The New Scientific Study of Religion Moving On

with Lluís Oviedo, "Challenges, Opportunities, and Suggestions for a Renewed Program in the Scientific Study of Religion"; Robert N. McCauley, "Recent Trends in the Cognitive Science of Religion: Neuroscience, Religious Experience, and the Confluence of Cognitive and Evolutionary Research"; Connor Wood, "Antistructure and the Roots of Religious Experience"; Konrad Szocik, "Critical Remarks on the Cognitive Science of Religion"; Hans Van Eyghen, "Religious Belief as Acquired Second Nature"; and Léon Turner, "Isolating the Individual: Theology, the Evolution of Religion, and the Problem of Abstract Individualism."

CRITICAL REMARKS ON THE COGNITIVE SCIENCE OF RELIGION

by Konrad Szocik

Abstract. Cognitive explanations of religious beliefs propose an evolutionary past in which humans had to possess certain cognitive adaptations to survive. The aim of this article is to show that some cognitive accounts may overvalue the putative role of cognition. One such cognitive idea is an assumption that cognition has been evolutionarily shaped only, or most importantly, in the Pleistocene. This idea seems common among writers on the cognitive science of religion (CSR), but is mistaken. Cognition has been shaped throughout evolution. Another idea is that components of religion could not have been produced by natural selection (the hypothesis that religion is a by-product). But the article suggests that there are some domains in the field of religion and religious components that could be acquired and transmitted despite or even against alleged cognitive biases. The aim of this article is to argue for an extended approach that combines a cognitive account with functional naturalistic approaches, including an adaptationist one. Such distinction could imply that cognition is not functional. Obviously, this is not the case since cognition is the process of knowing, and surely knowledge is functional. However, the main argument for such a distinction lies in the key idea of the cognitive account that as far as cognition is functional and adaptive, religious components are not. Functionalism or "adaptivism" concerning cognition contradicts functionalism concerning religion. Numbers of scholars who consider themselves part of CSR seem also to consider both cognition and religion adaptive. However, in regard to components of religion, their adaptive, functional power is only

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 ISSN 0591-2385

secondary. The article concludes that the study of religion—as the study of cultural evolution in general—should include a pluralistic methodology combining cognitive and evolutionary accounts with the specificity of cultural evolution.

Keywords: adaptationism; cognitive science of religion; cultural evolution; functionalism; proximate explanation; ultimate explanation

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The cognitive science of religion (CSR) is an interesting and promising explanatory framework in the study of religion. The set of explanatory proposals and theories that are included in the broad term CSR shows how cognition affects acquisition and transmission of religious beliefs and other religious components. Empirical studies within CSR try to explore the important role played by cognition, or at least some correlation between cognitive patterns and biases in religiosity. Nevertheless, even if some cognitive tendencies and mechanisms may be at work and enhance religious representations, religiosity seems to be something "more," or at least something different, than the by-product of human cognition. Such a view assumes that religions and religiosity include such domains as meaning of life, spirituality, or looking for explanation, just to name a few (Oviedo 2018; Szocik 2018). From a cognitive point of view, we may reasonably ask if such putatively "special" domains of religion and religiosity are really something "more" and/or something special. All three can and should be addressed cognitively. Meaning, for example, seems to be a fundamentally linguistic issue, and thus concerns the cognition of language. The capacity to assign meanings to specific entities or manifestations is a highly advanced human cognitive function. Spirituality can be defined variously, but most simply as belief in spirits or disembodied persons, which again is cognitive. It means that spirituality can not only be explained as an autonomous capacity or phenomenon on its own, but as an epiphenomenon produced or affected by cognitive functions of the lower level involved in personal agency detection and/or teleological and anthropomorphic explanation. Explanation seems the most cognitive of all. Religious explanation shares some familiar patterns with scientific explanation, such as looking for a sense or cause, but at the same time it introduces unique functions, such as hope, coping with trauma and anxiety, and others which are beyond scientific approach. This is the specific role of religious explanation of the world in terms of personal agency. A cognitive account explains putative proximate mechanisms that generate and manage religious beliefs. The fact that religion is explained by CSR as a phenomenon connected only with human cognition leads to a growing critique of cognitive accounts—mostly by philosophers of religion and theologians—and to a need for extension of the cognitive paradigm. Proposed new trajectories include reference to

topics such as cultural evolution, religious meaning and sense, or a more context-based theory of the human mind, which extends the cognitive paradigm of computational and modular theories (Oviedo 2018; 2019).

The scientific study of religion includes some misunderstandings and unwarranted assumptions. One of them is the idea of religion as a puzzling phenomenon, which is incompatible with natural selection oriented at the evolution of practical functions and features, which are aimed at maximizing fitness.[1] Followers of this idea take for granted that religious behaviors are costly, religious beliefs are counterintuitive, and as such they should never have evolved (Slingerland et al. 2013, 336). But the human mind creates and acquires many nonreligious counterintuitive beliefs (Miller 2001), and many religious rituals and behaviors are not costly in any important senses. Another misunderstanding is an attempt to separate content and context in the study of religion. While such separation is fruitful for methodological clearness of concepts, there are good reasons to assume that religious beliefs are natural in both cognitive and cultural senses, when an individual can have some cognitive "proreligious" biases (cognitive naturalness), but her beliefs are supported and/or activated by social learning (cultural naturalness) (Visala and Barrett 2019, 69–70). Cognitivists have a tendency to treat cognitive naturalness as a justification for cross-cultural naturalness, but the latter is not a logical consequence of the former. The hypothesis that religion is a by-product is rooted in such unjustified identification of those two different kinds of naturalness of religion (Visala and Barrett 2019, 71).

The apparent commonality of similar religious beliefs may be rooted both in their functionality explained in terms of Darwinian adaptation, and in some cognitive biases or abilities as well. However, this apparent disjunction becomes belied by the fact that cognitive biases are also explained by Darwinian adaptation. This combined approach is other than the pure CSR explanation. CSR may sometimes accept some beneficial results provided by religious components, but they are always explained in terms of evolutionary by-products.

Basic Assumptions of CSR and the Challenge for the Adaptationist Explanation

There are plenty of books and articles devoted to describing, explaining, and criticizing CSR. Despite this fact, it is worthwhile to enumerate briefly some basic assumptions and key ideas.

CSR refers, among other disciplines, to evolutionary psychology. On the one side, we should not give too much weight to evolutionary psychology, because CSR also refers to developmental, cognitive, and social psychology, as well as to a number of other disciplines. In fact, it is heavily interdisciplinary and by no means relies exclusively on evolutionary psychology.

On the other side, this component of evolutionary psychology is of high importance for some main conclusions drawn by cognitivists, mostly in regard to the evolutionary status of religious components.

Evolutionary psychology states that cognition evolved under selective pressure, and includes domain-specific modules responsible for particular cognitive tasks. Domain-specific modules have evolved under selective pressures and are required by living organisms as necessary for survival and reproduction. They include such purposes as food supply, mating, or predator detecting.

