McCauley and Lawson 2002). Because Whitehouse's theory is more concerned with memory dynamics, the role of religious events and ceremonies as vehicles for reinforcing orthodoxy, and subsequent social arrangements, his account may concern a broad range

of practices. Christian worship services, Mass, weddings, special baptism ceremonies, and many others could, in principle, feature in Whitehouse's account. That Christian corporate life centres on weekly community 'rituals' enables Christianity to successfully create a sense of a universal church, to place doctrinal teachings at the core of Christian identity, to spread effectively into new places and cultures, and to tend towards hierarchy and policed orthodoxy (Whitehouse 2004). By Whitehouse's lights, a Christianity that centred on rarely occurring, emotional rites of passage – such as group initiations (e.g. through baptism) – would be more likely to bond small groups of fellow initiates into tight-knit communities that are relatively hard to grow or spread, and far less likely to be concerned with orthodox beliefs.

In contrast, ritual form hypothesis explicitly requires that a religious ritual include some connection to a superhuman agent in the action structure (e.g. through a priest, a sacred object, etc.; McCauley and Lawson 2002). It is by virtue of this connection to superhuman agency that observers and participants will tend towards the specified intuitions and emotional responses that characterize the rituals. Without such connections, the events in question might still be religious events, but they will not necessarily have the same psychological consequences. Though ritual form hypothesis is still undergoing further examination and investigation (Hornbeck, Bentley and Barrett 2015; Hornbeck and Barrett 2021), it may bear many implications for Christian practice by giving new causal accounts for the intuitions, emotions, and social structures that surround specific religious rituals because of their differing forms, even if their histories, theological meanings, and many features are not so different. For instance, not all instances of baptism or communion as performed in the Christian tradition would be considered rituals as defined by ritual form hypothesis. Though most baptisms in the Catholic or Orthodox Christian traditions would be considered rituals because a supernatural agent is believed to be acting, other Protestant traditions may not believe a supernatural agent is acting similarly and baptism or communion within these traditions may not fit McCauley and Lawson's (2002) definition of ritual. Consequently, these seemingly similar variants of baptism and communion may be accompanied by different psychological and social consequences. Likewise, these dynamics concerning the psychological and social consequences of particular ritual forms may inform historical studies of early Christianity (Czachesz 2017; Uro 2016; Martin 2007).

1.6 Sacred texts and objects

Sacred text and objects, though certainly important within many religious traditions and in many branches of the Christian faith, have received less attention from CSR scholars. Accordingly, a great deal of opportunity exists for scholars to consider and test existing theories concerning these objects. This opportunity is highlighted further by the range of special texts and objects that may exist in various religious traditions and within the

Christian tradition itself. Such objects may include various relics, holy water and oil, special clothing, and even entire buildings (Greenway 2022).

1.6.1 Minimally counterintuitive ideas

One area of CSR that offers insight into the nature of special objects is the study of intuitive and counterintuitive concepts (Boyer 2001). 'Counterintuitive' is used here as a technical term indicating the violation of one or more domain-specific intuitive assumptions that arise as the result of typical maturation (McCauley 2011). People conceptualize various objects based on their ontology and the domain-specific intuitive assumptions that ontology includes. For instance, bounded physical objects (e.g. a mug, a car, a chair) are intuitively believed to possess the qualities of cohesion, visibility, and tangibility. A rock that did not possess one or more of those qualities (e.g. an invisible rock), would be conceptually counterintuitive. Importantly, objects or agents are only considered counterintuitive by this account if they violate various properties core to their intuitive ontology. A very large rock or an oddly shaped rock, while novel and unique, would be considered counterschematic because they violate previous knowledge but not domain-specific intuitive assumptions tied to their ontological category (Greenway 2022; see also Purzycki and Willard 2016 for their distinction between 'deep' and 'shallow' inferences and some critiques of minimally counterintuitive [MCI] theory). Those concepts that do not violate any domain-specific intuitive assumptions are considered intuitive, those concepts that violate one or two intuitive assumptions are considered minimally counterintuitive (MCI), and those concepts that violate many intuitive assumptions are considered extremely counterintuitive (XCI). Some research finds that MCI are more memorable than intuitive or XCI concepts, particularly for adolescents and young adults (Gregory and Greenway 2017; Gregory, Greenway and Keys 2019).

Scholars theorize that many religious beliefs are connected to MCI concepts. Certain agents, such as ghosts or talking animals, may be considered MCI in that they violate minimal intuitive concepts. Other religious beliefs, however, are more counterintuitive (e.g. belief in the God of the Abrahamic faith traditions) and may require further cultural scaffolding to support theologically correct belief (Greenway and Barrett 2017; Barrett 2004; Boyer 2001).

1.6.2 Special objects and rituals

MCI theory suggests that special, religious objects are likely to be only modestly counterintuitive in the properties attributed to them. Likewise, the means by which objects are alleged to have become unusual are likely to have an intuitive causal core. For instance, powerful relics will tend to have been in close contact with an especially powerful or holy person and, thus, acquired their power through a contagion-like mechanism. Such special objects, then, may be used in religious rituals, particularly special instrument

rituals, or in magical practices that play off of the ability of the object to further contaminate other objects through contact or proximity. Alternatively, religious rituals could be used to create special objects (Barrett et al. 2017). In Roman Catholic and Orthodox Christianity, blessing the Host prior to Holy Communion is an example of such a special agent ritual that makes ordinary objects extraordinary (McCauley and Lawson 2002).

1.6.3 Sacred texts

A common feature of many contemporary religions is that they have sacred texts or scriptures – texts that appear to influence individual and group identity, values, and behaviours by virtue of some kind of unusual authority. But the reckoning of a text as authoritative and the actions of individuals around and in response to texts are psychological dynamics. As such, questions concerning how texts become (and remain) sacred, why and in what sense they are regarded as authoritative, the pathways by which they impact individuals and groups, and how people go about using and interpreting these texts are all psychological questions. A cognitive science approach to scripturalism is not only possible,but may be critical to a full-bodied understanding of these special texts. Nevertheless, a cognitive science of scripturalism remains in its infancy, with Brian Malley being one of the only scholars explicitly locating a treatment of scripture in a CSR framework (Malley 2004; Malley 2022).

1.6.4 Application to Christian theology and practice

Considerations of the intuitive or counterintuitive nature of various concepts may be helpful for religious educators. MCI concepts are theorized to be more memorable and attention grabbing than intuitive or XCI concepts. Educators may consider how to incorporate MCI concepts in lessons, and when additional scaffolding may be needed when XCI concepts are being taught. The relative advantage for adolescents and younger adults (as compared with older adults) may also suggest the importance of exposing these younger groups to more complex theological concepts.

