

The Cognitive Science of Imagination & Religion

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Abstract

Religion and imagination both deal with what is beyond the empirical here and now. In this article, I will argue that imagination as a capacity is highly important for the development, maintenance, and evolution of religion and the variety of components that together make a religion: (religious) belief, religious cognition broadly, religious events such as miracles, religious agents such as deities, religious rituals and experiences, religious texts and narratives, and finally religious art and creativity. I will argue that the cognitive science of imagination can crucially shed light on various aspects of religion that previously may have seemed unrelated, and that in fact, perceiving, remembering, and imagining may not be as distinct processes from each other as we might have thought, and indicate what consequences these suggestions may have for beliefs as we understand them.

Keywords: Imagination, religion, cognitive, fiction, belief, narrative, parasocial, mentalizing, absorption, creativity

Introduction: Imagination and Religion

Religion and imagination are two intrinsically connected concepts; whether you adhere to a narrow definition of religion, entailing just belief in supernatural beings (i.e., not part of the physical, empirical world), or one reaching beyond the cognitive sphere, involving rituals (i.e., actions that appear to not have a direct causal effect) and experiences amongst other things - imagination is part of the picture. This broad overlap is a strength as well as a weakness – there is a huge range of ways in which we can investigate how imagination supports religion, or vice versa. This article and special issue present an overview of some of the current approaches to the cognitive science of imagination and religion, including developmental perspectives, individual differences, and philosophy.

What do imagination and religion have first and foremost in common? They deal with what is *beyond the empirical here and now*. Imagination will be defined here as the cognitive capacity to simulate mental representations in the absence of external, sensory input, and to (mentally) manipulate these representations in some way. Religion similarly crucially deals with the transcendental, “that which is beyond or above the range of normal or physical human experience” (OED 2019). Imagination is therefore required for religion to exist at all (note though that no suggestions are implied here, or anywhere in this article, as to the ontological status of spiritual or religious concepts in – what we may call – reality, but rather that imagination is required as a cognitive capacity to represent these concepts). However, that does not entail that imagination is the only capacity required for religion, nor that religion is the only “product” of imagination. This leaves a rather broad potential for this article; and truly summarizing all aspects of imagination that are relevant for religion is far beyond the scope of this article. Indeed, I will instead focus on the aspects of the imagination as they may be particularly relevant for the cognitive science of religion (CSR), and specifically as they relate to articles within this special issue.

First, I will show how imagination may be important for CSR (despite being a capacity that supports “merely imaginary” ideas). This will be followed by a section on the philosophy of the cognitive science of imagination and religion. Then, I will briefly engage the literature on religious beliefs and what the cognitive science of imagination might contribute to the discussion of religious beliefs. Next, I will briefly discuss some aspects of the developmental cognitive science of imagination and how this may inform CSR – again limiting myself to the scope of the articles in this special issue. This is followed by a suggestion of how imagination may underlie the representation of supernatural agents and the relationships individuals have with these agents. Next, I will elaborate on links between fiction and religion, in particular through research on narratives and absorption. Finally, this is followed by a brief discussion on the links between creativity, art, and religion.

The Importance of the Imaginary

How is imagination important for religion? Maurice Bloch argues that there is no real distinction between the so-called imaginary realm of the “transcendental social” and religion (Bloch 2008). Using Durkheim’s idea of the duality of human sociality, Bloch puts forward the idea that there is a transactional and transcendental element to human interactions: we act towards other human beings both in terms of how they appear to the senses at any given point in time (i.e., particular individuals; *transactional interaction*), but also on the basis of the “essentialized” (i.e., defined and existent apart from the particular individual in question) roles they have (*transcendental interaction*). Bloch gives the example of a Malagasy village elder, who is getting on a bit, but who is still treated with respect by the other villagers and is put in charge of rituals (a form of transcendental interaction). At the same time, in daily life, in more domestic situations, his opinions are less taken note of, given that he is turning somewhat senile, and this is understood as a natural consequence of his age and current state (transactional interaction). This duality is

suggested to be uniquely human; in the animal world, interactions solely take place on a transactional level – if you are elderly, and are no longer the strongest of the group, your place as leader will be challenged and taken over: there are no transcendental roles and rights one can appeal to. Thus, while these (essentialized, transcendental) roles and identities are in a particular sense “imagined,” they are absolutely pivotal to the structure of human society, and, by extension, religion.

This transcendental level of interaction is not unique to religion but rather pertains to culture as a whole. It requires both imaginative ability and symbolic processing: symbolic ability is necessary for endowing entities (objects, persons, but also relationships) in the physical world with culture-specific properties (Searle and Willis 1995). This endowment process has been called “status-function assignment,” and allows for roles to come into being, with associated specific activities and rights and duties (Searle 2010). For example, this includes assignments like: “this man counts as the president of the USA” and “this river counts as a border” (Kaufmann and Clément 2014).