This list does not include anything associated with religiosity and religious beliefs. In much of the world, the uncertainties of food, and of marriage and other relations with human and other-than-human agents, including persons, are central topics of religion.

Moreover, religious treatments of these topics are similar in ways that can be explained by referring to some cognitive abilities, such as the capacity to involve other-than-human persons. In this approach, domain-specific modules—for example, predator detection and looking for a good mate—work as adaptations. Consequently, all beliefs that are produced by these modules, and which are not directly referred to survival and reproduction, are by-products of cognition. In this model, supernatural and religious beliefs and representations do not contribute directly to fitness maximization and, consequently, no cognitive module did evolve to produce and affect religious beliefs caused by the lack of selective pressure (Boyer 1994). This is a good reason to apply the mentioned distinction of cognitive and adaptationist accounts despite the fact that, from another methodological perspective, both of them belong to the same evolutionary paradigm. An adaptationist approach treats religion as an adaptation in biological terms. The adaptationist account is aimed at looking for adaptedness of religious components, while a purely cognitive approach views them as by-products that may or may not happen to be adaptive. A similar classification divides the biocultural study of religion from the evolutionary study of religion and CSR (Sosis et al. 2018). The term adaptationist applied here should not be conflated with the term adaptationism as it is known in the evolutionary debate. An alternative distinction is a contradiction on advocates and opponents of the concept of religion as adaptation.

It is worth adding that the above-mentioned terms "supernatural" and "religious" need clarification and definition. Both terms are used in many ways, and both have been widely criticized as vague, culture-bound Western concepts. "Supernatural" for example often means little more than "false," "imaginary," or "inconsistent with current science." We mean by these terms the idea of entities that exist independently of human beings, who possess special features including, among others, immortality and/or omniscience, and who interact with people. But some "gods"—ancestors, for example—are neither immortal nor omniscient. In this case, someone

could ask if there is anything that characterizes all "special features" that they have. Being supernatural means being an entity who violates natural laws. But our understandings of natural laws change. As this happens, does what is "supernatural" change too? If so, does this not undermine the reliability of this category? We are not going to "solve" these challenges. But those questions show how challenging good definitions of "religious," "supernatural," and other key terms still are (Dow 2007). While, in some sense, something like religion does not exist—mostly does not exist from the evolutionary point of view—religion can be and should be reduced to its particular constituents which evolved independently from each other, and usually have appeared before they have been co-opted to "religious" purposes (Sosis 2009, 320).

We are intuitively prone to agree with that. Religious/supernatural representations are not the kinds of beliefs and concepts that are directly linked to survival. But people often *think* that religious actions, such as praying for rain, are linked to survival; and if they think a god will support them in a battle and therefore undertake that battle (as has happened, e.g., with millennial movements), they may be mistaken and therefore die. However, one could argue that such a way of thinking could give rise to enhanced social bonding, and the concept of God who supports in a battlefield could work as a useful figure.

Thus, survival is involved, though in a very specific sense. The apparent uselessness of religious beliefs is seen best when compared with pragmatic cultural, technological-like tools, including clothes, buildings, or means of transport, to mention a few. Religious components seem nonadaptive also when compared with other abstract cultural traits like legal rules. At least some religious components may provide—and some scholars following the adaptationist research program claim that they do provide—some adaptive functions that are used by believers to maximize fitness even if the main "function" of religious components is providing relations with a supernatural entity. Arguing against the component of evolutionary psychology within CSR, we can point out that there is no evidence that there exists something like the set of many cognitive modules. This topic is more philosophical than biological, and within philosophy we may speculate about alleged nonmaterial phenomena, including concepts, ideas, or modules. In contrast to evolutionary psychologists, some cultural evolutionists argue for the existence of a small number of domain-general modules. That latter approach is connected with the concept of the capacity for culture.

CSR scholars supported by evolutionary psychology argue that cognitive modules or mechanisms affect acquisition of religious beliefs. Some, including Pascal Boyer, argue that cognition affects religious beliefs in a random way. Randomness means here that the process is neither connected with adaptive functions, nor with regular selective pressures. Moreover, the genesis and combination of genes appears random, but nevertheless there

are regularities in natural selection. If evolution of cognition is connected with religious beliefs in a random way, it excludes an opportunity to explain the origin of religious beliefs in terms of natural selection, which is a nonrandom (at least nonrandom in a specific sense) process.[2] Some cognitivists, such as Stewart Guthrie, say that the relationship of belief and cognition is far from random. For example, infants are born ready to perceive anything face-like as a face, and apparently believe that it is a face. All sighted humans retain this readiness throughout their lives, and consequently often believe that persons exist where in fact they do not. If religious beliefs are only randomly linked to cognition, they cannot fulfill any adaptive functions. Or, at least, no adaptive functions can be predicted, but they can occur by chance. Adaptation needs to be specially "designed" by natural selection, and some kind of regularity is required. Beliefs are complex products of evolutionary predispositions and particular experiences. This is a strategically important conclusion of CSR that affects further speculations about religious components and adaptation. Religious components are explained as useless phenomena from a purely biological point of view. In that sense, they are a by-product of biological evolution. However, even as biological by-products, they still may be co-opted to other adaptations, and they may work as an adaptation at a secondary or tertiary level. Such secondary or tertiary adaptations (or features that contain adaptedness or adaptivity) may be favored and transmitted by cultural evolution. Being a by-product from the viewpoint of genetic evolution is not in contradiction with being an adaptation from the viewpoint of cultural evolution.

Both cognitive and adaptationist approaches are highly speculative. There are no strong reasons to argue for or against any of them. It is hard to assume that, for instance, the cognitive idea of many domain-specific modules—but this idea is neither intrinsic nor limited to cognitivism—is more or less speculative than the adaptationist idea of the adaptive value of at least some religious components. One may argue against the adaptationist account and show that this is a conceptual project based on wrong conceptual assumptions in regard to the putative functions of religion. It is difficult to define and analyze some traits in terms of adaptation. We may use biological concepts, but we find in them a lack of consensus and a lot of conceptual and definitional ambiguity. There are several different key concepts, including narrow and broad meanings of adaptation, an adaptive feature, a feature that provides adaptivity, exaptation, or a feature that is correlated with another, earlier adaptation (Futuyma 2006). If there is no consensus in biology, one may expect an even greater risk of misinterpretations and ambiguity when biological concepts are applied to the study of culture. Some scholars define adaptation as a feature that should contain "functional design" (Williams 1966), while others argue that adaptation should contain structural, not functional design features (Feierman 2009). Others look for group adaptations that are detected when

some results and effects at the group level are observed (Wynne-Edwards 1962).