The ease with which religious rituals may create or reinforce the idea that objects or texts have special power may be grounds for caution in how objects are used in liturgical contexts. Because rituals tacitly trigger intuitive cognition they may, for instance, lead observers to regard the objects used in sacraments as quasi-magical and able to be manipulated for such ends, as in using communion wine as an elixir for healing. Similarly, CSR-type accounts suggest that it is easy to trigger fanciful or even superstitious intuitions about the causal power of biblical passages, or the Bible, as sacred objects. For these and other reasons, it has been suggested that CSR may be helpful in understanding idolatry or errors in Christian thought and practice (Jong, Kavanagh and Visala 2015; Boyer 2020; Barrett 1999).

Applications of cognitive science perspectives to the historical and hermeneutical reflections on biblical texts is receiving increasing attention (Czachesz 2017). Gerd Theissen and István Czachesz have argued that CSR, and related cognitive and psychological perspectives, can contribute to a number of enduring problems in New Testament and related textual studies. These problems include the nature of relation between texts and cognition, how to account for the stability and change in texts as they are transmitted, cognitive factors impacting synchronic analyses of texts, how to account for the long-term success of some texts, and why it is that some texts become sacred or canonical (Czachesz and Theissen 2019).

1.7 Morality

Similar to how CSR stresses the ways in which religious thought builds upon cross-culturally recurrent, intuitive conceptual foundations, cognitive and psychological approaches to the study of moral judgments and commitments have arisen in recent decades, many of them drawing upon evolutionary perspectives (Curry 2016; Hauser 2006). For instance, moral foundations theory (MFT) focuses on natural, intuitive cognitive and affective dynamics in the development of moral beliefs and in moral decision-making (Haidt and Graham 2007). CSR scholars concerned with the relationship between morality and religious thought often supplement such cognitive accounts with additional cultural evolutionary perspectives that link gods to morality (McKay and Whitehouse 2015; Norenzayan 2013; Barrett 2012a; Baumard and Boyer 2013).

1.7.1 Moral foundations theory

Historically moral psychology has emphasized the importance of reflective moral reasoning for moral decision-making. More recently, scholars have turned to natural cognitive and affective dynamics that may account for cross-culturally recurrent patterns in moral intuitions. For instance, MFT has emphasized the importance of intuitive thought, often described as brief ‘flashes’ of approval or disapproval (Haidt and Graham 2007). More specifically, MFT argues that at least five moral foundations underlie much of human moral decision-making: harm/care, fairness/reciprocity, in-group/loyalty, authority/respect, and purity/sanctity.

Each of these foundations are ‘tuned up’ differently, similar to the taste buds of the mouth. Though humans across the planet are typically capable of tasting sweet, salty, sour, umami, and bitter, each culture ‘tunes up’ an individual’s taste buds differently, emphasizing some flavours more than others. Similarly, humans across the planet are believed to possess common moral foundations sensitive to certain stimuli (e.g. harm/care). Certain stimuli may readily trigger these foundations across cultures (e.g. a crying baby may nearly universally trigger the harm/care foundation), while others may be more

culturally specific (e.g. certain purity norms may be largely influenced by an individual's context).

Interestingly, Haidt and colleagues have identified patterns revealing how moral intuitions are tuned up and relied upon differently across various subgroups. For instance, Haidt and colleagues argue that US Republicans tend to rely on intuitions tied to all five foundations, whereas US Democrats tend to rely on intuitions tied to harm/care and fairness/reciprocity. Similar patterns and additional profiles have been identified across other groups, including religious groups (e.g. Unitarian Universalists and Southern Baptists within the United States; Graham, Haidt and Nosek 2009; Milojev et al. 2014; Greenway et al. 2019).

1.7.2 Morality and gods

Numerous evolutionary approaches to religion have stressed the role gods may have played in social regulation, often of a sort that overlaps with what would generally be considered morality (Shariff, Norenzayan and Henrich 2011; Norenzayan 2013; Bering and Johnson 2005; Johnson 2016). A common feature of such accounts is that belief in gods has become common because belief in gods somehow helped groups live together more harmoniously. Individuals who get along with others, or groups characterized by high degrees of cooperation and harmony, have a selective advantage over less prosocial ones. These accounts may differ in terms of exactly what evolutionary problem the gods purport to solve, and just how gods may have solved these problems (Schloss and Murray 2011). Nonetheless, there is something of an uneasy consensus that, somehow, broadly prosocial norms for life and the presence of gods or ancestors who are actively interested in humans behaving morally are mutually reinforcing. Exactly when and why such morally interested superhuman entities evolved and what their attributes are is an area of considerable disagreement (for instance, Baumard et al. 2015; Brazil and Farias 2016).

1.7.3 Application to Christian theology and practice

MFT may shed light on some difficulties experienced across Christian traditions and denominations. Jonathan Haidt (2005) argues that reliance on intuitions tied to different foundations may produce an 'invisible fence' such that Christians may experience discord because they fail to recognize intuitions that are core to the arguments of others. Christian communities may also consider how various moral intuitions (and other intuitive beliefs) fit into Christian formation. For instance, some traditions may heavily emphasize the individual's ability to reason and understand certain theological beliefs, but these traditions may ignore intuitive thought and moral emotion. Other traditions may emphasize one's experience within worship services and the emotions tied to those experiences, but similarly neglect intuitive thought and other types of cognition. Ministries may accordingly focus on holistic formation throughout their ministry, attending to various forms of cognition

and how those types of cognition are developed within their ministry (Greenway, Schnitker and Shepherd 2017; Greenway et al. 2019).

It may prove that some kind of morally interested god, such as the Christian God, was a critical ingredient in moving people beyond parochial moral intuitions towards a broader moral circle (e.g. Norenzayan 2013), and could remain the most efficient and effective social glue due to evolved psychosocial dynamics (Barrett and King 2021). If so, the social consequences of theologies that de-emphasize God's interest in human morality, or even secularization, may have far-reaching, unintended societal consequences.

2 Theology and scripture

CSR's focus on pan-cultural religious expressions and cognitively natural beliefs offers opportunity for connection to various theological topics and passages of scripture. CSR may be most readily connected to theological anthropology, moral theology, practical theology (see more details in section 3 on the believer and the community, below), natural theology, and apologetics. Three topics will be addressed more specifically below: the *imago Dei* (section 2.1), the *sensus divinitatis* (section 2.2), and morality and ethics (section 2.3).

2.1 *Imago Dei*

One topic of study within Christian theology is the uniqueness of humans as image bearers of God, otherwise termed the *imago Dei*. The nature of the *imago Dei* remains a topic of debate among theologians. A primary text in this debate is Gen 1:26–27:

> Then God said, 'Let us make humankind in our image, according to our likeness; and let them have dominion over the fish of the sea, and over the birds of the air, and over the cattle, and over all the wild animals of the earth, and over every creeping thing that creeps upon the earth.' So God created humankind in his image, in the image of God he created them; male and female he created them.

Here God announces that humans will be set apart from other creatures, made in God's image and maintaining dominion over creation. Psalm 8:5–8 further highlights the dominion which humanity has been given:

> Yet you have made them a little lower than God, and crowned them with glory and honour. You have given them dominion over the works of your hands; you have put all things under their feet, all sheep and oxen, and also the beasts of the field, the birds of the air, and the fish of the sea, whatever passes along the paths of the seas.