Evolutionarily speaking, such imaginations can, despite their non-existence in the empirical world, have huge benefits, to the extent that some have argued that we should consider imagination as a niche (Shantz 2018). Shantz has argued that imagination fulfils the following criteria for niche construction: (1) An organism (i.e., candidate niche constructor) must significantly modify environmental conditions; (2) The organism-mediated environmental modifications must influence selection pressures on a recipient of niche construction; (3) There must be a detectable evolutionary response in a recipient of the niche construction. Using the examples of smallpox (165 CE) and measles (251 CE) in Christian countries, she has pointed out that Christians survived more often as they supported each other on the basis of their belief (see also, Stark 2009). Shantz moreover argued that the imagination has the potential to stimulate biological responses, inducing affect (e.g., through stories and rituals), which in turn can contribute to motivate behaviors. Thus, imagination motivates behavior, influences selection

pressures, and can create a detectable evolutionary response (increased survival rates). Together, this builds a case for imagination to be considered as a niche in itself (“products” of imagination, such as a culture, may further constitute niches of their own). Either way, it is clear that imagination can and has had an important influence on human evolution, including an influence on religion and its own evolution.

Philosophy of Imaginative and Religious Cognition

More and more research shows that, with just small differences, perceiving something, remembering something, and imagining something recruit a very similar brain network (Schacter and Addis 2007; Reddan *et al.* 2018). Moreover, many types of imaginings can have the same effects as experiencing the real thing, like imagining one’s significant other to increase bonding with them (Poerio *et al.* 2015), and imagining meeting outgroup individuals to increase trust in them (Vezzali *et al.* 2012). In this way, relationships involving both religious and fictional characters may work as social surrogates (Derrick *et al.* 2009) or substitute attachment targets (Granqvist 2010)(see also below), increasing esteem and reducing feelings of rejection.

More recent ideas blur these distinctions between imaginary and real even further: in an sensationally-titled TED talk, neuroscientist Anil Seth explains that “your brain hallucinates your conscious reality” (Seth 2017). His talk builds on current theories in cognitive science that we are conscious through our brain, so that even though our sensory organs (eyes, ears, etc.) perceive the outside world/reality, it is our brain that has to interpret these signals. In other words, reality always takes place in a mental space (cf. Frith 2013). What is more, both sensory signals and the interpretations by the brain are noisy – they are estimations, and can be deluded. *Predictive processing* theories suggest that this is the consequence of the brain working as a prediction machine: it has prior models as to what to expect, which are compared to current experience, after which an estimation or prediction occurs. This prediction includes what is happening (or is

experienced) right now, as well as what is likely to happen (or be experienced) next (Hohwy 2013). This means that our experience is always based on a “best guess,” which may be considered an imaginary experience of reality. Predictive processing models have made their entrance in CSR over the past few years (Schjoedt and Andersen 2017), and have been used to explain Ouija boards (Andersen *et al.* 2018), mystical experience (Andersen *et al.* 2014), and agency detection in virtual reality (Andersen *et al.* 2019)

However, the idea that perceiving, remembering, and imagining are all very similar on a neuronal level does not need to be problematic. In fact, we historically used to not make a distinction between imagination and perception as we do now; it is – amongst other things – the result of the introduction of dualism by French philosopher Rene Descartes that we now consider imagination to be a faculty for ephemeral phenomena (Ovsepyan 2019). Ovsepyan (2019) in this special issue explains this in more detail, including how the Western philosophy of mind, with regards to imagination, has evolved through the centuries, and what this conceptualization means for CSR. She also puts forward how through CSR’s focus on the cognitive science, we may have lost the embodied aspects of imagination out of sight, and how experience may be a crucial aspect of the real-imaginary and belief distinctions (see also other sections below).

Belief

An important difference between the imaginary and reality is that the imagined is often dismissed as, well, “imaginary.” While we have previously seen that even the imagined can have important consequences in everyday life, this distinction still raises important questions: when do we know whether something is imaginary or real? What effect does this distinction have on our belief in the object (of imagination or perception) in question? And if so, what does this mean for

supernatural beliefs, which are not empirically verifiable, and therefore to some extent are always “imaginary” (in the sense of existing in imagination)?

Neil Van Leeuwen has put forward his “Religious Credence Thesis” which gives the following explanation for religious beliefs (Van Leeuwen 2014): We need to make a distinction between *religious credence* and *factual belief*, which are supported by distinct cognitive attitudes, and which have different etiologies (i.e., how the beliefs are formed and revised) and different consequences. Without repeating Van Leeuwen’s entire theory (see his 2014 paper), the distinctive characteristics of these beliefs are what allows them to co-exist but also raises confusion for people, in particular non-religious, non-believing individuals (and sometimes, CSR researchers): “Do religious individuals really believe that the sacramental bread is Christ’s body?” Whereas factual beliefs are independent of practical setting and vulnerable to evidence, and cognitively govern other attitudes, religious credences are susceptible to free elaboration and vulnerable to special authority (such as religious leaders or gurus), and have a normative orientation. The main problem causing the confusion between these types of beliefs is that it is often assumed that belief is a single cognitive attitude type, and the variation in the effects of different beliefs is due to their variation in *contents* (Van Leeuwen 2014), while in effect it is the different cognitive attitudes underlying these beliefs. However, since religious credences lack the defining characteristics of factual beliefs, this puts them closer to attitudes like fictional imagining and acceptance in certain contexts (e.g., religious rituals).