If natural selection works at the level of the gene, and if the gene is the basic unit of selection (Hamilton 1964; Williams 1966; Dawkins 1976), some scholars as, for instance, Jay Feierman (2016), take for granted that cognition cannot be explained in terms of adaptation. They argue that natural selection acts on brain and neuronal structures that produce cognition. In that model, many other basic physiological functions, including digestion, reproduction, or homeostasis, would have the status of by-product of selection acting on genes. In such a way, cognition is a product of natural selection that acts on genes, brain, and neurons. In variable populations, a given complex of neurons and genes provides better functions that are used for survival and reproduction than other competitive genetic constellations. However, despite the fact that the gene is one level of selection, the products of genes, including cognition, deserve at least equal consideration.

Another explanatory effort in evolutionary biology and behavioral ecology is associated with the distinction between earlier and current adaptations. Some traits might have worked as adaptations in the past, but lose their adaptive functions during development and/or in new ecological conditions. Other functions misfire, for example, in imprinting behavior. As Konrad Lorenz (1935) points out, imprinted behavior is innate, but recognition of its appropriate object is not innate. Adaptation may lead easily to maladaptive or, at least, to selectively neutral behaviors. An animal may realize innate behavioral protocols in an inappropriate ecological condition. Many other old adaptations are not useful any more.

Cognitive explanations of the origin and acquisition of religious beliefs miss the broad set of adaptive functions linked to religiosity (or functions in general) that include support for morality and the source of ethical rules, social cohesion, and prosocial functions in general, positive impact on the rate of reproduction, or the broad set of psychotherapeutic functions associated with hope and stress coping. In the context of the mentioned list of putative religious functions, it is worth keeping in mind the following remarks. First, we cannot take for granted that religiosity—on an individual level—and religious affiliation—on a social level—really provide those functions. However, we can take for granted that a religious believer can possess such feelings and thoughts. Religious affiliation fulfills effectively psychological functions that—at least partially—overlap with its social context. Second, we may doubt if the mentioned "proreproductive" value of religious affiliation really works in a causal way. The topic of the rate of fertility is very complex and context-dependent. There is at work a lot of factors, including, among others, the rate of existential security or social policy, to mention a few. Due to that broad causative context, we find that "secular" France has a higher rate of reproduction than "religious" Poland. No strict correlation between the rate of religiosity and the rate of fertility

is an obvious fact. Despite this, religious components may include values and beliefs that protect an absolute value of life, and treat life as sacred value (LSV).

Looking for and detecting structural design features in cultural traits—like, for instance, LSV behavior ("the make-oneself-lower-or-smaller-or-more-vulnerable behavior") (Feierman 2009)—is more complicated and unclear than in biological ones. A kind of thought experiment may be useful for our approach. Let us consider if the transition to large groups would be possible without the evolution and development of religion. We can say "yes" to this question because there are many humans without religion and likely always have been. Religion may be supported by cognition, but its acquisition always requires an appropriate cultural environment. On the other side, science cannot provide an answer for this question because we do not have parallel planets, some kind of twin Earth where no religion evolved. Evolutionary biology cannot test the issue of the evolution of morality with or without religion empirically by DNA sequences, neither by morphological comparison, nor by exploring fossils (Futuyma 2006). We may only speculate on this.

This is the classical formulation of the problem of evolution of cooperation. Adaptation applied to human group should also meet this criterion. There is no sense for any human group to successfully reproduce and overpopulate (but many, including Darwin, would think it a teleological mistake to expect "sense," or purpose, in evolution), if this group will become extinct immediately due to lack of rules and mechanisms that enable social cohesion and collaboration. If we take it for granted that human reproduction "must" take care for the family, which is the basic unit of reproduction (Rothman 2015), religiosity and religious components can be analyzed in terms of Darwinian adaptation. The concept of family as the basic unit and the value of reproduction and fertility lie in the center of ethical teaching in many religious traditions. This is one of the possible explanations of the origin of religious beliefs that assumes that they could evolve due to their mentioned benefits. In that model, it is supposed that rather their function, not random drift, affected their evolution and transmission. However, due to the counterintuitive nature of this scenario, only relatively few scholars follow the adaptationist account in the study of religion.

The Cognitive Story on the Origin of Religious Beliefs

The cognitive explanation finds its starting point in the ubiquity of religious beliefs and practices. The idea of the "ubiquity" of religion seems doubtful, however, and requires explanation. Certainly, many individuals do not have religion, and most non-Western people do not have any word that corresponds to it. Whether there is any cross-cultural phenomenon that corresponds to the Western concept is debated among scholars of

religion. For that reason, religious components may be interpreted as ubiquitous only in a specific, historical sense, limited mostly to medieval and modern Europe. What may explain the same (their "sameness" may be only apparent, imposed by the mainly Western concept of "supernatural") supernatural representations, like the concept of supernatural agent/agents, or belief in an afterlife, that are shared in different cultures and in different periods around the world? Common human cognitive tendencies, abilities, and biases seem to be a simple and intuitive explanation of this commonality of religious beliefs. However, it is worth keeping in mind that this commonality may be only apparent, not real.

CSR in its starting point refers to the idea of an agency detection device, derived from Guthrie's earlier work on anthropomorphism (Guthrie 1980, 1995) and to anthropomorphism itself. Some of Guthrie's predecessors may be found in such authors as Francis Bacon, Baruch de Spinoza, David Hume, Ludwig Feuerbach, Friedrich Nietzsche, and Claude Levi-Strauss. The last, like Hume and others, said that religion is the anthropomorphization of nature. This evolutionary cognitive explanation is a convincing and elegant theory that is rooted in the human evolutionary past. One of the theories states that there is something like an original evolutionary environment identified with Environment of Evolutionary Adaptedness (EEA). In fact, there can be no "original" evolutionary environment. Instead, evolution is a perpetual, ongoing process with many environments, and anthropomorphism is as much a product of the modern world as it is of an ancient one. Some writers, for example, Charles Darwin (1871), Guthrie (1980, 2002), Kevin Foster and Hanna Kokko (2009), and James Harrod (2011, 2014), argue that the past environment provided an excellent chance for religious beliefs to appear.

As is commonly known by scholars interested in CSR and evolutionary psychology in general, the basic evolutionary story goes as follows. Humans possess a hypersensitive cognitive detective system that was/is used to detect agents in the environment. Because humans may interpret ambiguous external stimuli as animate or inanimate, anthropomorphism may be the most effective category for their survival and reproductive success. Anthropomorphism is understood here as a retrospective category of miscellaneous mistakes: interpretations of nonhuman phenomena as human. However, the concept of anthropomorphism provides a deeper, broader, and richer account of the phenomena in question than does "agent/agency detection." It explains, for example, phenomena ranging from seeing faces in clouds—and elsewhere—to assuring teleology, to the likelihood that we initially conceive agency not as all-purpose but as personal. The notion of agent detection usually deployed in CSR literature does not explain these phenomena. Further, the very term "device" suggests modularity, with a narrow range of input and output. Anthropomorphism, in contrast, is the opposite of modular (Guthrie, personal communication). It is extremely

general and cross-modal, involving, for example, all senses and a number of brain areas (see, e.g., Farah and Heberlein 2007).