Though it is clear that humankind is set apart from other aspects of creation in some way, interpretations concerning the nature of humanity's unique role as image bearers abound.

Some scholars focus on humankind's role in the world, others focus on humankind's relationship with God, and still others focus on other capacities or combine multiple foci.

One approach to this debate is to focus on capacities that separate humans from other species and may accordingly shed light on what is required to bear the image of God. CSR may aid this conversation by highlighting uniquely human capacities and their relationship to religious expression, perhaps also highlighting what it means for humans to be image bearers (Barrett and Greenway 2017c).

2.1.1 Higher-order theory of mind

One capacity that is unique to the human species (at least in degree and typical use) is higher-order theory of mind (HO-ToM). Theory of mind (see section 1.2.2 on theory of mind, above) enables humans to consider the mental states of others. Theory of mind may be understood on a continuum, and when theory of mind extends to understand the existence of false beliefs (and the passing of false-belief tasks, which require individuals to attribute a false-belief to others), this form of theory of mind may be termed HO-ToM (Barrett and Greenway 2017c; Barrett and Jarvinen 2015).

HO-ToM enables a wide variety of relational activities, including the ability to consider what an individual believes about the mental states of others. For instance, Person A may consider what Person B believes about Person C. Such an ability may be considered essential for the kind of relationship humanity may have with God. Without HO-ToM, considerations of the will, intentions, and goals of God and relationships of the sort articulated in scripture would not be possible (Barrett and Greenway 2017c; Barrett and Jarvinen 2015).

2.2 *Sensus divinitatis*

Another theological topic for which CSR may offer insight is the *sensus divinitatis* or sense of the divine. In his *Institutes of the Christian Religion*, John Calvin writes, 'there exists in the human minds and indeed by natural instinct, some sense of Deity' (1997). This claim may be built on passages such as Rom 1:19–21:

> For what can be known about God is plain to them, because God has shown it to them. Ever since the creation of the world his eternal power and divine nature, invisible though they are, have been understood and seen through the things he has made. So they are without excuse; for though they knew God, they did not honour him as God or give thanks to him, but they became futile in their thinking, and their senseless minds were darkened.

Similarly, Alvin Plantinga defines the *sensus divinitatis* as 'a disposition or set of dispositions to form theistic beliefs in various circumstances, in response to the sorts of conditions or stimuli that trigger the working of this sense of divinity' (2000: 173). CSR's

focus on human capacities that enable and may incline humanity toward belief in God or gods lends helpful insight to discussions concerning the *sensus divinitatis* (Greenway and Barrett 2018). CSR provides scientific evidence that humans – as groups, if not individuals – are naturally attracted to many ideas consistent with the broad contours of this claim: that there is purpose in the natural world best accounted for by at least one superhuman intentional agent (Järnefelt, Canfield and Kelemen 2015), that some moral facts exist (McKay and Whitehouse 2015), that gods may be morally interested (Norenzayan 2013), and so on (Barrett 2011b; 2012b). Whether these natural propensities match a given theological take on the *sensus divinitatis* is an open question, but findings from CSR may help to make some views on this aspect of theological anthropology more or less probable (Clark and Barrett 2010; Kvandal 2020; Van Eyghen 2016).

2.2.1 Naturalness of religion

CSR as a whole often argues that religion may be considered cognitively natural in that human cognitive capacities often incline the human mind to adopt certain religious beliefs and expressions (e.g. agency detection and theory of mind enabling belief in supernatural agents), though these capacities may not incline the human mind toward belief in a specific supernatural agent. Indeed, on their own these capacities may lead to belief in some deity that creates and perhaps sustains, but further specifics may be culturally variable. Furthermore, certain characteristics of various supernatural agents may be counterintuitive (e.g. the trinitarian nature of God; McCauley 2011; Greenway and Barrett 2018).

2.2.2 Religion as evolutionary adaptation or byproduct

Debates concerning the degree to which religious thought and expression may be understood as either an evolutionary adaptation or byproduct may be helpful for the theological study of the *sensus divinitatis* as well. Some scholars argue that religion (i.e. belief in gods and associated rituals in response to those beliefs) is adaptive for humans and evolved because of the fitness-enhancing benefits it offers, usually by way of helping humans build larger cooperative groups (Szocik and Eyghen 2021; Norenzayan 2013). Others argue that religious thought and action are evolutionary byproducts, in that they did not evolve because of fitness-enhancing benefits they offer, but other capacities evolved for the benefits they offer, and these capacities in turn made religious thought and practice attractive (Greenway and Barrett 2017). The particulars of the accounts matter, but at a basic level, adaptationist accounts suggest that something like a *sensus divinitatis* is an add-on to human nature, becoming widespread with larger societies. From a byproduct perspective the *sensus divinitatis* is an emergent property of what it means to be human and is, likely, much more ancient than the shift to larger societies. It also appears that the adaptationist's *sensus divinitatis* is a product of cultural evolution (not genetic evolution) and is more specific: a morally interested high god is a 'natural' feature of many cultural

conditions. The byproduct *sensus divinitatis* appears to be more inchoate. Hence, these scientific debates may contribute to theological discussions of the *sensus divinitatis* by informing scholars about the nature of the cognitive capacities that enable religious thought and behaviour.

2.3 Morality and ethics

Another topic of theological study for which CSR can offer insight is the study of morality and ethics. In Rom 2:15, the apostle Paul writes concerning Gentiles, 'They show that what the law requires is written on their hearts, to which their own conscience also bears witness'. Paul's writing suggests that some sense of morality is available and a natural propensity in humans. Research within CSR and moral psychology offers some insight concerning the nature of this natural law. More specifically, moral foundations theory may help identify some of the core components of this intuitive morality and may shape how we consider best practices in character development and the study of ethics. Such studies may also draw attention to otherwise neglected aspects of human nature, including these natural tendencies (both good and bad; Greenway 2021). CSR and moral psychology may also shed light on the limitations of these moral intuitions, and further theological study may consider how certain teachings in Scripture seek to 'tune up' or correct intuitions (e.g. Jesus and the Beatitudes).

3 The believer and the community

Applications for the believer and Christian community are noted throughout this entry, but the following sections will address two major applications that merit further exploration: the naturalness of beliefs, theological correctness, and religious education; and rituals and worship. As future research develops, additional points of application will certainly arise (see section 5 on further directions, below).

3.1 Naturalness of beliefs, theological correctness, and religious education

Cognitive scientists argue that certain cognitive processes incline the human mind toward certain beliefs more readily than others. Beliefs supported and encouraged by these processes may be considered cognitively natural, whereas those beliefs that are not supported or encouraged by intuitive cognition may be termed cognitively unnatural beliefs (Edman 2015). For instance, children tend to develop certain fears more readily (e.g. fear of snakes or spiders) than others (e.g. fear of flowers or bunnies). Those fears that develop more readily are considered cognitively natural and are likely the results of intuitive cognition the human mind is prepared to develop.