David Sloan Wilson explains this distinction in terms of *factual realism* versus *practical realism* (Wilson 2008). He suggests that every belief can be evaluated according to two criteria: (1) How well does it correspond to what is out there (factual), and (2) what does the belief cause the believer to do (practical)? We use “realism” in both ways without thinking, and which way is used depends on the situation; both have their own function. Sometimes we function better by knowing the world as it really is (factual realism), and sometimes we function better by “distorting” the world (when we need motivation, for example, such as in the case of adaptive

fictions). This distinction has important consequences for religion and the study of religion. Wilson has pointed out that this is where researchers of CSR may at times go wrong – often, religious beliefs are treated as if they are believed facts (factual realism), while they should be treated as adaptive “fictions” (practical realism).

In the psychology of fiction research, the idea of different types of beliefs has long been accepted and further examined. Typically, (factual) belief is differentiated from so-called “alief” (Gendler 2008), which is akin to Wilson’s “practical realism” (2008). Alief is an automatic, gut-level, belief-like attitude that may contradict an explicitly held belief, and refers to the fact that sometimes we believe something while we know it is not really true, and we do not “believe-believe” it. For example, when you are fully engrossed in a film, you might, at that time, “alieve” that the person’s partner has died, and experience associated emotions. However, you do not “believe” that in reality, that person exists, and that their partner has died. In other words, we believe that fiction is fictional, we “alieve” that it is real.

If religious beliefs are indeed a form of religious credence, practical realism, or alief, then this leads to further questions as to whether, and if so how, religious imagining is different from a non-religious imagining. It also begs the question when and how children distinguish between these types of belief or cognitive attitudes, which Harris & Corriveau (2019) investigate in this issue (see also below), and if religious stories are of a (qualitatively) different kind than non-religious stories, and if so, in what way(s), and whether there are differences in the way that religious believers and non-believers tend to interact with stories (see Black *et al.* 2019 in the current special issue, and below).

Development of Cognition for Imagination and Religion

When it comes to religious beliefs, there appear to be two main streams of developmental theories within the cognitive science of religion: there are researchers who claim that children are

born believers, claiming that “religion is natural,” while other researchers postulate that religious belief is very much an institutionally sanctioned, culturally transmitted belief (see Harris & Corriveau 2019, this issue). Proponents of the “born believers” theories include Jean Piaget, who posited that children are “artificialists,” attributing natural entities such as lakes and mountains to human ingenuity (Piaget 1929), and Deborah Kelemen, who posits that children have a strong bias to see the world as purposeful or purposefully designed (“promiscuous teleology”), independent of upbringing (Kelemen 2004).

Regardless of whether religious beliefs come natural or not, the question remains how children can tell the difference between factual and religious beliefs. To answer this question we can examine previous research on source monitoring, or how children can tell the difference between fact and fiction (again not passing judgment regarding the ontological status of religious beliefs, but rather making a distinction between empirically verifiable and non-verifiable beliefs). This question is particularly pertinent for children, as they are typically exposed from a young age to a mixture of both types of narratives. Initially, it was thought, by Piaget and others, that children were not capable of distinguishing imaginary from real – both in terms of pretend play and fictional narratives. Over the past few decades, however, many researchers have found that at the age of three, children are typically successful at distinguishing reality from these imaginative activities (Weisberg 2013). Moreover, the events they do imagine appear to be subject to natural constraints, such as physical, biological and psychological constraints, much as is suggested for adult religious beliefs and god representations (with the exception of minimally counterintuitive violations).

There appears to be a paradox for the developmental pathway for religious imagination (see Harris & Corriveau 2019, this issue): on the one hand, as mentioned, a predisposition to religious or magical thinking in children is often postulated (Piaget 1928), while on the other hand, empirical evidence shows that children of the age of 5-6 years old can be overly conservative, claiming that which is improbable to also be impossible (Shtulman and Carey

2007). In other words, while young children may easily suggest naturalistic explanations for unusual events, they are also open to explanations in terms of divine agency – so how do they understand extraordinary events?

Harris & Corriveau (2019) show, in this special issue, that children make use of the knowledge about possibility and impossibility of events when assessing the status of a narrative. In their overview, Harris and Corriveau discuss studies which have used narratives with magical possibilities as well as religious miracles, for children to be judged as either fictional or factual. They report that studies have found that children with a religious education (presumably leading to institutionally transmitted religious beliefs) believe in miraculous possibilities, especially if God is involved, in which case the narrative is frequently judged factual rather than fictional.

