

# Evolutionary explanations for religion: An interdisciplinary critical review

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## Abstract

Some form of religion exists in every documented society on earth. However, ‘religion’ is a multifaceted phenomenon commonly including aspects, such as rituals, myths, rules and regulations concerning ethical behaviour, social practices and some form of belief in the supernatural (e.g. gods, spirits or souls). Due to its pervasiveness, many researchers of biological and cultural evolution have suggested that religion needs a universal evolutionary explanation. However, most proposed explanations have either treated religion as a single all-encompassing entity or only focused on a single or a few aspects of religion. We propose, instead, to carry out an extensive review of such suggested evolutionary explanations with the express aim of pairing up proposed explanations with religious components in order to form a more comprehensive depiction of causation and how religion and human cognition both have evolved, each influenced by the other. We also propose to summarise predictions and hypotheses that spring from each explanation, with the express aim of stating how each may be evaluated and tested. Crucially, different aspects of religion may have different explanations and different explanations may apply to several aspects of religion. Proposed explanations will be summarised in a series of thematically oriented scientific articles, as well as in a summary monograph. Our dual competencies, in evolutionary theory and religious studies, provide us with a unique opportunity to evaluate these issues from both a natural and a humanistic point of view.

## Keywords

evolution, cultural evolution, cognitive science of religion, religion

## Purpose and aims

The concept of religion, as it is employed in academic as well as non-academic contexts, covers a multitude of widespread cultural phenomena. Anthropologist Pascal Boyer stated in 2001 that 'why'-questions pertaining to religious beliefs and practices 'used to be *mysteries* (we did not even know how to proceed) and are now becoming *problems* (we have some idea of a possible solution)' (Boyer 2001, 2). Boyer further identified the scientific fields where solutions could be sought: cognitive science, linguistics, anthropology and, most importantly for this project, biological and cultural evolution. Several evolutionary explanations for different aspects of religion have been proposed in recent research; sometimes several explanations for the same phenomenon and sometimes the same explanation for several different phenomena. The aim of this project is to carry out an extensive critical review and evaluation of this rapidly-expanding field, summarising predictions and hypotheses and stating how each can be, or has been, evaluated and tested.

## Significance

The project proposed here constitutes a 'boundary' crossing between two academic perspectives: evolutionary theory and the comparative study of religions. The purpose of combining our competencies is to highlight what both collaborators see as a deficiency within the field. Many scholars trained in the field of comparative study of religions are sceptical of evolutionary theory, often deeming it reductionist and not worthy of serious scholarly attention. Conversely, amongst the more known scholars who do apply evolutionary theories to religion (or culture in general), few have formal training in the study of religions or its comparative approach (for a notable exception to this, see Bellah 2011). Rather, their background is in fields such as anthropology, psychology, evolutionary biology, philosophy etc. In addition, such theorising often operates with implicit definitions of religion that, during the last two decades, have faced considerable critique within the field of religious studies, as modern, ethnocentric, ideological constructs with limited applicability from a cross-cultural and historical perspective (Asad 1993, Fitzgerald 2000, Nongbri 2013).

To date, there is no systematic survey, comparison and critical scientific evaluation of evolutionary explanations for religion from the dual, cross-disciplinary perspective suggested in this project, engaging competence from both the natural sciences and the humanities. The two researchers involved in the project have their formal training in evolutionary biology and the comparative study of/history of religions, respectively, but

share a keen professional interest in each other's academic fields (see below). Furthermore and importantly, both share a common scientific outlook. Any suggestions as to the evolutionary roots of religion must be evaluated in accordance with basic scientific principles to which both collaborators in the project subscribe: parsimony, theoretical integration, predictive potential and not least, compatibility with known data, experimental, ethnographic, sociological and historical.

## Survey of the field

Evolutionary thinking had a prominent place in the early phases of the academic study of religions, heavily influenced by notions that mankind, or rather civilizations, advances from one stage to the next. An early example is Auguste Comte who proposed 'that each of our leading conceptions, each branch of our knowledge, passes successively through three different theoretical conditions: the Theological or fictitious; the Metaphysical or abstract; and the Scientific or positive.' (Comte 1853). John Lubbock later argued that 'races in a similar state of mental development, however distinct their origins may be, and however distinct the regions they inhabit, have very similar religious concepts.' He proposed a six-stage evolution of religion: atheism, fetishism, totemism, shamanism, anthropomorphism and ethical monotheism (Lubbock 1882). Herbert Spencer argued that gods were derived from early experiences of ghosts that were identified as heroic ancestors from the past. Thus, he argued, the hero god was the earliest form of deity to be worshipped and all other forms of religion grew out of this primary religious experience (Spencer 1885). Several of the earliest, anthropologically-oriented explanations for religious phenomena were based upon such notions, for example works of James Frazer (Frazer 1890) and Edward Tylor (Tylor 1871).