As noted in earlier sections, belief in supernatural beings may similarly be considered cognitively natural because various cognitive processes – agency detection, theory of mind, and teleological reasoning – seem to support and enable these beliefs. Certain characteristics of supernatural beings may be more or less cognitively natural as well. For example, the omniscience or omnipotence of God may be readily grasped by children (see section 1.2.2 on theory of mind, above), but God's omnipresence may be more difficult (Barrett 2012a).

Religious educators may confront a high degree of theological incorrectness as it relates to certain beliefs and practices. Omnipresence is one example of a belief that seems to lack cognitive processes and intuitive foundations to support its ready adoption in the human mind, but others exist as well. The trinitarian nature of God is another example of a belief that seems to be difficult for lay believers (and even theologians) to readily understand and articulate without accidently lapsing into heresy. Another example may be the concept of salvation by grace. Though salvation by grace alone is readily taught in many churches, often believers find they lapse into works righteousness (Edman 2015). Religious educators and believers themselves may need to spend more time committing these beliefs to memory, learning about them, and applying them to daily life. Such beliefs are often surrounded by more cultural scaffolding to ensure correct transmission.

3.2 Rituals and worship

Ritual form hypothesis (see section 1.5.1, above) argues that three types of rituals exist across religious traditions: SARs, SPRs, and SIRs. Perhaps the most prominent rituals in the Christian tradition are baptism (a SAR) and communion or the Eucharist (a SPR). Ritual form hypothesis also argues that each type of ritual includes certain characteristics. SARs involve a high degree of sensory pageantry, are reversible, and are not repeatable. SPRs involve a low degree of sensory pageantry, are irreversible, and are repeatable.

There may be implications for Christian communities that violate some of these characteristics. For instance, if baptism is repeated multiple times or involves low degrees of sensory pageantry, the perceived effects of the ritual may be altered. Similarly, if communion involves high degrees of sensory pageantry relative to other elements in worship, the perceived effects of this ritual may be altered as well.

Ritual form hypothesis also makes arguments about ritual balance and imbalance. SARs and SPRs need to be balanced, such that the high sensory pageantry of SARs in which a supernatural agent is acting are matched by the low sensory pageantry of SPRs in which a supernatural agent is acted upon. Christian communities that experience an imbalance may not be sustainable, as too much sensory pageantry may become commonplace or too little may lead people to fail to understand how God is active (Edman 2015). Combining ritual form hypothesis with divergent modes of religiosity theory (see section 1.5.2 on

divergent modes of religiosity theory, above) raises implications for liturgical decision-making as well. Drawing upon Whitehouse's work, McCauley and Lawson (2002) argue for the importance of having a balance of types of rituals in a community. A faith community with only special patient and special instrument rituals, with their low sensory pageantry and repetition, will lack motivational sparks than a more balanced system with occasional highly evocative special agent rituals. Revival and charismatic movements may arise in response to this tedium, but excesses in that direction may carry their own challenges (Edman and Penner 2022). Similarly, though repetitive doctrinally focused rituals may facilitate the formation of large faith traditions that can spread across local groups, occasional emotionally and materially costly events (such as weddings, ordinations, and baptisms) may boost enduring commitment (Whitehouse and Kavanagh 2022).

4 Limitations

One central limitation of CSR is that it focuses on the cognition involved in religious processes and not the reality of the supernatural beings involved in religious processes. In other words, CSR may shed light on which supernatural beings are most cognitively natural, but it cannot determine if those supernatural beings exist. Relatedly, many CSR scholars note that CSR is limited in ability to scientifically explain many aspects of 'religion' or 'religiosity' (see the introduction of section 1, above).

Another limitation of CSR is its focus on pan-cultural beliefs. Most often CSR examines patterns across traditions, rather than beliefs or practices specific to one tradition. Accordingly, applications of CSR to Christian theology may be somewhat limited. However, future research may consider specific applications further (see section 5, below).

5 Future directions

CSR as a field continues to develop, grow, and offer additional insight concerning the cognitive processes incorporated in religious expression, but it has made stronger progress concerning the various features of traditions that are generally regarded as religious instead of assembling a systematic account of any one religious tradition. Some doubts have been raised concerning whether CSR has as much to offer in analysis of Christianity as it does older, traditional religions (Jong, Kavanagh and Visala 2015). Hence, one promising future direction would be to develop a cognitive science of Christianity (Barrett 2012b). The central tenets of CSR may be applied to the Christian tradition more specifically in order to investigate how best to form the Christian faith. The concept of grace, for instance, may be quite cognitively unnatural, in that it is often difficult to apply in everyday life and believers often lapse into other ways of thinking (Emmons et al. 2017). The cognitive science of Christianity may investigate grace and similar beliefs to

understand why they are difficult to understand and apply and how they may be better taught.

Similarly, a CSR perspective on Christian sacraments and other rituals may help identify the psychological and knock-off implications of some liturgical decisions. For instance, Lawson and McCauley's analysis of religious rituals seems to imply that many Protestant observances of communion are psychologically very different than Roman Catholic ones; baptism in one tradition may psychologically be a different rite than baptism in another. Such applications of theories from CSR to Christian practices are in their early days (e.g. Hornbeck and Barrett 2020).

As theologians become more acquainted with CSR, it seems likely that theological questions may shape the direction of CSR. CSR has largely developed as an a-theological project, but there is nothing in principle preventing an integration of theology and CSR.

Attributions

Bibliography

Further reading

- Barrett, Justin L. 2011a. *Cognitive Science, Religion, and Theology: From Human Minds to Divine Minds*. West Conshohocken, PA: Templeton Press.
- Barrett, Justin L. (ed.). 2022a. *The Oxford Handbook of Cognitive Science of Religion*. New York: Oxford University Press.
- McCauley, Robert N. 2011. *Why Religion Is Natural and Science Is Not*. New York: Oxford University Press.
- White, Claire. 2021. *An Introduction to the Cognitive Science of Religion: Connecting Evolution, Brain, Cognition and Culture*. Abingdon/New York: Routledge.