In addition to narratives and pretend play, children's imaginary friends are of particular relevance to CSR. Children behave as if imaginary companions are real, and treat them like fellow human beings, while at the same time knowing that they are in fact imaginary. Luhrmann has suggested that her Pentecostal participants may treat God in ways very similar to such imaginary friends (Luhrmann 2012). The engagement with supernatural agents is another important aspect of imaginative ability for religion.

Supernatural Agents, Mentalizing, and Parasocial relationships

In many cultures across the world, supernatural agents – in the form of gods, spirits, ghosts, djinn, and ancestors – are core elements of religion. These agents are intentional, that is to say, they have minds, and therefore beliefs, concerns, and desires, and people (attempt to) interact with them in order to learn (i.e., represent and reason) about these beliefs, concerns, and desires. Therefore, mind imagination, or so-called *Theory of Mind* (ToM) (Premack and Woodruff 1978) or “mentalizing” (Frith and Frith 2003), is another form of imagination that is required for religion. ToM is the capacity to imagine the beliefs, attitudes, and mental states of others

around us. Visuri (2019) further conceptualizes Theory of Mind as intersubjective imagination, as opposed to intrasubjective imagination (see this issue).

Importantly, it is suggested that ToM – the presupposition and understanding of other agents' minds – is used in the same or very similar way for human and supernatural agents (Schjoedt *et al.* 2009), and therefore Theory of Mind is likely instrumental to religious beliefs at large (Barrett 2004; Gervais 2013), shaping and constraining what kind of supernatural agent concepts individuals maintain (Gervais 2013; Schaap-Jonker *et al.* 2013).

Supernatural agents are assumed to be represented in a psychologically similar way to human agents – this similarity extends to the relationships that individuals have with these agents: it is theorized that *parasocial interaction* functions in very much a similar way to social interaction. Parasocial interaction is defined as the one-sided relationship with a character or figure through media and then treatment of that figure as if it were another human being (Schiappa *et al.* 2007; Giles 2012). This interaction involves mind imagination for fictive agents, but also human agents that one may not have met in real life (Derrick *et al.* 2008). It is suggested that relationships with supernatural agents work similarly through parasocial interaction (see Visuri 2019 and Black *et al.* 2019; both this issue). Differences in parasocial interactions between fictitious and supernatural agents may lie in their agency: powers are ascribed to supernatural agents that fictive agents simply do not have – they may be able to affect the course and outcomes of things in the real world (Luhrmann 2012). Additional research is needed to investigate this further.

The benefits of this parasocial interaction may be similar across fictive and supernatural agents: to assist with social situations and issues (in terms of providing support, comfort and meaning). These benefits could be particularly important for individuals with deficits in social abilities, such as individuals on the autism spectrum. Indeed, it has long been suggested that, given that autistic individuals have lower mentalizing abilities than neurotypical individuals, this can explain why autistic individuals typically score lower on religiosity and are more likely to be

atheists (Caldwell-Harris *et al.* 2011; Norenzayan *et al.* 2012). However, see Visuri (2019) in this issue for a challenge of this idea (see also, Reddish *et al.* 2016).

Narrative, Fiction, and Absorption

Narratives, and to some extent, sacred texts, are central within all religions. Some have suggested that it may even be the case that narratives are required for religions to start to become accepted within a tribe or community and for religious beliefs to form (Sterelny 2018; see also Geertz & Jensen, 2011, and Black *et al.* 2019, this issue). Despite this central role of narratives within religion, the topic remains under-investigated. It has previously been suggested that narratives may be particularly important to religion and religious rituals because they give meaning to events, and can create links between events and identities (van Mulukom 2017). These narratives may be the result of personal reflection (Whitehouse 2002) or from listening to religious authorities, who provide the narrative before, during, or after a religious ritual. These narratives may speak to the imagination in particular after *cognitive resource depletion*; that is, when participants have exhausted their cognitive resources through the religious ritual, allowing for activity in brain regions supporting error monitoring to be turned down (Schjoedt *et al.* 2013).

In one of the few psychology studies on narrative and religion, Black *et al.* (2019; this issue) have suggested that the way in which people consume fictional narratives, and how frequently they do this, may be closely related to their religiosity or religious beliefs. Religious and fictional stories may rely on similar capacities and may fulfil similar needs; in the previous section, it was suggested that this appears at least to be the case for mind imagination or mentalizing (both in terms of capacity and needs).