Eventually, stage thinking fell into disrepute as being an ethnocentric, if not racist, view, postulating (Protestant) Christianity or Science as the 'end result' of an evolving civilisatory process. It was replaced by other theories focusing on the social function, rather than the origin, of religious phenomena or perspectives rejecting explanatory endeavours altogether, refusing to 'reduce' those phenomena to social or psychological causes. Religion should, according to this latter view, be studied as a phenomenon *sui generis*. The goal of the researcher was to describe and interpret religious phenomena, rather than to explain them.

In our research, we propose to take the opposite approach and attempt to explain religious phenomena, rather than to describe them. Whereas traditional theology has had much to say on the existence of God, we leave this question unexamined and instead propose to investigate religion as any other cultural phenomenon.

Modern cultural evolutionary theory has, to a large degree, left stage thinking behind, since it is problematic both concerning theoretical rigour and empirical backing (Carneiro 2003; see, for example, Boyd and Richerson 1985, Boyd and Richerson 2005, Laland and Brown 2002). It is in the contemporary context difficult to talk about different stages of development that peoples pass through. Within the field of the study of religions, this new

approach to evolutionary theory, applied to cultural phenomena, has only recently gained footing. Several projects and research groups devoted to explaining religious phenomena, with more or less heed taken to evolutionary theory, have been established in recent years, for example, the EXREL (Explaining religion) project ([www.icea.ox.ac.uk/research/explaining-religion](http://www.icea.ox.ac.uk/research/explaining-religion)) and the 'Evolution of Religion'-project ([evolution-of-religion.com](http://evolution-of-religion.com)). This recent trend is not without internal controversy and particularly important for the current project, the suggestions as to the evolutionary roots of religion take on seemingly competing forms. These may be roughly divided into three categories:

1. Theories that mainly focus on religious phenomena as by-products of human psychological dispositions; dispositions that originally evolved for other purposes.
2. Theories that postulate a set of evolved psychological dispositions, or biases, particularly related to social learning, but view these as the 'hardware' for an independent cultural evolutionary process alongside and/or in combination with biological evolution (gene-culture coevolution).
3. Theories that hypothesise that religious phenomena (beliefs and practices motivated by beliefs) have evolved as human dispositions or cultural phenomena because they have been of adaptive significance during our biological evolution.

In the academic study of religions, the by-product perspective is particularly dominant within what is termed the 'cognitive science of religion', established in the early 1990s. Basically, religious phenomena, beliefs, practices and social organisation are here explained as a result of a selective process on religious cultural traits where those most compatible with human-evolved psychological dispositions will be maintained and propagated. According to scholars taking this perspective, there is no particular human religious 'instinct' or religious 'gene.' The psychological dispositions that give rise to religious phenomena are no different from the dispositions that are active in every-day cognition, in isolation or in combination; mainly concept formation, categorisation and inferences. Hence, the widespread beliefs in superhuman agents (gods, spirits etc.) and their supposed involvement in human affairs are made possible and salient because of an evolved 'theory of mind', together with a set of specialised mental systems, such as a proposed 'hypersensitive agency detection device' (HADD), an intuitive morality and diverse mental mechanisms particularly related to social cognition. The form such beliefs take may be explained by the fact that supernatural concepts that are 'minimally counter-intuitive' are particularly prone to be remembered (Atran 2002, Boyer 2001, Barrett 2004, McCauley 2012, Barrett 2012). Many of the suggestions put forward here have been tested empirically.

By-product orientated theories rest heavily on the tradition of evolutionary psychology, on notions of modularity of mind and domain specificity. The main aim is to explain universal or near universal recurring features of religious thought and behaviour, with recourse to sets of specific mental mechanisms. This makes the perspective somewhat different from other theories presenting cultural evolution as a more independent, but still evolutionary, process. Here, certain evolved general biases affecting attention to and processing of cultural information, such as conformity bias and prestige bias, have cumulative effects on the content of culture (Boyd and Richerson 2005). Humans are, for example,

psychologically prepared, at an early age, to learn easily from authorities (otherwise language would be impossible); thus religious traditions that emphasise religious instruction to children and develop institutions that cater for such instruction will be maintained and propagated to a larger extent than traditions that less stress such early tutoring. Cultural 'scaffolding' can provide explanations for forms of religious beliefs and practices that take on complex forms and stray far from the cognitive optimum explainable through simple by-product theory. This explanation is, at times, difficult to differentiate from a by-product perspective and is, in many ways, compatible with it, since it too argues that religious phenomena need not serve any intrinsic 'purpose' and even can be outright maladaptive.

Perspectives viewing religious phenomena as adaptations in themselves, as a result of either biological or cultural evolution, tend to focus on their function in relation to social cohesion, cooperation and norm enforcement through, for example, providing shared ethnic markers or a common unifying cause (Wade 2010, Johnson 2005, Bulbulia 2004). Better group cohesion is good for the group which stays together longer, but also good for the individuals (and the genes of those individuals) who benefit from being part of a tighter cooperative network and, finally, also beneficial for the beliefs and practices themselves, due to the better survival and reproduction chances of the carriers of such beliefs and practices.