Numbers of scholars have argued that the category "religion" is Western and modern—in other words, culture-bound. Therefore, these scholars say, it is suspect for use cross-culturally. The anthropologist Maurice Bloch (2008), for instance, argued that anthropologists should abandon the study of "religion" and instead study a cultural universal. Guthrie agrees increasingly with Bloch, though not necessarily with the universal he proposes in religion's stead. He holds instead (as virtually given, in light of Hume et al.) that religion can be identified one form of a particular universal, namely anthropomorphism. Among the advantages of this move is that, unlike religion, anthropomorphism clearly is culturally universal. More important, it is a human universal in neurologically normal people (Guthrie, personal communication). It is thus more worthy of attention than is religion. As another advantage, it is relatively easy to define. A possible disadvantage is that it has attracted few scholars other than those mentioned, a few recent psychologists (e.g., Epley et al. 2007), art historians (especially Carolyn van Eck), and anthropologists (Guthrie 1995; Gell 1998).

According to the evolutionary cognitive story, humans detected and detect a lot of inanimate stimuli that are wrongly interpreted as signals produced by animate agents. This cognitive confusion, a false positive, is more adaptive than another possible confusion when someone detects and interprets a real animate agent as an unreal inanimate one (false negative) (Guthrie 1980; Kanazawa 2015, 307). It is assumed here that the human cognitive detection system is rational and effective if it makes as few Type II errors (false negatives) as possible and as many true positives as possible. Because the world always is ambiguous and cognition is imperfect, however, false positives as well as false negatives are inevitable (Guthrie 1995, 2002). Human cognition cannot work correctly every time and it is impossible to find a constant balance between these two extremes. Such highly active and correct cognition would be too metabolically costly even if it is not evolutionarily too costly. Human cognition may work slowly and keep a distance toward the environment, or it may be hyperactive and focused on detecting agency.

Compromise seems to be hard to achieve but is still possible because slow and fast processing need not be mutually exclusive and may coexist. For this reason, natural selection favored people who possessed more hyperactive cognition focused on detecting more false positives than people possessing slowly working cognition that registered more false negatives (or that did not register and detect anything). This concept refers to the key ideas of the error management theory that assumes that natural selection favors errors that are the least costly (see the pre-"error-management" argument in Guthrie 1980, 1995). Maij et al. (2017) hold that threatening conditions do not lead to looking for human agency or intentionality in the environment.

Their conclusion suggests that threat and anxiety are not important for religious beliefs to emerge in the context of an agency detection device as is sometimes assumed. However, as Guthrie (2017) notes, their argument is unconvincing because the conditions they use are not realistic.

A little digression is worth mentioning in that context. In our opinion, the above-mentioned distinction appropriate for error management system suggests that human cognition is not truth-oriented. Despite the idea that natural selection is not truth-oriented, some thinkers, among them Maartena Boudry and Michael Vlerick, are trying to argue that cognition is truth-oriented. Their statement works against the key idea of natural selection that cognition is fitness-oriented, not truth-oriented. But truth often is consistent with fitness. They are right that in some cases correct detection of agents in the environment, especially predators, is used for survival (Boudry and Vlerick 2014). Their approach works against the above-mentioned false positive/false negative distinction that suggests that human cognition is used not to correctly detect agency (truth value of cognition) but to over-detect agency (selective or fitness value of cognition). Our point is that the role played by truth claims is underestimated in CSR. While, as mentioned above, selective pressures are not always truth-oriented—consider, for instance, many cases of mimics, camouflage, and bluff among many animal species, including human species—it is hard to assume that CSR is right when it usually ignores any connection between components of religion, truth, and utility.

This story introduces religious/supernatural entities as further steps in the natural history of human cognition. It is assumed that a human who is naturally predisposed to over-detect a natural animate agency in the natural environment is also prone to assume, invent, or generate an unnatural (supernatural) agency within a Type I error (known as "false positives," when one thinks that she detects an agent who, in fact, does not exist) (Kanazawa 2015, 308). However, the problem is that the alleged cognitive effortlessness in making false positives may refer only to natural animate agents.[3] We accept the logic of possible functionality of something like agency detection—our detection of "agents" is not "hyper" but has been naturally selected just right, now as in the past—but there is no justification of a transition from detecting animals and animate/natural agency in general to detecting so-called "supernatural" agency. The human mind may detect existing, living entities. Living entities mean entities that are real, live in time and space, and may be described in physical terms. Detected agency should be the product and function of an agent. However, as far as we know regarding religious figures, an impression of detected agency is not a function of a real agent. Agency that is assigned to an unnatural object does not exist in a physical sense.

On the one side, thinking about a predator instead of the wind may seem to be more natural than talking about God or gods or any other

supernatural agents instead of the former two. The latter may be perceived as unnatural for human cognition that is deeply rooted in sensual cognition. However, on the other side, we should have in mind the following fact: if religious concepts were in fact "unnatural" in a cognitive sense, they would never evolve in "natural" human cognition. This is a somewhat paradoxical fact which may lead to the conclusion that religious beliefs—despite their unrealistic contents—should have some connections to truth and/or utility to be able to evolve. Due to this fact, gods are simply other-than-human persons. Some of them may be either disembodied or embodied differently but, in folk psychology, so may ordinary persons (Guthrie). Some may be more powerful than ordinary humans, but so are kings and celebrities. Our remark works in the hypothetical prereligious environment of the Pleistocene, when human ancestors did not share yet (let us speculate in this way while we cannot know this) any supernatural concepts, ideas, and beliefs.

The fact that religious contents have ever evolved opens space for an attempt to explain religion in terms of cultural evolution. For instance, the concept of religion as a tertiary adaptation that works to enhance the power of secondary adaptations, including increasing human happiness or enhancing the feeling of sense and purpose of life, is based on some assumptions and observed correlation. This concept of religion as adaptation is not assumed by a cognitive account. One assumption is that the happier humans are (human happiness as secondary adaptation), the higher their reproductive success (the first and the basic adaptation) is, affected by their meaning and sense of life (Kanazawa 2015, 308–09). The problem is that the feeling of sense and purpose do not have to lead to a decision about reproduction. There are many cases when the high and complex feeling and sense of life not only does not lead to reproduction but definitely works against it. It seems that Roman Catholic priests may possess one of the highest possible senses of life, but they usually do not reproduce. Nonreproductive priests work for the benefit of the entire community of believers, and their nonreproduction may be adaptive for a group. There are many other examples of people who are focused strongly on some particular ideas. It is possible that many pairs are looking for their purpose and sense in reproduction because they cannot find it when they live in a nonreproductive way. This question is a part of another topic, the problem of human sense and meaning. Our critical remark points out here that a causal relationship between a feeling of meaning and an ability to reproduce and the rate of reproduction is unclear and perhaps not significant for that matter. Religious contents may work as a selective force at the individual level of a particular believer when they favor reproduction. Other religious contents—at least in the case of Roman Catholicism—also work at the individual level, but they are much more exclusive and only a small number of young men decide to be priests. Religious contents in general working at

the individual level may affect individual decisions in two different ways. A believer who wants to be a priest and to live in celibacy may play an adaptive role as well. As Feierman points out, nonreproductive priests are used to enhance eusociality because everything they can invest they invest in maximization of fitness of others (Feierman 2016). Definitely, religiosity in populations is correlated with a higher reproductive rate, but it is dubious if just a religious sense of life, a feeling of purpose, and life satisfaction work as main motivational factors for the reproductive success of religious populations. It is unclear if poor and hardworking people, who are the most religious part of religious communities, feel purpose and happiness. There are good reasons to assume that religiosity does not necessarily guarantee happiness, but may be more useful in providing hope.