Works cited

- Baron-Cohen, Simon, Helen Tager-Flusberg, and Donald J. Cohen (eds). 2003. *Understanding Other Minds: Perspectives from Developmental Cognitive Neuroscience*. Oxford: Oxford University Press.
- Barrett, H. Clark, Alexander Bolyanatz, Tanya Broesch, Emma Cohen, and Peggy Froerer. 2021. 'Intuitive Dualism and Afterlife Beliefs: A Cross-Cultural Study', *Cognitive Science* 45 https://doi.org/10.1111/cogs.12992
- Barrett, Justin L. 1999. 'Theological Correctness: Cognitive Constraint and the Study of Religion', *Method & Theory in the Study of Religion* 11: 325–339.
- Barrett, Justin L. 2004. *Why Would Anyone Believe in God?* Lanham, MD: AltaMira Press.
- Barrett, Justin L. 2008a. 'Coding and Quantifying Counterintuitiveness in Religious Concepts: Theoretical and Methodological Reflections', *Method & Theory in the Study of Religion* 20: 308–338. https://doi.org/10.1163/157006808X371806
- Barrett, Justin L. 2008b. 'Why Santa Claus Is Not a God', *Journal of Cognition and Culture* 8, no. 1–2: 149–161.
- Barrett, Justin L. 2011b. *Cognitive Science, Religion, and Theology: From Human Minds to Divine Minds*. West Conshohocken, PA: Templeton Foundation Press.
- Barrett, Justin L. 2012a. *Born Believers: The Science of Children's Religious Belief*. New York: Free Press.
- Barrett, Justin L. 2012b. 'Toward a Cognitive Science of Christianity', in *The Blackwell Companion to Science and Christianity*. Edited by J. B. Stump and Alan G. Padgett. Hoboken, NJ: Wiley & Sons, 317–334.
- Barrett, Justin L. 2017. 'On Keeping Cognitive Science of Religion Cognitive and Cultural', in *Religion Explained? The Cognitive Science of Religion After Twenty-*

Five Years. Edited by Luther H. Martin and Donald Wiebe. London: Bloomsbury, 193–202.

- Barrett, Justin L. 2022b. 'Ghostly Relationships: Differentiating Cognitive Science of Religion and Psychology of Religion', in *The Oxford Handbook of the Cognitive Science of Religion*. Edited by Justin L. Barrett. New York: Oxford University Press, 3–53.
- Barrett, Justin L., and Tyler S. Greenway. 2017a. 'Cognitive Science', in *Dictionary of Christianity and Science: The Definitive Reference for the Intersection of Christian Faith and Contemporary Science*. Edited by Paul Copan, Tremper Longman III, Christopher L. Reese, and Michael G. Strauss. Grand Rapids: Zondervan Academic, 95–96.
- Barrett, Justin L., and Tyler S. Greenway. 2017b. 'Cognitive Science of Religion', in *Dictionary of Christianity and Science: The Definitive Reference for the Intersection of Christian Faith and Contemporary Science*. Edited by Paul Copan, Tremper Longman III, Christopher L. Reese, and Michael G. Strauss. Grand Rapids: Zondervan Academic, 96–98.
- Barrett, Justin L., and Tyler S. Greenway. 2017c. 'Imago Dei and Animal Domestication: Cognitive-Evolutionary Perspectives on Human Uniqueness and the Imago Dei', in *Human Origins and the Image of God: Essays in Honor of J. Wentzel van Huyssteen*. Edited by Christopher Lilley and Daniel Pedersen. Grand Rapids: Eerdmans, 64–81.
- Barrett, Justin L., Ryan G. Hornbeck, Brianna Bentley, and Skyler T. Barrett. 2017. 'Ritual Imbalance in Contemporary China: A Ritual Form Hypothesis Analysis', in *Religious Cognition in China: 'Homo Religious' and the Dragon*. Edited by Ryan G. Hornbeck, Justin L. Barrett, and Madeleine Kang. New York: Springer, 97–109.
- Barrett, Justin L., and Matthew J. Jarvinen. 2015. 'Evolutionary Byproducts and Imago Dei', in *The Emergence of Personhood: A Quantum Leap?* Edited by Malcolm Jeeves. Grand Rapids: Eerdmans, 163–183.
- Barrett, Justin L., and Pamela Ebstyne King. 2021. *Thriving with Stone Age Minds: Evolutionary Psychology, Christian Faith, and the Quest for Human Flourishing*. Downers Grove: IVP.
- Barrett, Justin L., Rebekah A. Richert, and Amanda Driesenga. 2001. 'God's Beliefs Versus Mother's: The Development of Nonhuman Agent Concepts', *Child Development* 72: 50–65. https://doi.org/10.1111/1467-8624.00265
- Barrett, Justin L., R. Daniel Shaw, Joseph Pfeiffer, and Jonathan Grimes. 2019. 'Where the Gods Dwell: A Research Report', *Journal of Cognition and Culture* 19, no. 1-2: 131–146. https://doi.org/10.1163/15685373-12340051
- Baumard, Nicolas, and Pascal Boyer. 2013. 'Explaining Moral Religions', *Trends in Cognitive Sciences* 17, no. 6: 172–180.

- Baumard, Nicolas, Alexandre Hyafil, Ian Morris, and Pascal Boyer. 2015. 'Increased Affluence Explains the Emergence of Ascetic Wisdoms and Moralizing Religions', *Current Biology* 25, no. 1: 10–15.
- Bek, Judith, and Suzanne Lock. 2011. 'Afterlife Beliefs: Category Specificity and Sensitivity to Biological Priming', *Religion, Brain & Behavior* 1, no. 1: 5–17. https://doi.org/10.1080/2153599X.2010.550724
- Bering, Jesse M. 2006. 'The Folk Psychology of Souls', *Behavioral and Brain Sciences* 29, no. 5: 453–462. https://doi.org/10.1017/S0140525X06009101
- Bering, Jesse M. 2011. *The Belief Instinct: The Psychology of Souls, Destiny, and the Meaning of Life*. New York: W. W. Norton.
- Bering, Jesse M., and Dominic D. P. Johnson. 2005. '"O Lord... You Perceive My Thoughts from Afar": Recursiveness and the Evolution of Supernatural Agency', *Journal of Cognition and Culture* 5, no. 1–2: 118–142.
- Bloom, Paul. 2005. *Descartes' Baby: How the Science of Child Development Explains What Makes Us Human*. New York: Basic Books.
- Bloom, Paul. 2007. 'Religion Is Natural', *Developmental Science* 10, no. 1: 147–151. https://doi.org/10.1111/j.1467-7687.2007.00577.x
- Boyer, Pascal. 2001. *Religion Explained: The Evolutionary Origins of Religious Thought*. New York: Basic Books.
- Boyer, Pascal. 2020. 'Informal Religious Activity Outside Hegemonic Religions: Wild Traditions and Their Relevance to Evolutionary Models', *Religion, Brain & Behavior* 10, no. 4: 459–472.
- Brazil, Inti A., and Miguel Farias. 2016. 'Why Would Anyone Want to Believe in Big Gods?', *Behavioral and Brain Sciences* 39 https://doi.org/10.1017/S0140525X15000370
- Burdett, Emily Reed. 2013. *Cognitive Developmental Foundations of Cultural Acquisition: Children's Understanding of Other Minds*. Oxford: University of Oxford. https://ora.ox.ac.uk/objects/uuid:30370354-6c07-4279-81b6-a5666f909b4d Unpublished doctoral thesis.
- Burdett, Emily Reed, J. Bradley Wigger, and Justin L. Barrett. 2021. 'The Minds of God, Mortals, and in-Betweens: Children's Developing Understanding of Extraordinary and Ordinary Minds Across Four Countries', *Psychology of Religion and Spirituality* 13, no. 2: 124–151.
- Calvin, John. 1997. *Institutes of the Christian Religion*. Translated by Henry Beveridge. Bellingham, WA: Logos Bible Software.
- Clark, Kelly James, and Justin L. Barrett. 2010. 'Reformed Epistemology and the Cognitive Science of Religion', *Faith & Philosophy* 27, no. 2: 174–189.
- Cohen, Emma. 2007. *The Mind Possessed: The Cognition of Spirit Possession in an Afro-Brazilian Religious Tradition*. New York: Oxford University Press.