No one has taken the idea of benefits of religion for large scale cooperation further than David Sloan Wilson, who is mainly known in biology for his attempts to revive the long since discredited theory of group selection through what he terms 'multi-level selection.' Wilson (Wilson 2002) has proposed that religion is a product of cultural evolution developed through this multi-level process. Even if Wilson is probably wrong concerning the role of group selection in biological evolution (Williams 1966, Dawkins 1976), the process may well exist within the context of cultural evolution where conditions are different and thus needs to be seriously considered.

Different aspects of religion can be more straightforwardly advantageous in other ways. Religious myths can, for example, provide psychosocial comfort through providing satisfying explanations of the world around us and our place in it or through explanations of seemingly inexplicable events in times of need (Clark and Leikes 2005). Of particular interest are empirical results across societies indicating that religious people have better health (Koenig 2012) and higher fertility than comparable groups without strong religious convictions (Blume 2009).

The division between strands in contemporary evolutionary explanations for religious phenomena provided in this short overview may give the impression that the competing explanations are mutually exclusive. This is not the case, as has been shown in attempts at reconciling them into a unified theoretical framework (see, for example, Norenzayan 2013). However, at times, particular religious phenomena may render evolutionary explanations that *are* mutually exclusive. It is one of the tasks of the proposed project to identify these instances and evaluate proposed explanations from the perspective of the dual competencies of the two researchers involved.

## Project description

From the fact that there is no known society on earth (with the possible exception of a few contemporary societies, for example, North Korea) where religion has not played an important part, it has been hypothesised that religion is intrinsic to human nature, that human beings have a 'faith instinct' (Wade 2010) or, as in the controversial discipline of 'neurotheology', a 'God centre' in the brain (Newberg 2010). Such general assumptions, however, pose more problems than they solve. 'Religion' is not a single, unitary phenomenon easily delimited or locatable in a structure of the brain. Indeed, the academic study of religion displays a continuous problem of defining its research object, in terms of necessary and sufficient criteria (Bruce 2011). The definitional problem aside, if different phenomena of human culture deemed 'religious' are part and parcel of human nature, there is still a question of how they became thus. From an evolutionary point of view, the phenomena must have been 'beneficial' in one way or the other, in order to evolve. Basically, there are four possible levels on which a trait – any trait – may be 'beneficial.' (Note: "Beneficial", in an evolutionary context, means "increases survival and reproduction of", except in case 4 (cultural evolution), where it means "increases persistence and dispersal of.")

1. Beneficial for the group
2. Beneficial for the individual
3. Beneficial for the gene(s)
4. Beneficial for itself

Contemporary evolutionary explanations for religion, mentioned above, focus on different levels. Adaptionist perspectives focus on selection levels 1-3, with religious phenomena being biologically beneficial for the group, individual or gene. A by-product perspective, on the other hand, focuses on level 4, where religious phenomena are mainly beneficial for their own propagation. Perspective focusing on *cultural* evolution will also tend towards level 4, but without rejecting the possibility of adaptive features of cultural beliefs or rather adaptive types of behaviour that these beliefs cause and even feedback-loops between cultural and biological evolution.

Current cultural evolutionary theory is based on the realisation that cultural change is a process similar, but not identical, to biological evolution (e.g. Boyd and Richerson 1985, Boyd and Richerson 2005, Laland and Brown 2002, Lindenfors 2011). Variable traits are subjected to some form of selective process that determines what traits will be more common than others in the next generation (or 'the near future'). In biology, new variation (new genes or old genes in new combinations) emerges through mutations or recombination and these traits are then subjected to natural selection through interaction with the environment, including other organisms. Cultural evolution functions similarly, but here variation not only comes through copying errors and recombination, but also through (sometimes intelligent) design of novel cultural traits. The selection process functions similarly, through an interaction between cultural traits and the environment, including the

preferences and judgements of other individuals. Importantly, cultural and biological evolution also interact, each affecting the other.

There is one crucial difference between biological and cultural evolution, however, prohibiting the direct import of methods from biology to cultural studies (Lindenfors 2011, Lindenfors 2011). Whereas biological traits are passed on from parent cells or individuals to descendant cells or individuals through information physically encoded in genes, culture is passed on either through direct interaction with the trait itself, for example, through the use of physical artifacts or through information transfer via language interactions between (any) individuals. This difference has cascading consequences that give rise to large differences between biological and cultural evolutionary processes.

Central insights of the contemporary evolutionary perspective, with consequences for both biological and cultural evolution, are that there is no end-goal of evolution, no common transitory stages and no best solution; instead the common theme is *similar solutions to similar problems of existence*. This understanding leads to predictions of the 'if condition X, then trait Y'-variety. Any evolutionary understanding of religions must therefore focus on factors such as human psychology, potential evolutionary benefits of different religious practices and on similar changes in similar situations. In extension, this means that theories of evolutionary causes of religious components are testable with both historical and contemporary data.