However, another major function of fiction is that it provides simulations for the real world (Buckner and Carroll 2007; Gottschall 2012; Nair 2002, 2011; Oatley 2016). This involves other humans and relationships with other humans, but also allows for the simulation of

everyday problems, dilemmas, and other issues. To be able to simulate potentially problematic situations as well as several solutions in your mind before or even instead of attempting to try them all out has clear evolutionary advantages over creatures which do not possess this ability (Suddendorf and Corballis 2007). This type of imagination involves the imagining of situations other than the here and now, including future events and counterfactual events, is sometimes called *episodic simulation*, and relies heavily on memory of past events (Schacter and Addis 2007; van Mulukom 2013). If such simulations have tangible benefits, then practice of these capacities (whether through for example reading or daydreaming) should similarly improve real-world problem-solving and social interactions (including social understanding and empathy), something which is currently suggested (Mar *et al.* 2006; Mar *et al.* 2009; see also Visuri 2019 in this issue).

Are certain individuals better at engaging with fiction, or for that matter, religion? Recent research suggests that a certain type of attentional processing called *absorption* may allow for a more rich and intense engagement with, or experience of, fiction and religion (Luhmann *et al.* 2010; Luhmann 2012; see also Coleman *et al.* 2019, this issue). Absorption was first identified by Tellegen and Atkinson (1974) as a personality trait which includes a broad range of processes including hyper-focus, attentional commitment, and imaginative involvement (see also Roche and McConkey 1990). First used to identify hypnotic susceptibility and then linked to engagement with fiction, absorption was later found to be associated with individual differences in religious, spiritual, and other mystical or self-transcendental experiences (Granqvist *et al.* 2005; Luhmann *et al.* 2013; van Elk 2014; Maij and van Elk 2018), possibly through the temporary loss of self in the union with the object of attention.

Coleman *et al.* (2019) in this issue build on Luhmann and colleagues' findings that the increased practice (in terms of frequency and length) of religious orthopraxy increases the intensity of mystical experiences, and suggest that religious practice may increase both mentalizing capacity and/or the capacity for absorption (much like more frequent engagement

with fiction may increase the capacity for absorption). Finally, they argue that when mentalizing ability is low in an individual, trait absorption may facilitate mystical experiences, in line with a very recent review paper on absorption (Lifshitz *et al.* 2019).

Creativity and Art

Imagination is often associated with creativity and art – we consider those who are imaginative to also be creative. Creativity poses an interesting paradox for religion: on the one hand, it is clear that creative imagination has led to a wide variety of deities and other supernatural beings and religious rituals around the world, but on the other hand, religions appear notoriously averse to innovation, focusing instead on uniformity of dogma and practices.

A further distinction lies in personal versus general religious beliefs (Van Leeuwen and van Elk 2018); while general religious beliefs may conform to a set of rules, this does not mean there is uniformity of personal religious beliefs. In fact, there are good reasons to believe that personal religious beliefs are subject to high levels of personalization, innovation, or at least elaboration (Van Leeuwen 2014). This is further elaborated on by Visuri (2019) in this issue, who suggests that (general) creative imagination – including religious concepts – may appear constrained in individuals on the autistic spectrum, but that this may in fact be an artefact of how we test general creativity, and that the (personal) creative imagination of these individuals is “intact.”

It is clear that much work on creativity, art, and religion remains to be done. Such research is important given that religion may both stifle and encourage artistic creativity: while religious institutions may at times prohibit creative expression, they have also been known to fund some of the most famous and extraordinary artworks in the world (e.g., Sistine Chapel).

Conclusions

The supernatural includes fleeting experiences or empirically unverifiable concepts, but comes to life and lives in imagination; to believe or experience the supernatural as “real” is at the heart of religion (Lifshitz *et al.* 2019). The capacity for imagination is therefore pivotal for religion.

Having said that, imagination may not necessarily be as distinct from remembering and perceiving as we once thought, and may instead be the capacity with which we represent so-called “real” or “true” events as well as imaginary events. This means that the cognitive science of imagination is important for many aspects of religion.

In this article, whilst referring to articles in this special issue, we have touched upon the importance of imagination for religion, the philosophy of imaginative and religious cognition (Ovsepyan 2019), religious belief, religious events such as miracles (Harris & Corriveau 2019), religious agents such as deities (Visuri 2019 and Black *et al.* 2019), religious rituals and experiences (Coleman *et al.* 2019), religious texts and narratives (Black *et al.* 2019), and religious creativity and art (Visuri 2019).

Finally, we have seen that much of the research on imagination and religion overlaps with psychology research on fiction, in line with some previous suggestions (Van Leeuwen 2014), and there is still more potential for future research here. Indeed, given the wide range of imagination as a capacity – to represent, experience, and invent events and concepts – there is still much more that could be covered in this article in general, such as the representation and belief in an afterlife (the ultimate form of imaginative “future thinking”) and the emergence of afterlife rituals (and its archeological evidence as some of the first evidence of imagination away from the here and now), to name a few, and it is exciting to see how research on the intersection between imagination and religion may develop further.