- Curry, Oliver Scott. 2016. ‘Morality as Cooperation: A Problem-Centred Approach’, in *The Evolution of Morality*. Edited by Todd K. Shackelford and R. D. Hansen. New York: Springer, 27–52.
- Czachesz, István. 2017. *Cognitive Science and the New Testament: A New Approach to Early Christian Research*. Oxford: Oxford University Press.
- Czachesz, István, and Gerd Theissen. 2019. ‘Cognitive Science and Biblical Interpretation’, in *Language, Cognition, and Biblical Exegesis: Interpreting Minds*. Edited by Frederick S. Tappenden, István Czachesz, Ronit Nikolsky, and Tamás Biró. London: Bloomsbury Academic, 13–39.
- Edman, Laird R. O. 2015. ‘Applying the Science of Faith: The Cognitive Science of Religion and Christian Practice’, *Journal of Psychology and Christianity* 34: 240–251.
- Edman, Laird R. O., and Myron A. Penner. 2022. ‘Lived Faith and Cognitive Intuitions: Some Theological Implications of Cognitive Science of Religion’, in *The Oxford Handbook of the Cognitive Science of Religion*. Edited by Justin L. Barrett. New York: Oxford University Press, 411–430.
- Emmons, Robert A., Peter C. Hill, Justin L. Barrett, and Kelly M. Kapic. 2017. ‘Psychological and Theological Reflections on Grace and Its Relevance for Science and Practice’, *Psychology of Religion and Spirituality* 9, no. 3: 276–284.
- Evans, E. Margaret. 2000. ‘Beyond Scopes: Why Creationism Is Here to Stay’, in *Imagining the Impossible: Magical, Scientific, and Religious Thinking in Children*. Edited by Karl S. Rosengren, Carl N. Johnson, and Paul L. Harris. New York: Cambridge University Press, 305–333.
- Graham, Jesse, Jonathan Haidt, and Brian A. Nosek. 2009. ‘Liberals and Conservatives Rely on Different Sets of Moral Foundations’, *Journal of Personality and Social Psychology* 96: 1029–1046.
- Greenway, Tyler S. 2021. ‘Attending to the Multidimensional Nature of Spirituality and Faith: Integrating Spiritual Development and Moral Foundations Theory’, *Christian Education Journal* 19, no. 1: 47–62. https://doi.org/10.1177/0739891320986162
- Greenway, Tyler S. 2022. ‘Special Objects’, in *The Oxford Handbook of the Cognitive Science of Religion*. Edited by Justin L. Barrett. New York: Oxford University Press, 191–211.
- Greenway, Tyler S., and Justin L. Barrett. 2016. ‘Theory of Mind Mechanisms’, in *Religion: Mental Religion*. Edited by N. K. Clements. Farmington Hills, MI: Macmillan Reference, 31–44.
- Greenway, Tyler S., and Justin L. Barrett. 2017. ‘Evolutionary Developmental Psychology of Children’s Religious Beliefs’, in *The Oxford Handbook of Evolutionary Psychology and Religion*. Edited by James R. Liddle and Todd K.

Shackelford. Oxford: Oxford University Press, 69–82. https://doi.org/10.1093/oxfordhb/9780199397747.013.7

- Greenway, Tyler S., and Justin L. Barrett. 2018. ‘Cognitive Science, Sensus Divinitatis and Christ’, in *Christ and the Created Order: Perspectives from Theology, Philosophy, and Science*. Edited by Andrew Torrance and Thomas McCall. Grand Rapids: Zondervan Academic, 239–252.
- Greenway, Tyler S., Joel Jin, Abigail M. Shepherd, and Sarah A. Schnitker. 2019. ‘Beyond the Liberal-Conservative Binary: Generosity, Religion, and a Latent Profile Analysis of Moral Foundations in a Christian Sample’, *American Behavioral Scientist* 63, no. 14: 1938–1964.
- Greenway, Tyler S., B. C. Nystrom, Gregory S. Foley, and Justin L. Barrett. 2017. ‘Dogs, Santa Claus, and Sun Wukong: Children’s Understanding of Nonhuman Minds’, in *Religious Cognition in China: ‘Homo Religious’ and the Dragon*. Edited by Ryan G. Hornbeck, Justin L. Barrett, and Madeleine Kang. New York: Springer, 97–109.
- Greenway, Tyler S., Sarah A. Schnitker, and Abigail M. Shepherd. 2017. ‘Can Prayer Increase Charitable Giving? Examining the Effects of Intercessory Prayer, Moral Intuitions, and Theological Orientation on Generous Behavior’, *The International Journal for the Psychology of Religion* 28, no. 1: 3–18. https://doi.org/doi:10.1080/10508619.2017.1406790
- Gregory, Justin P., and Tyler S. Greenway. 2017. ‘Is There a Window of Opportunity for Religiosity? Children and Adolescents Preferentially Recall Religious-Type Cultural Representations, but Older Adults Do Not’, *Religion, Brain & Behavior* 7, no. 2: 98–116.
- Gregory, Justin P., Tyler S. Greenway, and Christina Keys. 2019. ‘Gods and Talking Animals: The Pan-Cultural Transmission Advantage of Supernatural Agent Concepts’, *Journal of Cognition and Culture* 19, no. 1–2: 97–130.
- Guthrie, Stewart. 1995. *Faces in the Clouds: A New Theory of Religion*. New York: Oxford University Press.
- Guthrie, Stewart Elliott. 1980. ‘A Cognitive Theory of Religion’, *Current Anthropology* 21, no. 2: 181–203. https://doi.org/10.1086/202429 [restricted access]
- Haidt, Jonathan. 2005. ‘Invisible Fences of the Moral Domain’, *Behavioral & Brain Sciences* 28: 552–553.
- Haidt, Jonathan, and Jesse Graham. 2007. ‘When Morality Opposes Justice: Conservatives Have Moral Intuitions That Liberals May Not Recognize’, *Social Justice Research* 20: 98–116. https://doi.org/10.1007/s11211-007-0034-z
- Hauser, Marc. 2006. *Moral Minds: How Nature Designed Our Universal Sense of Right and Wrong*. New York: Ecco/HarperCollins.