In cultural as well as biological evolution, explanations to a particular type of behaviour in organisms are of two kinds: proximate and ultimate (Tinbergen 2010). The ultimate explanation is the evolutionary explanation that centres on survival and reproduction. The proximate explanation is psychological and/or physiological. The ultimate explanation suggests a causal background also to the proximate explanation. In this project and the review and evaluation it proposes, the aim is to clarify how, in different evolutionary accounts for religion, ultimate, evolutionary causes are linked to proximate causes on to the phenomena to be explained and evaluate how well these links correspond with established principles of evolutionary theory, as well as empirical evidence.

An important aspect of the critical evaluation of evolutionary explanations for religion is to highlight underlying conceptualisations of the subject matter. This is particularly important when these conceptualisations constitute limitations to the scope of the explanations. Preliminary surveys indicate, for example, that the concept of religion, at times, prototypically mirrors a Christian, mainly Protestant, understanding of what constitutes 'true' religion, i.e. with a focus on dogma, belief and morals. Hence, evolutionary explanations for religion may, at times, best be viewed as explanations for one, perhaps limited, set of beliefs and practices and not of 'religion' as a totality.

This has consequences for the methodology employed. The collaborators will not provide a single operative definition of religion. When evaluating diverse evolutionary explanations, it is preferable to fractionalise the abstract, theoretical concept of religion and address different components in turn, as separate (though, at times, interrelated) units, i.e. particular mental states (beliefs) and instances of behaviour that, by themselves, may

require not a single, but different evolutionary explanations. For each component, each explanation provided in contemporary research can be scrutinised systematically from the project's dual perspective in the following sequential manner: the validity of the theoretical premises upon which it rests, the suggested scope of the explanation and how the explanation corresponds with known data, historical and contemporary. Particularly important in the latter respect are data that contradict theoretical assumptions and predictions in evolutionary theories of religion.

In practice, the collaborators will focus on particular phenomena that receive attention in contemporary evolutionary explanations for religion, but also highlight phenomena that have been in focus in the study of religions, but has received less interest in evolutionary accounts. The two collaborators have preliminarily (independently and together) identified several areas where analysis can be undertaken. These include evolutionary explanations for individual religious experience of the 'holy', the construction and spread of myths and other forms of sacred narratives, religious artifacts and art, the cult of relics, religious ethics and law (which often extends far beyond moral codes, beneficial to social cohesion and cooperation); festivals and ceremonies and associated behaviour. Within all of these areas, there is a wealth of empirical data that has been gathered through historical and ethnographic methods within the study of religions and that can be used in evaluation.

## Preliminary and expected results

The following constitute three snapshots of how the proposed review and evaluation will be carried out. These represent areas where the collaborators of the project have initiated a discussion and exchange of ideas. It should be stressed, however, that these are just snapshots and that a thorough analysis will be much more nuanced and detailed, heeding both proximate and ultimate explanations for the diverse phenomena, as well as evidence and counter-evidence for the predictions they render. Furthermore, the three snapshots by no means exhaust the field, but are an indication of the manner in which the project will proceed.

a.) *Beliefs in culturally postulated superhuman (i.e. minimally counter-intuitive) agents such as gods, spirits or ancestors.*

As Boyer (Boyer 2001) points out, our brains function as hypersensitive agency detectors that identify agents even when they are not present. Seeing a 'self' in entities that have none provides a biological advantage as it is better to flee one too many times from an imagined danger than one too few times from a real one. This over-sensitive ability to detect agency may result in beliefs in imagined, superhuman agents. The testable hypothesis here becomes that beliefs in superhuman beings should be lower in people with less well-functioning 'theory of mind', i.e. in people diagnosed with autism, a prediction that has been tested and confirmed (Norenzayan et al. 2012).

There are further theories based on other human psychological predispositions on the approximate form such superhuman agents should take. The theory of superhuman agents

as 'minimally counter-intuitive' concepts has gained wide recognition, where experimental research has shown that human beings are prone to give attention to and remember concepts that contain only a limited set of features that contradict our intuitive expectations (Boyer and Ramble 2010, Johnson et al. 2010). While not questioning the basic findings, critics have voiced scepticism concerning the explanatory potential in relation to superhuman agents in whom people actually believe and to whom they commit themselves, in contrast to those who are clearly perceived of as fictional (e.g. Mickey Mouse or Santa Claus) (Vial 2006, Gervais and Henrich 2010). From the perspective of the history of religion, it can further be noted that the superhuman agents, found in traditional religion, are anything but *minimally* counter-intuitive – their counter-intuitive features are instead often multifold. From the perspective of cultural evolution, there is still a need to account for why some superhuman agents become culturally important and others not and how and why some transform into being almost maximally counter-intuitive. From a by-product perspective, the answer may lie in the extent to which some superhuman agents are culturally connected to and become relevant for, other parts of human cognition, particularly in the social domain (Boyer 2001).