Kanazawa (2015, 309) suggests in his theory of religion as tertiary adaptation that primary adaptation must be a domain-specific trait, not domain-general, because adaptation works to solve specific problems. It is assumed by, among others, John Tooby and Leda Cosmides that human cognition/mind is built from many domain-specific modules or composites that are focused on managing particular functions and solving particular problems.

As we pointed out, this model must exclude religious components, for instance, the concept of God or gods, from the default human evolutionary equipment, including such modules and propensities as agency detection (however, there are some reasons to not treat agency detection as "modular," because it is too complex and uses too many modes of perception to be done by a module), food acquisition, or predator avoidance. It is hard to find any function possibly provided by the concept of God in the EEA which would have affected the evolution of any brain structure—responsible for creation of religious representations. Putative functions provided by religious components, if any, do not belong to the same level of functions strategical for survival as food recognition and acquisition or a capacity for language or predator avoidance. For these reasons, the modular concept of mind does not leave any space for other religious concepts than the concept of by-products of other modules, which evolved for particular adaptive purposes. Cultural evolutionists reject the concept of domain-specificity. They suggest that EEA did not exist as a stable environment, and that the Pleistocene was a dynamically shaped period that has inhibited evolution of domain-specific adaptations. For this reason, cultural evolutionists conclude that human evolutionary adaptive preparedness contains only, or mostly, domain-general structures (Lotem et al. 2017). We are a little bit skeptical toward this model. For example, human physiology and neurology include many quite specific processes and structures. A neurological process relevant to this argument, for example, is the interpretation of phenomena resembling eyes. All vertebrates, all the way back to fishes, are "wired" to interpret things resembling eyes as eyes (Guthrie, personal communication)—a quite

domain-specific process. In this latter model, religious components may be considered as evolutionarily useful traits that increase human fitness. If religiosity is strictly connected with fitness maximization and provides some social and psychological benefits, the concept of domain generality enables us to include religiosity and religious components in the set of domain-general abilities. The idea of domain-general modules and abilities opens space for an unlimited number of significant functions and forms, which may serve to provide a particular purpose. If one such domain-general ability is an ability to cooperate, human behavioral and cognitive patterns are not designed to favor or exclude particular cultural forms, including religious ones. In contrast to the idea of domain-specific modules, which by definition excludes any "religious module," the idea of domain generality includes possibly all kinds of solutions and traits which may support a given ability.

Kanazawa argues that only secondary and tertiary adaptations may be domain-general. In this sense, he accepts the concept of religious components as tertiary domain-general adaptations. However, our idea is to remove the concept of domain-specific adaptation and to talk only about domain-general adaptations, including religiosity and religious components. In this sense, there is no need to talk about adaptations that come in degrees. It is possible that this lack of explanatory consensus may be more the result of conceptual and terminological ambiguity than ontological and functional differences (see Okasha 2006; Sosis 2009).

When criticizing the cognitive account, it is worth keeping in mind that the cognitive toolkit is able to explain only some part of religious processes and religious phenomena. There is no doubt that some cognitive processes must be at work when religious concepts and beliefs are produced, acquired and, in general, activated. But the cognitive approach may explain only some simple religious beliefs, mostly due to the fact that, as Lluís Oviedo (2019) reports, religious forms practiced across cultures are complex, complicated, and context-based processes, which go beyond simple mechanisms described within CSR. Archeological study of historical records confirms that the evolution and development of religion was more complex than the cognitive explanation assumes (Wunn and Grojnowski 2016). Harvey Whitehouse (2008, 36–37) adds that religious systems should not be treated as the sum of particular simple beliefs and mechanisms, which find their explanation within CSR. On the contrary, various religious traditions offer complex belief systems. In consequence of this complexity and context dependence, there are good reasons to assume that particular religious components in a particular place and time could belong to all possible categories describing adaptations, such as group and individual-level adaptation, cultural parasitism, old adaptation in small groups, by-products of other adaptation, or neutral traits (Wilson 2008, 24).

The Adaptationist Story on Religion

An alternative story on the origin and transmission of religious components tries to provide a different explanation than CSR does. The adaptationist accounts assume that similar religious beliefs are widespread across cultures because they provided the same adaptive functions (Sosis 2000, 2004, 2005; Wilson 2002; Szocik 2017, 2018). This model also assumes some common human conditions, and in this sense is similar to the CSR approach. However, for CSR, human cognition is the main deterministic factor. For adaptationist explanations, the set of common human features refers to biological and psychological needs, including reproduction or food supply, just to mention a few. The main difference between the two models lies in the fact that while for the CSR standard approach—for instance, in the model expressed by Boyer (2002)—content biases are sufficient to explain belief in God or gods, the evolutionary accounts refer mostly to context biases and context-based cultural learning, supported by social practice and credibility-enhancing displays (Gervais and Henrich 2010).

When one takes into consideration a purely conceptual perspective on adaptation, he or she finds good reasons to interpret religious components in terms of adaptation. Basic definitional criteria of adaptation include cross-cultural universality, being easy to acquire, and being supported by biological equipment (Harris and McNamara 2008, 79–80). Religious beliefs and behaviors are good candidates to formally follow these criteria.

Cooperation works here as a general ability that may be essential for providing all other existential needs. There is some kind of feedback and mutual causation between cooperation and mentioned biological needs. Humans cannot live without cooperation, but cooperation is not necessary for itself but only as a tool to achieve biological goals. Martin Nowak (2006) expresses the biological importance of cooperation when he enumerates it as the fundamental principle of evolution together with natural selection and mutation. There are good reasons to treat cooperation as a separate causal power in evolution due to the fact that there are lots of examples of transitions from less complex groups to cooperative units at different levels of organization of life. An ability to cooperate and think about common goals was necessary (however, people did not want this transition intentionally) for human transition from small to large groups, especially when ecological conditions started to change. It is necessary for small groups, such as foraging bands, as well.

Adaptationist explanations of religion explore the idea of similarity by analogy. Because humans have the same biological and psychological needs associated with survival and reproduction independently of the type of ecological niches—however, following the niche construction theory, humans like other animals actively modify their environments and try to adapt them to their needs and possibilities—it is highly probable that the same

selective pressure will lead to evolution of the same adaptive traits. There are commonly known examples of convergent evolution in the natural world, including independent lineages of evolution of the eye or the evolution of eusociality. The same selective pressure favored the same kind of structures. We may apply this kind of explanation by analogical similarity to the study of religion, as an explanatory alternative to the CSR explanation.