References

- Andersen, Marc, Kristoffer L. Nielbo, Uffe Schjoedt, Thies Pfeiffer, Andreas Roepstorff Andreas and Jesper Sørensen. 2018. "Predictive Minds in Ouija Board Sessions." *Phenomenology and the Cognitive Sciences* 18(3): 577–588.
- Andersen, Marc, Thies Pfeiffer, Sebastian Müller and Uffe Schjoedt. 2019. "Agency Detection in Predictive Minds: A Virtual Reality Study." *Religion, Brain & Behavior* 9(1): 52-64.
- Andersen, Marc, Uffe Schjoedt, Kristoffer L. Nielbo and Jesper Sørensen. 2014. "Mystical Experience in the Lab." *Method and Theory in the Study of Religion* 26: 217-245.
- Barrett, Justin L. 2004. *Why Would Anyone Believe in God?* Walnut Creek, CA: AltaMira Press.
- Black, Jessica E., Molly Oberstein-Allen and Jennifer L. Barnes. 2019. "Tell Me a Story: Religion, Imagination, and Narrative Involvement." *Journal for the Cognitive Science of Religion*. Special issue: Imagination & Religion.
- Bloch, Maurice. 2008. "Why Religion Is Nothing Special but Is Central." *Philosophical Transactions of the Royal Society B: Biological Sciences* 363(1499): 2055-2061.
- Buckner, Randy L and Daniel C. Carroll. 2007. "Self-projection and the Brain." *Trends in Cognitive Sciences* 11(2): 49-57.
- Caldwell-Harris, Catherine, Murphy, Caitlin Fox, Velazquez, Tessa, & McNamara, Patrick. 2011. "Religious belief systems of persons with high functioning autism." *Paper presented at the Proceedings of the Annual Meeting of the Cognitive Science Society*.
- Coleman, Thomas J., III, James E. Bartlett, Jenny M. Holcombe, Sally B. Swanson, Andrew Atkinson, Christopher F. Silver and Ralph W. Hood Jr. 2019. "Absorption, Mentalizing, and Mysticism: Sensing the Presence of the Divine." *Journal for the Cognitive Science of Religion*. Special issue: Imagination & Religion.

- Derrick, Jaye L., Shira Gabriel and Kurt Hugenberg. 2009. "Social Surrogacy: How Favored Television Programs Provide the Experience of Belonging." *Journal of Experimental Social Psychology* 45(2): 352-362.
- Derrick, Jaye L, Shira Gabriel and Brooke Tippin. 2008. "Parasocial Relationships and Self-discrepancies: Faux Relationships Have Benefits for Low Self-esteem Individuals." *Personal Relationships* 15(2): 261-280.
- Frith, Chris D. 2013. *Making Up the Mind: How the Brain Creates Our Mental World*. Malden, MA: Wiley-Blackwell.
- Frith, Uta and Chris D. Frith. 2003. "Development and Neurophysiology of Mentalizing." *Philosophical Transactions of the Royal Society of London. Series B: Biological Sciences* 358(1431): 459-473.
- Geertz, Armin W. and Jeppe Sinding Jensen. 2011. *Religious Narrative, Cognition and Culture: Image and Word in the Mind of Narrative*. Sheffield & Oakville: Equinox Publishing, Ltd.
- Gendler, Tamar Szabó. 2008. "Alief and Belief." *The Journal of Philosophy* 105(10): 634-663.
- Gervais, Will M. 2013. "Perceiving Minds and Gods: How Mind Perception Enables, Constrains, and Is Triggered by Belief in Gods." *Perspectives on Psychological Science* 8(4): 380-394.
- Giles, David. 2012. "Parasocial Relationships: Current Directions in Theory and Method." In *The Social Use of Media: Cultural and Social Scientific Perspectives on Audience Research*, edited by Helena Bilandzic, Geoffroy Patriarche and Paul J. Traudt, 161-176. Bristol: Intellect.
- Gottschall, Jonathan. 2012. *The Storytelling Animal: How Stories Make Us Human*. Boston: Houghton Mifflin Harcourt.
- Granqvist, Pehr. 2010. "Religion as Attachment: The Godin Award Lecture." *Archive for the Psychology of Religion* 32(1): 5-24.