Adaptationist evolutionary explanations for possible benefits of beliefs in superhuman agents usually focus on the domain of compliance to moral codes and social control. Experimental research has shown, for example, that humans will behave more morally if they perceive or believe, consciously or not, that someone else is watching them. Beliefs in present, but invisible, superhuman entities may, therefore, influence people to behave more honestly (Johnson 2005), even if it is made completely obvious that this entity is made-up (e.g. Piazza et al. 2011, Shariff and Norenzayan 2016). The proximate mechanisms mediating this effect may be fear of direct punishment or bad reputation, while the evolutionary explanation may be that the behaviour furthers cooperation and altruistic behaviour, while reducing tendencies to cheat. Since such behaviour will benefit individuals in social contexts, the proclivity for beliefs in superhuman agents may have been independently selected for (Johnson and Bering 2006). Importantly, at least from the perspective of the history of religions, is that the agents in question need not themselves be *moral*. It is the experience of being watched that is the key. This is important since many superhuman agents in diverse religious traditions are not necessarily moral supervisors – some are amoral or even immoral.

There are other potential areas where beliefs in superhuman agents could possibly be viewed as adaptive, for example, as a means to lessen existential anxiety and relieve humans from the effort of searching for causality in events where such causality is not directly evident. Furthermore, studies indicate that beliefs in supernatural agents that can affect your life may have effects on personal health (Koenig 2012). A potential psychological link between belief and health could partly explain this pattern in that religion may function as a placebo. In a cultural evolutionary scenario, religions that have such placebo effects should persist longer and spread more effectively through populations than those that do not (McClenon 1997). This effect could be expected to work both ways, however, as different religious traditions display different sorts of notions of superhuman

agents where some will affect health positively (e.g. gods and benevolent spirits), others negatively (evil spirits, devils).

b.) *Rituals and other forms of religious behaviour*

Rituals pose an evolutionary puzzle in that they are examples of costly behaviour with no immediate or obvious benefits. Boyer and Liénard (2006) have proposed an explanation for rituals 'in terms of an evolved system to detect and react to inferred threats to fitness.' Particularly important and common in many traditions, are rituals concerned with cleansing and pollution avoidance. According to Boyer (Boyer 2001), the ultimate cause for these types of behaviour should be sought in contagion avoidance, evolved as protection against pathogens in the environment (Kelly 2011).

Ritualistic behaviour is structurally similar to Obsessive Compulsive Disorder (OCD) and, according to Dulaney & Fiske (Dulaney and Fiske 1994), the similarity is not a coincidence. Both OCD and rituals relate to an underlying psychological mechanism. The simple feeling of at least doing 'something' can be very comforting in situations of duress. The psychological mechanism here is the general desire to control one's environment. As BF Skinner showed long ago (Skinner 1947), it is possible to get even pigeons to draw erroneous conclusions of causality, resulting in their believing that they, through ritualised 'superstitious' behaviour, are controlling access to food when they are not.

Quite distinct from such a by-product perspective, adaptionist explanations have attempted to solve the riddle of costly ritual behaviour by connecting it to social signalling. By involving oneself in costly ritual behaviour, individuals signal their commitment to the group and their readiness for sacrifice, which in turn evokes responses from others in terms of trust and altruistic behaviour, responses that are beneficial to the ritual performer (Henrich 2009, Bulbulia 2004, Sosis and Alcorta 2003). The problem with this theory is that many rituals in diverse religious traditions are not public, but private undertakings and hence, with little value as social signals.

One problem with such adaptionist theories of religious behaviour, in general, is the assumption of correspondence and one-way causal relationship between beliefs (or rather mental states) and behaviour. Experimental evidence exists that indicate that religious beliefs may not be the cause of behaviour, but in many cases, the effect of it (Barrett 2004). This is also in line with a large amount of data, not least ethnographic, within the study of religion where it has been shown that the relationship between belief and behaviour is much more complex.

Human beings are prone, as a result of evolution, to act in certain ways, not least in social contexts, while not knowing why they do it. The assumed presence of religious beliefs and convictions becomes a way for the individual to account for his/her own, often puzzling behaviour. One example of this is self-sacrificial behaviour. While possibly receiving more attention when occurring in a religious context, suicide attacks also occur outside of these, as evidenced for example amongst Tamil Tigers, a Marxist organisation in Sri Lanka. The causal mechanism behind this type of self-sacrificial behaviour may thus run deeper than

'belief in an afterlife' (Atran 2010, Capell and Sahliyah 2007, Ginges et al. 2009). In general, explanations for self-sacrificial or moral behaviour, based on assumptions concerning beliefs in divine rewards and punishments in an afterlife, is evidence of the 'prototypical', possibly Christocentric, implicit definition of religion mentioned above. Not all religious traditions contain such notions.