Advocates of the adaptationist explanation argue that religious components have provided some adaptive functions that maximized fitness and increased chances for survival. Among them, there are commonly known psychological and psychotherapeutical functions of religion, including stress reduction, providing hope, and overcoming the fear of death. But religion is not always reassuring. For example, Hume wrote that the Calvinism of his childhood was terrifying (Guthrie 1995). Some religious concepts, including the concept of the afterlife and supernatural punishment, are strictly linked to these psychological functions. However, there is evidence, for example, in the work of Jesse Bering, Paul Bloom, Emma Cohen, and others, that an afterlife is intuitive because mind–body dualism is intuitive, not because of religion. While this fact explains why belief in an afterlife is widespread in religions, it also shows that religion is not considerably needed to enhance that belief. There are also at work social and prosocial components of religiosity and religion, like the concept of eternal reward and punishment, that use the same religious tools that are engaged in psychological support. Advocates of the prosocial religions' hypothesis argue that religious contents, mostly moralizing supernatural agents providing supernatural monitoring (Norenzayan et al. 2013), have affected and manipulated human psychology and overlapped with mechanisms supporting group identity toward the evolution of large-scale cooperation (Slingerland et al. 2013). Some of them, like Dominic Johnson (2008), go even one step further and speculate that religion and religiosity could evolve as an adaptation designed to support warriors during conflicts, while others (e.g., Shariff 2008) report both pro- and antisocial effects of religiosity. If religious components provided only benefits (in this sense, that religion is not a factor that was "designed" to destroy and harm humanity even if there are some evident harmful social or/and psychological consequences of religion and religiosity), they may be considered as domain-general adaptations. The concept of a domain-general trait is useful to explain the adaptive role of religion. Religion and religious components are understood as a general framework that provided the adaptive landscape for humanity. This framework is a set of various traits that were used to manage existentially strategical functions, including mating or access to resources, directly connected with survival and reproduction. If believers reproduced better than nonbelievers, there could be at work selective pressure for individuals who possessed religious or supernatural beliefs and some behavioral patterns shaped by these beliefs. But "religious or supernatural beliefs" are so

diverse, various, and ill-defined that it is hard to see how a general capacity for them could have been selected by any adaptive function or functions. We could try to find some core ideas and functions that could work as the source for all possible adaptive functions of religious components.

One of the possible solutions is the concept of religion as in-group marker (Feierman 2009). This approach is useful but it seems to suggest that there are no special religious motivational factors. It seems rather that in-group evolutionary dynamics is the unique source of some social and behavioral patterns. Religion works here as a symbolical framework (on the one side, only symbolical, on the other side, definitely deeply rooted in human psychology) that enables social cohesion and provides clear signs to distinguish one group from other, competitive groups. However, there are examples that show that this seems doubtful: in World Wars I and II, for example, both sides had the same God.[4] As Oviedo (2019) argues in contrast to the mentioned "prosocial" explanations of religion, "reviewing the historical record rather suggests that even great empires like the Roman one lacked such big gods, while the people of Israel, who believed in the greatest and most transcendent God at that time, did not overcome a rather limited socio-political status." These historical examples may suggest that the correlation between the type of religiosity and institutionalized religion, and the social enhancement functions, is far from being clear and regular.

This remark introduces a distinction between specifically religious adaptive functions that are directly caused and affected by religious contents and rituals, and the general behavioral and symbolical framework that is provided by religion. There is no doubt that religious components have a good chance to be favored by some general-domain mechanisms oriented toward, for instance, social cohesion. If religion is able to enhance social cohesion—at least in some periods and for some people—religions are no worse in doing that than many other tools, both biological and cultural. We have in mind both meanings and both kinds of adaptive application of religious beliefs. It is unclear if religious components considered as in-group markers for a given population may work better and more efficiently than nonreligious markers. Religious markers make religious systems open for new members of a given group because they do not require genetic relatedness or other biological features. Religious markers may increase the size of a given group more efficiently than biological markers. But "religious" markers are not the only alternative to biological markers. Language and other ethnic cultural markers, such as kinship by clans, tribes, and nations, do the same.

When we are going to consider specifically religious adaptive functions, there are at work some religious contents, including the concept of supernatural agent/s, supernatural (not a cross-cultural concept) punishment and reward, or the concept of the afterlife (not necessarily a "religious" idea;

see, e.g., Jessing Bering on afterlife beliefs of *secular* people), mentioned above. At least theoretically, such concepts provide specific internal motivational power. As is commonly known, the most important and the main concept is the concept of god/s or supernatural agency in general. Nonreligious in-group marking systems do not provide such a concept. Some of them are trying to sanctify a given entity like mankind, race, ethnicity, human rights, human reason, public order, citizenship, and freedom. Some values work as sacred values and they are transcendental. In some sense, they may even be transcendent.

It is worthwhile to refer to the concept of the devoted actor in conflict situations. The best studies in that field are conducted by Scott Atran and his collaborators. Atran et al. point out that putting the sacredness into a given value leads to nonnegotiability of interests and purposes that are engaged in a given conflict. As we mentioned above, some secular values may be sanctified, like democracy. They get nonnegotiable status, and actors may be highly engaged in fighting for them and defending them. In the context of Atran's study, we cannot ignore some cognitive biases. Atran et al. find a correlation between the power of willingness to fight, and the threat condition that increases this power (Gómez et al. 2017). However, the great difference still lasts because nonreligious concepts do not postulate the agency that works independently on human actions.

The apparent commonality of similar religious beliefs may be rooted both in their functionality explained in terms of Darwinian adaptation, and in some cognitive biases or abilities as well. However, this apparent disjunction becomes belied by the fact that cognitive biases are also explained by Darwinian adaptation. This combined approach is other than the pure CSR explanation. CSR may sometimes accept some beneficial results provided by religious components, but they are always explained in terms of evolutionary by-products.

CSR, like the gene–culture coevolution, assumes that religious beliefs are usually useless by-products (however, being a by-product does not mean being useless) that may be co-opted to other adaptations. Then, such secondary or tertiary adaptive religious beliefs may be favored by cultural evolution. We may speculate if at least some religious components could be explained in terms of primary adaptations. In any case, as we mentioned above, cognitive support is necessary to enable forming religious representations. Even if we take into consideration the possible impact of cognitive biases, the main difference with the cognitive approach is as follows. According to the biological adaptationist account to the study of religion, at least some religious beliefs evolved as traits because of their adaptive functions. The cognitive framework worked as a secondary factor that shaped supernatural representations in the way they are. CSR suggests the opposite explanation: religious representations evolved

accidentally as cognitive by-products, and only some of them became co-opted to adaptive functions by means of cultural evolution. If religious components, including most beliefs and behaviors, were useful for survival and reproduction in various periods and cultures, why not assume that they worked as the best possible adaptive response to solve given existential problems? As Joseph Bulbulia (2008, 104) points out: "Though not always adaptive, religiosity evolved as a powerful fuel for biological success." Cultural evolutionists favor the view that religious components and religious systems have played a crucial role in the evolution of human cooperation by overlapping with some proximate cognitive mechanisms and by affecting intragroup and intergroup selections (Bulbulia et al. 2013).