- Granqvist, Pehr, Mats Fredrikson, Patrik Unge, Andrea Hagenfeldt, Sven Valind, Dan Larhammar and Marcus Larsson. 2005. "Sensed Presence and Mystical Experiences Are Predicted by Suggestibility, Not by the Application of Transcranial Weak Complex Magnetic Fields." *Neuroscience Letters* 379(1): 1-6.
- Harris, Paul L. and Kathleen H. Corriveau. 2019. "Some, But Not All, Children Believe in Miracles." *Journal for the Cognitive Science of Religion*. Special issue: Imagination & Religion.
- Hohwy, Jakob. 2013. *The Predictive Mind*. Oxford: Oxford University Press.
- Kaufmann, Laurence and Fabrice Clément. 2014. "Wired for Society: Cognizing Pathways to Society and Culture." *Topoi* 33(2): 459-475.
- Kelemen, Deborah. 2004. "Are Children 'Intuitive Theists'? Reasoning about Purpose and Design in Nature." *Psychological Science* 15(5): 295-301.
- Lifshitz, Michael, Michiel van Elk and Tanya M. Luhrmann. 2019. "Absorption and Spiritual Experience: A Review of Evidence and Potential Mechanisms." *Consciousness and Cognition* 73: 102760.
- Luhrmann, Tanya M. 2012. *When God Talks Back: Understanding the American Evangelical Relationship with God*. New York: Vintage.
- Luhrmann, Tanya M., Howard Nusbaum and Ronald Thisted. 2010. "The Absorption Hypothesis: Learning to Hear God in Evangelical Christianity." *American Anthropologist* 112(1): 66-78.
- Luhrmann, Tanya M., Howard Nusbaum and Ronald Thisted. 2013. "'Lord, Teach Us to Pray': Prayer Practice Affects Cognitive Processing." *Journal of Cognition and Culture* 13(1-2): 159-177.
- Maij, David LR and Michiel van Elk. 2018. "Getting Absorbed in Experimentally Induced Extraordinary Experiences: Effects of Placebo Brain Stimulation on Agency Detection." *Consciousness and Cognition* 66: 1-16.

- Mar, Raymond A., Keith Oatley, Jacob Hirsh, Jennifer dela Paz and Jordan B. Peterson. 2006. "Bookworms Versus Nerds: Exposure to Fiction Versus Non-fiction, Divergent Associations with Social Ability, and the Simulation of Fictional Social Worlds." *Journal of Research in Personality* 40(5): 694-712.
- Mar, Raymond A., Keith Oatley and Jordan B. Peterson. 2009. "Exploring the Link between Reading Fiction and Empathy: Ruling Out Individual Differences and Examining Outcomes." *Communications* 34(4): 407-428.
- Nair, Rukmini Bhaya. 2002. *Narrative Gravity: Conversation, Cognition, Culture*. Oxford & New Delhi, Oxford University Press.
- Nair, Rukmini Bhaya. 2011. "The Nature of Narrative: Schemes, Genes, Memes, Dreams and Screams!" In *Religious Narrative, Cognition and Culture: Image and Word in the Mind of Narrative*, edited by Armin W. Geertz and Jeppe Sinding Jensen, 117-146. Sheffield & Oakville, Equinox Publishing, Ltd.
- Norenzayan, Ara, Will M. Gervais and Kali H. Trzesniewski. 2012. "Mentalizing Deficits Constrain Belief in a Personal God." *PLoS One* 7(5): e36880.
- Oatley, Keith. 2016. "Fiction: Simulation of Social Worlds." *Trends in Cognitive Sciences* 20(8): 618-628.
- Ovsepyan, Mari. 2019. "Reimagining the Imaginaries: Towards a Biocultural Theory of (Non)religion." *Journal for the Cognitive Science of Religion*. Special issue: Imagination & Religion.
- Oxford English Dictionary. Online: Oxford University Press. Accessed 11th of July 2019.
- Piaget, Jean. 1928. "La causalité chez l'enfant." *British Journal of Psychology* 18: 276-301.
- Piaget, Jean. 1929. *The Child's Conception of the World*. New York: Harcourt Brace.
- Poerio, Giulia L., Peter Totterdell, Lisa-Marie Emerson and Eleanor Miles. 2015. "Love Is the Triumph of the Imagination: Daydreams about Significant Others Are Associated with Increased Happiness, Love and Connection." *Consciousness and Cognition* 33: 135-144.

- Premack, David and Guy Woodruff. 1978. "Does the Chimpanzee Have a Theory of Mind?" *Behavioral and Brain Sciences* 1(4): 515-526.
- Reddan, Marianne Cumella, Tor Dessart Wager and Daniela Schiller. 2018. "Attenuating Neural Threat Expression with Imagination." *Neuron* 100(4): 994-1005. e1004.
- Reddish, Paul, Penny Tok and Radek Kundt. 2016. "Religious Cognition and Behaviour in Autism: The Role of Mentalizing." *The International Journal for the Psychology of Religion* 26(2): 95-112.
- Roche, Suzanne M. and Kevin M. McConkey. 1990. "Absorption: Nature, Assessment, and Correlates." *Journal of Personality and Social Psychology* 59(1): 91-101.
- Schaap-Jonker, Hanneke, Bram Sizoo, Janine Van Schothorst-Van Roekel and Jozef Corveleyn. 2013. "Autism Spectrum Disorders and the Image of God as a Core Aspect of Religiousness." *International Journal for the Psychology of Religion* 23(2): 145-160.
- Schacter, Daniel L. and Donna Rose Addis. 2007. "The Cognitive Neuroscience of Constructive Memory: Remembering the Past and Imagining the Future." *Philosophical Transactions of the Royal Society of London B: Biological Sciences* 362(1481): 773-786.
- Schiappa, Edward, Mike Allen and Peter B. Gregg. 2007. "Parasocial Relationships and Television: A Meta-analysis of the Effects." In *Mass Media Effects Research: Advances through Meta-analysis*, edited by Raymond W. Preiss, Barbara Mae Gayle, Nancy Burrell and Mike Allen, 301-314. New York: Routledge.
- Schjoedt, Uffe and Marc Andersen. 2017. "How Does Religious Experience Work in Predictive Minds?" *Religion, Brain & Behavior* 7(4): 320-323.
- Schjoedt, Uffe, Hans Stødkilde-Jørgensen, Armin W. Geertz and Andreas Roepstorff. 2009. "Highly Religious Participants Recruit Areas of Social Cognition in Personal Prayer." *Social Cognitive and Affective Neuroscience* 4(2): 199-207.