- Hornbeck, Ryan G., and Justin L. Barrett. 2020. ‘Ritual Forms and Ritual Stuff: Implications of Lawson and McCauley’s Ritual Form Hypothesis for Material Culture’, *Ethos* 48, no. 1: 129–146.
- Hornbeck, Ryan G., and Justin L. Barrett. 2021. ‘The “Constitutive Relevance of Models” (CRoM) Test: A Tool for Transferring Constructs and Virtues Between Psychological and Anthropological Theories of Ritual’, *Method & Theory in the Study of Religion* 34, no. 4: 349–377. https://doi.org/10.1163/15700682-12341531
- Hornbeck, Ryan G., Brianna Bentley, and Justin L. Barrett. 2015. ‘Examining Special Patient Rituals in a Chinese Cultural Context: A Research Report’, *Journal of Cognition and Culture* 15, no. 5: 530–541.
- Järnefelt, Elisa, Caitlin F. Canfield, and Deborah Kelemen. 2015. ‘The Divided Mind of a Disbeliever: Intuitive Beliefs about Nature as Purposefully Created Among Different Groups of Non-Religious Adults’, *Cognition* 140: 72–88.
- Johnson, Dominic, and Jesse Bering. 2009. ‘Hand of God, Mind of Man: Punishment and Cognition in the Evolution of Cooperation’, in *The Believing Primate*. Edited by Jeffrey Schloss and Michael J. Murray. Oxford: Oxford University Press, 26–43.
- Johnson, Dominic P. 2016. *God Is Watching You: How the Fear of God Makes Us Human*. New York: Oxford University Press.
- Jong, Jonathan, Christopher Kavanagh, and Aku Visala. 2015. ‘Born Idolaters: The Limits of the Philosophical Implications of the Cognitive Science of Religion’, *Neue Zeitschrift Für Systematische Theologie Und Religionsphilosophie* 57, no. 2: 244–266.
- Kelemen, Deborah. 1999. ‘The Scope of Teleological Thinking in Preschool Children’, *Cognition* 70: 241–272.
- Kelemen, Deborah. 2004. ‘Are Children “Intuitive Theists”? Reasoning about Purpose and Design in Nature’, *Psychological Science* 15, no. 5: 295–301.
- Kelemen, Deborah, and Cara DiYanni. 2005. ‘Intuitions about Origins: Purpose and Intelligent Design in Children’s Reasoning about Nature’, *Journal of Cognition and Development* 6: 3–31. https://doi.org/10.1207/s15327647jcd0601_2
- Kelemen, Deborah, and Evelyn Rosset. 2009. ‘The Human Function Compunction: Teleological Explanation in Adults’, *Cognition* 111: 138–143. https://doi.org/10.1016/j.cognition.2009.01.001
- Kelemen, Deborah, Joshua Rottman, and Rebecca Seston. 2013. ‘Professional Physical Scientists Display Tenacious Teleological Tendencies: Purpose-Based Reasoning as a Cognitive Default’, *Journal of Experimental Psychology: General* 142, no. 4: 1074–1183. https://doi.org/10.1037/a0030399
- Knight, Nicola. 2008. ‘Yukatek Maya Children’s Attributions of Belief to Natural and Non-Natural Entities’, *Journal of Cognition and Culture* 8, no. 3–4: 235–243.

- Knight, Nicola, Paulo Sousa, Justin L. Barrett, and Scott Atran. 2004. ‘Children’s Attributions of Beliefs to Humans and God: Cross-Cultural Evidence’, *Cognitive Science* 28: 117–126. https://doi.org/10.1016/j.cogsci.2003.09.002
- Kundert, C., and Laird R. O. Edman. 2017. ‘Promiscuous Teleology: From Childhood Through Adulthood and from East to West’, in *Religious Cognition in China: ‘Homo Religious’ and the Dragon*. Edited by Ryan G. Hornbeck, Justin L. Barrett, and Madeleine Kang. New York: Springer, 79–96.
- Kvandal, Halvor. 2020. ‘The God-Faculty Dilemma: Challenges for Reformed Epistemology in the Light of Cognitive Science’, *International Journal of Philosophy and Theology* 81, no. 4: 404–422.
- Lawson, E. Thomas. 2022. ‘The Historical Genesis of Cognitive Science of Religion’, in *The Oxford Handbook of the Cognitive Science of Religion*. Edited by Justin L. Barrett. New York: Oxford University Press, 13–26.
- Lawson, E. Thomas, and Robert N. McCauley. 1990. *Rethinking Religion: Connecting Cognition and Culture*. Cambridge: Cambridge University Press.
- Leslie, Alan M. 1995. ‘A Theory of Agency’, in *Causal Cognition: A Multidisciplinary Debate, Symposia of the Fyssen Foundation*. Edited by Dan Sperber, David Premack, and Ann James Premack. New York: Clarendon Press/ Oxford University Press, 121–141.
- Liénard, Pierre, and Pascal Boyer. 2006. ‘Whence Collective Rituals? A Cultural Selection Model of Ritualized Behavior’, *American Anthropologist* 108: 814–827. https://doi.org/10.1525/aa.2006.108.4.814
- Malley, Brian. 2004. *How the Bible Works: An Anthropological Study of Evangelical Biblicism*. Walnut Creek, CA: Altamira Press.
- Malley, Brian. 2022. ‘Scripturalism’, in *The Oxford Handbook of the Cognitive Science of Religion*. Edited by Justin L. Barrett. New York: Oxford University Press, 167–190.
- Malley, Brian, and Justin Barrett. 2007. ‘A Cognitive Typology of Religious Actions’, *Journal of Cognition and Culture* 7, no. 3–4: 201–211.
- Martin, Luther H. 2007. ‘The Promise of Cognitive Science for the Study of Early Christianity’, in *Explaining Christian Origins and Early Judaism*. Edited by Petri Luomanen, Ilkka Pyysiäinen, and Risto Uro. Boston: Brill, 37–56.
- McCauley, Robert N. 2011. *Why Religion Is Natural and Science Is Not*. New York: Oxford University Press.
- McCauley, Robert N. 2017. ‘Twenty-Five Years in: Landmark Empirical Findings in the Cognitive Science of Religion’, in *Religion Explained? The Cognitive Science of Religion After Twenty-Five Years*. Edited by Luther H. Martin and Donald Wiebe. London: Bloomsbury, 17–41.