In general, there is a potential problem in the use of official dogma within religious traditions as data for beliefs and motives for the behaviour of individuals formally belonging to that tradition. Again, the academic study of religions has repeatedly shown that correspondence between official dogma formulated by religious experts and the beliefs of individuals is often small. There is widespread 'theological incorrectness' (Slone 2004) both in historical and contemporary contexts. This phenomenon in itself has also been experimentally attested and provided with an explanation, based on the dual system differentiation between fast, intuitive thinking necessary for managing everyday life and slow reflective thinking (Barrett and Keil 1996, Barrett 1998, Tremlin 2005).

### c.) *Social organisation*

Questions concerning how religion relates to social organisation, authority and power, distinctions between social groups, intra-social stratification and inter-social conflict have been central in the study of religions. The field is huge and here only a few areas can be noted, examples where the value of the project's dual approach becomes apparent.

By-product perspectives have generally been less influential in explaining phenomena relating to religion and social organisation, apart from noting that a set of general mechanisms of social cognition contain elements that serve the purpose of social control and hierarchies. These include regulations of social exchange, monitoring of social status, cheater detection, intuitive notions on justice and morality and a coalitional instinct (Boyer 2001, Atran 2002, Barrett 2004B). However, these mechanisms operate in social contexts in general, whether religious beliefs and practices are present or not.

Social cohesion has received more attention in the adaptionist perspectives. The latter have already been alluded to above. Humans in large groups need to organise themselves, something which is also true for religious groups. As discussed above, a better organised group is also a better functioning group, which is beneficial for individuals, their genes and the organisation itself (Wilson 2002, Bowles and Gintis 2017). From an adaptionist perspective, religious beliefs and behaviour may be functional in this respect: providing common norms, notions of superhuman agents policing these norms and providing contexts where coordinated behaviour-strengthening cooperation can be executed (i.e. collective rituals). People being governed would reap individual benefits from this (Bowles and Gintis 2017).

However, such a suggested role for religious phenomena is not uncontroversial. Social functionalist theories of religion are challenged by the fact, which is well attested in historical and ethnographic research, that internal solidarity and cooperation need not be the standard feature of religious groups. Rather, a situation of contestation and conflict,

dissent and violent means to force compliance is commonplace. Notions of superhuman agents, their wishes and demands and religious behaviour are central to this. Any adaptionist theory of evolution must take these facts of conflict, tension, contestation, diversity and change *within* religious groups into account, because it challenges simplistic and, at times, ideologically-motivated assumptions of the role of religion.

There are ample examples in both history and contemporary times how religion can be used for outright exploitation related to authority and power in society. The ruling classes of society and, not least, religious experts, may utilise religion to legitimise their privileges and secure access to common goods. Such observations need not be incompatible with evolutionary explanations. On the contrary, forms of exploitation evident in history and contemporary societies may be explained with recourse to human dispositions. As an example, the common use of 'family' titles (father, sister, brother) amongst religious authority figures can be explained as a cultural exploitation of our biologically evolved sense for kin, i.e. the cultural creation 'fictive kin' (Quirko 2011).

One particular suggestion from the perspective of evolutionary theory to the long identified puzzle of explaining and not only describing, how religious authority is established, upheld and challenged, should be noted. This explanation invokes a combination of a by-product perspective and a cultural evolutionary perspective focusing on evolved social learning strategies (Laland 2004, Morgan et al. 2011). Humans are expert, if not compulsive, social learners and have developed certain mental mechanisms to facilitate such learning. Some of these are specialized on identifying to *whom* to give attention amongst a multitude of potential role models. This identification is based on crude cues, reactions to which are not necessarily conscious. Amongst these are outer appearance, signs of success and, perhaps most importantly, the prestige that others in the environment attribute (Henrich and Gil-White 2001, Chudek et al. 2012). Research into social learning strategies, how they work and how they may have developed from an evolutionary perspective is ongoing and has, in the view of the collaborators, great potential for explaining features of religious authority structures. This involves not least one of the more puzzling ones in this context, which, despite lacking any ultimate explanation whatsoever, has long had a prominent place within the study of religion: that mysterious trait of *charisma*, either as a personal character trait of a religious authority or as imbedded in charismatic institutions (Potts 2009, Ketola 2008). The rich material provided by the history of religions concerning religious authority can here be utilised to evaluate and develop theories of how this authority is related to social learning strategies.

## Collaboration

The preliminary results of the collaborators' exchange of ideas, described above, rest upon their independent previous research. Lindenfors' work on cultural evolution has resulted in one book and seven co-authored peer-reviewed articles, including publications on the evolution of language, the evolution of democracy and cultural evolution in general. He has summarised research on cooperation from an evolutionary perspective in the book *Samarbete*. Svensson has during the last three years focused on applying theories from

the cognitive science of religion on Islamic material. He has so far published three peer-reviewed articles connected to this work and an additional three have been accepted for publication. Currently he is finalising a book applying theories on human cognition and cultural evolution on historical and contemporary Muslim views on the prophet Muhammad and their relationship to behaviour and social organisation.