The Group-Level Context of Religion

Religion and religious components, like culture in general, are a domain of groups, not a domain of the individual. There is probably no one-person religion. However, the group-scale effect of religion is not in conflict with the fact that religious beliefs are individually experienced by particular individuals. But before religious components start to affect individual decisions and behaviors, they must evolve as a common experience and the product of group effort. This is what we mean by saying that there is no one-person religion. For this reason, the origin and function of religious components can be explained in terms of group adaptation and group functionality in the same way as the evolution of altruism and cooperation. We do not mean that religion necessarily works in a way analogical to group-level adaptation theories. However, religions have a good chance to produce group-scale effects relatively easily due to the fact that they affect individual behaviors in the same way—at least, they did in the past when religion meant more than today in currently secularized societies. Consequently, religion seems to work at the individual level, but it produces group effects and group results, which are the sum of individual adaptations. The origin and stability of religious components and altruism are similar puzzling phenomena to explain. Both of them are costly in terms of individual survival and reproduction—however, it is worth keeping in mind that the concept of the costliness of religious affiliation is under discussion—and, consequently, it is difficult to expect that natural selection may favor such traits that go against individual fitness. There is some kind of tension between individual and group benefits. This topic is commonly known and discussed in the study of evolution of cooperation. When we follow William Hamilton's (1964) rule of kin selection and inclusive fitness theory, we must conclude that cooperation is the combined result of direct and indirect fitness. Direct fitness means that an individual maximizes his fitness by increasing his own reproduction. Indirect fitness works when an individual increases the fitness of related individuals. There is no place

for cooperation, including altruism, to evolve. However, many kinds of animals—for example, ants, bees, lions, wild dogs, wolves, chimpanzees, and others—have many forms of evolved cooperation.

If we assume that the gene is the basic unit of selection, as George Williams (1966) and Richard Dawkins (1976) point out, there are two possible theories at work. One of them states that natural selection works at the individual level, and cooperation and altruism are the products of kin selection and inclusive fitness. Cooperation that goes beyond the narrow borders of kin ties is affected by cultural evolution. It is unclear what role natural selection could play in regard to cultural evolution of cooperation. In our view, the applicability of the principle of natural selection to cultural change or cultural "evolution" is doubtful or, at least, is a challenging conceptual task (for more arguments on it, see Szocik 2019). It may be assumed that the individual is the only vehicle for the gene. This approach does not say anything about group benefits. However, the total individual benefits may be the result of the sum of individual behaviors of many or all agents in a given population. This question refers to the debate between individual and group selection, and the strong critique of the concept of natural group selection. The key idea is here that adaptation should possess function. Williams (1966) provided famous examples of misinterpretation of some behaviors that are wrongly explained in terms of group adaptation. His critical remarks may be applied to the evolutionary study of religion and may be useful to clarify the difference between the mentioned individual level of selection (behaviors and decisions of particular believer) and group effects of individual adaptive behaviors (as, for instance, higher reproductive rate and/or higher cooperative rate of religious communities over secular ones).

The Critique of the Adaptationist Account

There are a lot of arguments against the concept of religion as adaptation. Lee Kirkpatrick (2006) points out that the high complexity of religion and its unnaturalness make it a bad candidate for an adaptive trait. For this reason, religion may be replaced by other, nonreligious traits.

Another reason is that religion is more focused on survival than on reproduction (Kirkpatrick 2006). This objection may fail in these cases where religious contents and practices are focused on reproduction and on sexual matters in general, as in the Roman Catholic Church. Sexual policy is still an important part of religious teaching in different religious traditions (but not among foragers—who live the original and longest-lasting human way of life). There is assumed a correlation between the rate of religiosity and the reproductive rate. John Shaver (2017) addresses the role of high fertility and high provisioning of religious people by alloparenting (so-called the Alloparenting Signaling Model), which is more among religious than nonreligious people. As we may see in both Kirkpatrick and Shaver, religion

and religious components provide some benefits connected directly with reproductive functions and caring for offspring. Religion is at least partially focused on reproduction and relevant matters. Some religious texts directly call for reproduction, as in the following passage in Genesis: "As for you, be fruitful and increase in number; multiply on the earth and increase upon it" (Genesis 9:7). In that context, religion is about reproduction and is used to maximize fitness in the same way as the biological definition of adaptation. Another set of arguments for the adaptive nature of religious components is provided by sexual selection theory (Buss 2002). Cognitivists argue that religion as such cannot be adaptive because at least some of its constituents are by-products of other "nonreligious" adaptations. However, as Richard Sosis (2009, 323) notes, while particular components may be really by-products, religious system considered as the unit may be adaptive and provide functions.[5]

The main set of antiadaptationist arguments is deeply rooted in the CSR approach even if many adaptationists, including Sosis, Bulbulia, Benjamin Purzycki and others, consider themselves part of CSR. Their followers, including Todd Tremlin, focus their attention on the alleged nature of human cognition that is not religiously oriented. Tremlin's approach is compatible with the core assumptions of CSR that explore evolutionary psychology's paradigm based on the concept of cognitive tools used to solve particular problems. Tremlin points out that there are no cognitive mechanisms for any religious purposes (this is consistent with the view that "religion" is a culture-bound, Western category) and religious beliefs are by-products of cognition. Tremlin (2013) argues that religious components are too costly, and for that reason nonreligious traits are more accurate adaptive tools than highly nonnatural and counterintuitive religious components. However, the idea that religion is "nonnatural" and "counterintuitive" is disputed.

Another set of critical remarks is associated with the larger and more complicated issue, cultural evolution and its possible causal agents. A Darwinian account of culture fails in many cases because not only genes but many environmental and behavioral factors are also at work (Laland and Brown 2011). Apparent correlations between genes and behavioral patterns may be the result of such factors like "assortative mating, spatial autocorrelation, and a shared environment" (Creanza et al. 2017, 7784). Creanza et al. argue that many models discuss ways of transmission of cultural traits but they do that without reference to genetic background and fitness. This remark is important for proponents of an adaptationist explanation of religion who are looking for impact of religious components on fitness.

Another critical remark comes from Williams's (1966, 211–12) theory of adaptation. He points out that adaptation should contain "functional design." For this reason, apparent group behaviors are not group functions but summations of individual functions and behaviors. For Williams,

adaptations work to maximize fitness of individuals who possess these adaptations. For this reason, possible apparent population level effects of a given adaptation may be only a "statistical by-product" (Williams 1966, 237).