- McCauley, Robert N., and E. Thomas Lawson. 2002. *Bringing Ritual to Mind: Psychological Foundations of Cultural Forms*. New York: Cambridge University Press.
- McKay, Ryan, and Harvey Whitehouse. 2015. 'Religion and Morality', *Psychological Bulletin* 141, no. 2: 447–473.
- McNamara, Patrick. 2009. *The Neuroscience of Religious Experience*. New York: Cambridge University Press.
- Milojev, Petar, Danny Osborne, Lara M. Greaves, Joseph Bulbulia, and Marc S. Wilson. 2014. 'Right-Wing Authoritarianism and Social Dominance Orientation Predict Different Moral Signatures', *Social Justice Research* 27, no. 2: 149–174. https://doi.org/10.1007/s11211-014-0213-7
- Norenzayan, Ara. 2013. *Big Gods: How Religion Transformed Cooperation and Conflict*. Princeton: Princeton University Press.
- Norenzayan, Ara, Azim F. Shariff, Will M. Gervais, Aiyana K. Willard, and Rita A. McNamara. 2016. 'The Cultural Evolution of Prosocial Religions', *Behavioral and Brain Sciences* 39 https://doi.org/10.1017/S0140525X14001356
- Plantinga, Alvin. 2000. *Warranted Christian Belief*. New York: Oxford University Press.
- Purzycki, Benjamin Grant. 2022. 'Gods: Cognition, Culture, and Ecology', in *The Oxford Handbook of the Cognitive Science of Religion*. Edited by Justin L. Barrett. New York: Oxford University Press, 67–89.
- Purzycki, Benjamin Grant, and Aiyana K. Willard. 2016. 'MCI Theory: A Critical Discussion', *Religion, Brain & Behavior* 6, no. 3: 207–248.
- Richert, Rebekah A. 2022. 'The Cultural and Developmental Niche of Religious Cognitions: Educational Implications of the Cognitive Science of Religion', in *The Oxford Handbook of the Cognitive Science of Religion*. Edited by Justin L. Barrett. New York: Oxford University Press, 89–410.
- Richert, Rebekah A., and Kirsten Lesage. 2022. 'The Nature of Humans', in *The Oxford Handbook of the Cognitive Science of Religion*. Edited by Justin L. Barrett. New York: Oxford University Press, 90–109.
- Schjoedt, Uffe, and Michiel Van Elk. 2022. 'Neuroscience of Religion', in *The Oxford Handbook of the Cognitive Science of Religion*. Edited by Justin L. Barrett. New York: Oxford University Press, 327–348.
- Schloss, Jeffrey P., and Michael J. Murray. 2011. 'Evolutionary Accounts of Belief in Supernatural Punishment: A Critical Review', *Religion, Brain & Behavior* 1: 46–99. https://doi.org/10.1080/2153599X.2011.558707
- Scott, Julie B., and Justin L. Barrett. 2022. 'Nature of the World', in *The Oxford Handbook of the Cognitive Science of Religion*. Edited by Justin L. Barrett. New York: Oxford University Press, 110–129.

- Shariff, Azim F., Ara Norenzayan, and Joseph Henrich. 2011. ‘The Birth of High Gods: How the Cultural Evolution of Supernatural Policing Influenced the Emergence of Complex, Cooperative Human Societies, Paving the Way for Civilization’, in *Evolution, Culture and the Human Mind*. Edited by Mark Schaller, Ara Norenzayan, Steven J. Heine, Toshio Yamagishi, and Tatsuya Kameda. New York: Psychology Press, 119–136.
- Sorenson, Jesper. 2005. ‘The Problem of Magic - Or How Gibberish Becomes Efficacious Action’, *Recherches Semiotiques - Semiotic Inquiry* 25, no. 1/2: 93.
- Sosis, Richard, John Shaver, Benjamin Grant Purzycki, and Jordan Kiper. 2022. ‘Soul Mates? Conflicts and Complementarities in the Evolutionary and Cognitive Sciences of Religion’, in *The Oxford Handbook of the Cognitive Science of Religion*. Edited by Justin L. Barrett. New York: Oxford University Press, 349–370.
- Szocik, Konrad, and Hans Van Eyghen. 2021. *Revising Cognitive and Evolutionary Science of Religion: Religion as an Adaptation*. New York: Springer.
- Thagard, Paul. 2005. *Mind: Introduction to Cognitive Science*. Cambridge, MA: MIT Press.
- Tomasello, Michael. 2019. *Becoming Human: A Theory of Ontogeny*. Cambridge, MA: Harvard University Press.
- Uro, Risto. 2016. *Ritual and Christian Beginnings: A Socio-Cognitive Analysis*. Oxford: Oxford University Press.
- Van Eyghen, Hans. 2016. ‘There Is No Sensus Divinitatis’, *Journal for the Study of Religions and Ideologies* 15, no. 45: 24–40.
- Van Eyghen, Hans. 2022. ‘CSR and Religious Belief: Epistemic Friends or Foes?’, in *The Oxford Handbook of the Cognitive Science of Religion*. Edited by Justin L. Barrett. New York: Oxford University Press, 371–381.
- Van Leeuwen, Neil, and Michiel Van Elk. 2019. ‘Seeking the Supernatural: The Interactive Religious Experience Model’, *Religion, Brain & Behavior* 9, no. 3: 221–251.
- Wellman, Henry M., David Cross, and Julanne Watson. 2001. ‘Meta-Analysis of Theory-of-Mind Development: The Truth about False Belief’, *Child Development* 72: 655–684. https://doi.org/10.1111/1467-8624.00304
- White, Claire. 2021. *An Introduction to the Cognitive Science of Religion: Connecting Evolution, Brain, Cognition and Culture*. Abingdon/New York: Routledge.
- White, Claire. 2022. ‘Mortuary Practices’, in *The Oxford Handbook of the Cognitive Science of Religion*. Edited by Justin L. Barrett. New York: Oxford University Press, 145–163.
- Whitehouse, Harvey. 1995. *Inside the Cult: Religious Innovation and Transmission in Papua New Guinea*. Oxford: Clarendon Press.

◦ Whitehouse, Harvey. 1996. ‘Rites of Terror: Emotion, Metaphor and Memory in Melanesian Initiation Cults’, *Journal of the Royal Anthropological Institute* 2, no. 4: 703–715.
◦ Whitehouse, Harvey. 2004. *Modes of Religiosity: A Cognitive Theory of Religious Transmission*. Lanham, MD: Rowman and Littlefield.
◦ Whitehouse, Harvey. 2017. ‘Twenty-Five Years of CSR: A Personal Retrospective’, in *Religion Explained? The Cognitive Science of Religion After Twenty-Five Years*. Edited by Luther H. Martin and Donald Wiebe. London: Bloomsbury, 43–55.
◦ Whitehouse, Harvey, and Christopher M. Kavanagh. 2022. ‘What Is the Role of Ritual in Binding Communities Together?’, in *The Oxford Handbook of the Cognitive Science of Religion*. Edited by Justin L. Barrett. New York: Oxford University Press, 278–302.
◦ Wigger, J. Bradley. 2016. ‘Children’s Theory of God’s Mind: Theory-of-Mind Studies and Why They Matter to Religious Education’, *Religious Education* 111, no. 3: 325–339.
◦ Wigger, J. Bradley, Katrina Paxson, and Lacey Ryan. 2013. ‘What Do Invisible Friends Know? Imaginary Companions, God, and Theory of Mind’, *International Journal for the Psychology of Religion* 23: 2–14. https://doi.org/10.1080/10508619.2013.739059
◦ Xygalatas, Dimitris. 2022. ‘Extreme Rituals’, in *The Oxford Handbook of the Cognitive Science of Religion*. Edited by Justin L. Barrett. New York: Oxford University Press, 237–253.