- Schjoedt, Uffe, Jesper Sørensen, Kristoffer Laigaard Nielbo, Dimitris Xygalatas, Panagiotis Mitkidis and Joseph Bulbulia. 2013. "Cognitive Resource Depletion in Religious Interactions." *Religion, Brain & Behavior* 3(1): 39-55.
- Searle, John R. 2010. *Making the Social World: The Structure of Human Civilization*. Oxford: Oxford University Press.
- Searle, John R. and S. Willis. 1995. *The Construction of Social Reality*. New York: Simon and Schuster.
- Seth, Anil. 2017. Your Brain Hallucinates Your Conscious Reality. [Video file]. Retrieved from https://www.ted.com/talks/anil_seth_how_your_brain_hallucinates_your_conscious_reality
- Shantz, Colleen. 2018. "Imagine there's a Heaven – The role of imagination in niche construction." *Future Directions on the Evolution of Rituals, Beliefs and Religious Minds workshop*. Erice, Italy.
- Shtulman, Andrew and Susan Carey. 2007. "Improbable or Impossible? How Children Reason about the Possibility of Extraordinary Events." *Child Development* 78(3): 1015-1032.
- Stark, Rodney. 2009. *Discovering God: The Origins of the Great Religions and the Evolution of Belief*. Glasgow: Harper Collins.
- Sterelny, Kim. 2018. "Religion Re-explained." *Religion, Brain & Behavior* 8(4): 406-425.
- Suddendorf, Thomas and Michael C. Corballis. 2007. "The Evolution of Foresight: What Is Mental Time Travel, and Is It Unique to Humans?" *Behavioral and Brain Sciences* 30(3): 299-313.
- Tellegen, Auke and Gilbert Atkinson. 1974. "Openness to Absorbing and Self-altering Experiences ('Absorption'), a Trait Related to Hypnotic Susceptibility." *Journal of Abnormal Psychology* 83(3): 268-277.

- van Elk, Michiel. 2014. "An EEG Study on the Effects of Induced Spiritual Experiences on Somatosensory Processing and Sensory Suppression." *Journal for the Cognitive Science of Religion* 2(2): 121-157.
- Van Leeuwen, Neil. 2014. "Religious Credence Is Not Factual Belief." *Cognition* 133(3): 698-715.
- Van Leeuwen, Neil and Michiel van Elk. 2018. "Seeking the Supernatural: The Interactive Religious Experience Model." *Religion, Brain & Behavior* 9(3): 221-251.
- van Mulukom, Valerie. 2013. *Imagining a Brave New Future: The Effects of Novelty and Plausibility on Episodic Simulation*. Doctoral Thesis. The University of Auckland.
- van Mulukom, Valerie. 2017. "Remembering Religious Rituals: Autobiographical Memories of High-arousal Religious Rituals Considered from a Narrative Processing Perspective." *Religion, Brain & Behavior* 7(3): 191-205.
- Vezzali, Loris, Dora Capozza, Sofie Stathi and Dino Giovannini, Dino. 2012. "Increasing Outgroup Trust, Reducing Infrahumanization, and Enhancing Future Contact Intentions Via Imagined Intergroup Contact." *Journal of Experimental Social Psychology* 48(1): 437-440.
- Visuri, Ingela. 2019. "A Room of One's Own: Autistic Imagination as a Stage for Parasocial Interaction and Social Learning." *Journal for the Cognitive Science of Religion*. Special issue: Imagination & Religion.
- Weisberg, Deena S. 2013. "Distinguishing Imagination from Reality." In *The Oxford Handbook of the Development of Imagination*, edited by Marjorie Taylor, 75-93. New York: Oxford University Press.
- Whitehouse, Harvey. 2002. "Modes of Religiosity: Towards a Cognitive Explanation of the Sociopolitical Dynamics of Religion." *Method & Theory in the Study of Religion* 14(3-4): 293-315.

Wilson, David Sloan. 2008. "Benign Application of Knowledge through Evolutionary Theory."

In *Career Development in Bioengineering and Biotechnology*, edited by Guruprasad

Madhavan, Barbara Oakley and Luis Kun, 437-440. New York: Springer-Verlag.