The proposed research will be carried out in close cooperation with the Centre for the Study of Cultural Evolution (CEK) at Stockholm University. CEK resides within the faculty of humanities and hosts a mix of researchers from various social sciences and humanities, natural sciences and mathematics, who share an interest in the dynamics of human culture and behaviour. Researchers at CEK work together and benefit from each other's knowledge and methods. Thereby, it has become an internationally competitive and attractive research environment. CEK has been evaluated by Professor Stephen Shennan of University College, London who judged it as world leading in theoretical contributions to cultural evolution.

## **Time frame**

The results of the project will be published in several forms. One is co-written articles in international journals. These articles will mirror the fractionalising approach to religion outlined above, addressing one particular phenomenon at a time. The final aim is a co-written monograph in Swedish, with the aim of introducing the field of evolutionary explanations for religion in the local academic setting, where it is currently absent. Both researchers are active participants in a contemporary public debate, regularly presenting their research in forms and media accessible to the general public. This is an activity that will continue and form part of the project as a whole.

During the start of the project, we will focus on outlining how to divide 'religion' into sub-components and then linking known evolutionary and more direct causal factors to each sub-component. Over the next two consecutive years, we will thoroughly review the literature and place each proposed explanation, experiment and observation into this framework, publishing articles on particular phenomena as we proceed. The final year will be spent summarising our findings into a monograph to be published at the end of the research period.

## **Author contributions**

Both authors contributed equally to this grant proposal.

## **Conflicts of interest**

The authors have no conflicts of interest.

## References

- Asad T (1993) *Genealogies of Religion*. Johns Hopkins University Press
- Atran S (2002) *In Gods We Trust*. Oxford University Press
- Atran S (2010) *Talking to the enemy*. Allen Lane
- Barrett JL, Keil F (1996) Conceptualizing a Nonnatural Entity: Anthropomorphism in God Concepts. *Cognitive Psychology* 31 (3): 219-247. <https://doi.org/10.1006/cogp.1996.0017>
- Barrett JL (1998) Cognitive Constraints on Hindu Concepts of the Divine. *Journal for the Scientific Study of Religion* 37 (4). <https://doi.org/10.2307/1388144>
- Barrett JL (2004) *Why would anyone believe in God?* AltaMira Press, Walnut Creek
- Barrett JL (2012) *Born Believers: The Science of Childrens Religious Belief*. Free Press
- Bellah RN (2011) *Religion in human evolution*. Harvard University Press <https://doi.org/10.4159/harvard.9780674063099>
- Blume M (2009) The Reproductive Benefits of Religious Affiliation. *The Biological Evolution of Religious Mind and Behavior* 117-126. [https://doi.org/10.1007/978-3-642-00128-4\\_8](https://doi.org/10.1007/978-3-642-00128-4_8)
- Bowles S, Gintis H (2017) *A Cooperative Species*. A Cooperative Species <https://doi.org/10.23943/princeton/9780691151250.003.0001>
- Boyd R, Richerson PJ (1985) *Culture and the Evolutionary Process*. University of Chicago Press
- Boyd R, Richerson PJ (2005) *The Origin and Evolution of Cultures*. Oxford University Press
- Boyer P (2001) *Religion Explained*. Vintage
- Boyer P, Ramble C (2010) Cognitive templates for religious concepts: cross-cultural evidence for recall of counter-intuitive representations. *Cognitive Science* 25 (4): 535-564. [https://doi.org/10.1207/s15516709cog2504\\_2](https://doi.org/10.1207/s15516709cog2504_2)
- Bruce S (2011) Defining religion: a practical response. *International Review of Sociology* 21 (1): 107-120. <https://doi.org/10.1080/03906701.2011.544190>
- Bulbulia J (2004) Religious costs as adaptations that signal altruistic intention. *Evolution and Cognition* 10 (1): 19-38.
- Capell MB, Sahliyah E (2007) Suicide terrorism: is religion the critical factor? *Security Journal* 20 (4): 267-283. <https://doi.org/10.1057/palgrave.sj.8350029>
- Carneiro RL (2003) *Evolutionism in Cultural Anthropology: A Critical History*. Westview Press
- Chudek M, Heller S, Birch S, Henrich J (2012) Prestige-biased cultural learning: bystander's differential attention to potential models influences children's learning. *Evolution and Human Behavior* 33 (1): 46-56. <https://doi.org/10.1016/j.evolhumbehav.2011.05.005>
- Clark A, Lelkes O (2005) Deliver us from evil: religion as insurance. *Papers on Economics of Religion* 06/03, Dept Economic Theory and Economic History of the University of Granada
- Comte A (1853) *The Positive Philosophy of Auguste Comte*. (trans. Harriet Martineau; London)
- Dawkins R (1976) *The selfish gene*. Oxford University Press