Religion and religious components are a domain of groups, but their adaptive effect, fitness maximization, is the result of individual reproductive rate of particular believers.

Some scholars argue that the term "adaptation" should come in degrees when applied to cultural traits. Martin Hewson (2013, 116) argues that some cultural phenomena like cooperation or language (cultural in the *forms* they take, but genetically enabled) are definitely adaptation. The adaptive nature of religion is still a debated topic. The point of discussion and controversy is as follows: there are a lot of different cultural traits, from more pragmatic and technical, like clothes or canoes, to abstract and at least apparently nonpragmatic like philosophical systems. A Darwinian account may be applied directly to the most pragmatic traits, but it is unclear if it describes more abstract phenomena. According to the actual Darwinian account (Darwin 1871), the central "religious" idea—spiritual beings—is the result of a cognitive mistake, common to both humans and various nonhuman animals (cf. Guthrie 2002). Where is the place of religion and religious components that combine speculative ideas with some pragmatic applicable effects of religious faith and practice?

Liane Gabora points out that a Darwinian account does not explain cultural evolution because cultural traits are acquired, not inherited, and they are generated in a nonrandom way, by strategy and intuition. The Darwinian approach is aimed to explain inheritance, not acquisition, and as such cannot be applied directly to explain the process of acquisition, which works in a different way than inheritance. The key idea of Gabora's approach is an assumption that cultural changes may be explained in evolutionary but non-Darwinian terms, for instance through the concept of communal exchange (Gabora 2018). We may consider what is the status of religious components that on the one side, are acquired, not inherited, but on the other side (at least, according to the advocates of the adaptationist account) maximize fitness like biological adaptations.

It is worth adding that there are some genetic-like processes in cultural evolution like "random errors in teaching or acquiring items of culture (akin to mutation), statistical effects in small populations (akin to drift), and the effect of using different cultural variants on an individual's survival and reproduction (akin to natural selection)" (Ross and Richerson 2014, 103). Of course, they are not direct equivalents for genetic evolution. The great challenge for the concept of cultural evolution is that the phrase "cultural evolution" is problematic and misleading because it conflates biological inheritance with cultural learning. Good candidates for analogs of evolutionary processes are imitation—an analog of natural selection, or the trial and error approach—as an analog of mutation. However, they

still remain only far analogies for biological mechanisms. Mechanisms of transmission in cultural evolution are based on observation. Cultural traits are often reconstructed and dynamically shaped by learners, and they are not faithfully transmitted. For this reason, cultural evolution is preservative and reconstructive as well (Claidière et al. 2014).

Study of religion from the cultural evolution point of view expresses an attempt toward an integrative and comprehensive approach, which is aimed at avoiding the disadvantages of a one-sided approach. As Whitehouse (2013) notes, the same intuitive ideas may be supported or neglected in different cultural systems and contexts. As he argues, the main explanatory problem lies in the fact that representatives of particular disciplines tend to study religion only from their own perspective, limited to neuroscientific, cognitive, or social system background, while an appropriate approach should combine all levels to study their interconnectedness. Whitehouse (2008) notes that there are a lot of variables, biological, technological, or sociopolitical, which differently affect acquisition and transmission of religious beliefs. One good example is the fact that the process of secularization in the Western culture was challenging for institutionalized religions, but not necessary for the need of individual religiosity and spirituality. Ecological conditions and cultural systems affect particular adaptivity of religious components (Cohen et al. 2008, 314). The question of the adaptivity of religion—both in terms of biological and cultural adaptation—still does matter. Another useful approach is an extension of CSR on sexual selection theory, which is still undervalued in CSR but discussed by Iikka Pyysiäinen (2008), Jason Slone (2008), and István Czachesz (2018a). The key idea of the study of religion in terms of sexual selection theory is an assumption that female choice and male–male competition has played an important role in the process of acquisition and transmission of religious components. This approach may be especially useful for at least two reasons. First, it may show that religious components are a part of a broader ecological and social human environment affected by sexual selection forces. In this context, religion and religiosity is not an abstract phenomenon separated from the rest of human culture. Second, the sexual selection theory of religion may build a bridge between religion and science. This is a case which may be tested empirically. Religion becomes here a more or less useful phenomenon, which provides pragmatic functions. Sexual selection theory of religion makes religion a rational and pragmatic kind of human behavior. Religious components are not treated any more as useless by-products of other adaptations. They are also not challenging for the advocates of the adaptationist explanation of religion who may fail when they will try to find adaptive explanation for every religious trait. In the light of sexual selection theory, religion may be a useful trait to explore and know better the complexity of human behaviors. New insight is offered by combined archeological and biobehavioral evolutionary research. Wunn and Grojnowski

(2016, 239–40) connect historical survey on cross-cultural historical religious and ritual records with emphasizing an importance of such behaviors and biases as "territorial behavior, dominance, and existential fears," which have affected evolution of the complex set of ideas and beliefs expressed by the concept of underworld and then, religion.

Conclusion

Religion, like many other cultural phenomena, should be studied from different points of view involving combined cognitive and evolutionary approaches. Some kind of methodological reductionism is a domain of every approach, including cognitive and evolutionary adaptationist approaches, and it explains in the same way all cultural traits and phenomena despite the fact that cultural traits in different ways fit a given conceptual framework, if any. A pluralistic approach involving various mechanisms going beyond cognitive and evolutionary (in the sense of the Modern Evolutionary Synthesis, which includes such evolutionary processes as genetic drift, mutation, gene flow, and natural selection) terms, such as the Extended Evolutionary Synthesis (which takes into account other processes, such as niche construction or plasticity) or evolutionary developmental biology (Czachesz 2018b), may be considered as a reliable explanatory approach both for the study of culture in general (Smith, Gabora, and Gardner-O'Kearney 2018) and religion (Szocik 2019) in particular. Such a broad pluralistic approach may be a useful step in a dialogue between religion and science. Religion is treated here as a complex of traits, which are not necessary strange or irrational, but can be the case when one applies a particular methodological framework which is not able to explain all religious components.

Acknowledgment

Many thanks to Stewart Guthrie for his comments and substantial contribution.

Notes

1. While natural selection literally is not "oriented at" anything—it has no goal, and such features are not "aimed at" anything—this anthropomorphic language is useful here to express some features of natural selection.
2. This is a complicated issue. While many think that natural selection is, in fact, a random process, it can be treated as a non-random when compared with random genetic drift. Some evolutionary biologists argue that natural selection is both random and non-random (Mayr 2001).
3. However, it does not need really to be a problem, because most people—the ancient Greeks and recent Africans, for example—do not consider gods "supernatural," which appears mainly a recent Western concept (Guthrie, personal communication).
4. However, the same example may be used to show that both sides in world wars believed in God, and that this belief enhanced their cohesion.

5. An interesting evolutionary approach to the study of religion is offered by Ina Wunn and Davina Grojnowski (2018, 258). They offer the concept of religion as a taxon/unit of selection, which is defined with regard to other religions/taxons.

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