- Dulaney S, Fiske AP (1994) Cultural rituals and Obsessive-Compulsive Disorder: is there a common psychological mechanism? *Ethos* 22 (3): 243-283. <https://doi.org/10.1525/eth.1994.22.3.02a00010>
- Fitzgerald T (2000) *The ideology of religious studies*. Oxford University Press
- Frazer JG (1890) *The Golden Bough: A Study in Magic and Religion*. Wordsworth
- Gervais W, Henrich J (2010) The Zeus Problem: hy representational content biases cannot explain faith in gods. *Journal of Cognition and Culture* 10: 383-389. <https://doi.org/10.1163/156853710x531249>
- Ginges J, Hansen I, Norenzayan A (2009) Religion and support for suicide attacks. *Psychological Science* 20 (2): 224-230. <https://doi.org/10.1111/j.1467-9280.2009.02270.x>
- Henrich J, Gil-White FJ (2001) The evolution of prestige: freely conferred deference as a mechanism for enhancing the benefits of cultural transmission. *Evolution and Human Behavior* 22 (3): 165-196. [https://doi.org/10.1016/s1090-5138\(00\)00071-4](https://doi.org/10.1016/s1090-5138(00)00071-4)
- Henrich J (2009) The evolution of costly displays, cooperation and religion. *Evolution and Human Behavior* 30 (4): 244-260. <https://doi.org/10.1016/j.evolhumbehav.2009.03.005>
- Johnson C, Bishop P, Kelly S (2010) Measuring the mnemonic advantage of counter-intuitive and counter-schematic concepts. *Journal of Cognition and Culture* 10: 109-121. <https://doi.org/10.1163/156853710x497194>
- Johnson D, Bering J (2006) Hand of god, mind of man: punishment and cognition in the evolution of cooperation. *Evolutionary Psychology* 4 (1). <https://doi.org/10.1177/147470490600400119>
- Johnson DP (2005) God's punishment and public goods. *Human Nature* 16 (4): 410-446. <https://doi.org/10.1007/s12110-005-1017-0>
- Kelly D (2011) *Yuck! The nature and moral significance of disgust*. MIT Press <https://doi.org/10.7551/mitpress/8303.001.0001>
- Ketola K (2008) Founder of the Hare Krishnas as seen by devotees. *Brill* <https://doi.org/10.1163/ej.9789004166134.i-234>
- Koenig H (2012) *Handbook of Religion and Health*. Oxford University Press <https://doi.org/10.1007/s10943-012-9568-y>
- Laland KN, Brown GR (2002) *Sense & Nonsense: Evolutionary Perspectives on Human Behaviour*. Oxford University Press
- Laland KN (2004) Social learning strategies. *Learning & Behavior* 32: 4-14. <https://doi.org/10.3758/BF03196002>
- Lindenfors P (2011) *Samarbete*. Fri Tanke
- Lubbock JS (1882) *The origin of civilization and the primitive condition of man*. Chicago University Press
- McCauley RN (2012) *Why religion is natural and science is not*. Oxford University Press
- McClenon J (1997) Shamanic healing, human evolution, and the origin of religion. *Journal for the Scientific Study of Religion* 36 (3). <https://doi.org/10.2307/1387852>
- Morgan TJH, Rendell LE, Ehn M, Hoppitt W, Laland KN (2011) The evolutionary basis of human social learning. *Proceedings of the Royal Society B: Biological Sciences* 279 (1729): 653-662. <https://doi.org/10.1098/rspb.2011.1172>
- Newberg AB (2010) *Principles of Neurotheology*. Ashgate
- Nongbri B (2013) *Before religion: a history of a modern concept*. Yale University Press <https://doi.org/10.12987/yale/9780300154160.001.0001>

- Norenzayan A, Gervais W, Trzesniewski K (2012) Mentalizing deficits constrain belief in a personal god. *PLoS ONE* 7 (5). <https://doi.org/10.1371/journal.pone.0036880>
- Norenzayan A (2013) *Big gods: how religion transformed cooperation and conflict*. Princeton University Press <https://doi.org/10.1515/9781400848324-004>
- Piazza J, Bering J, Ingram G (2011) "Princess Alice is watching you": Children's belief in an invisible person inhibits cheating. *Journal of Experimental Child Psychology* 109 (3): 311-320. <https://doi.org/10.1016/j.jecp.2011.02.003>
- Potts J (2009) *A history of charisma*. Palgrave Macmillan, Hampshire <https://doi.org/10.1057/9780230244832>
- Shariff A, Norenzayan A (2016) God is watching you. *Psychological Science* 18 (9): 803-809. <https://doi.org/10.1111/j.1467-9280.2007.01983.x>
- Skinner BF (1947) Superstition in the pigeon. *Journal of Experimental Psychology* 38: 168. <https://doi.org/10.1037/h0055873>
- Slone JD (2004) *Theological incorrectness*. Oxford University Press <https://doi.org/10.1093/0195169263.001.0001>
- Sosis R, Alcorta C (2003) Signaling, solidarity, and the sacred: The evolution of religious behavior. *Evolutionary Anthropology: Issues, News, and Reviews* 12 (6): 264-274. <https://doi.org/10.1002/evan.10120>
- Spencer H (1885) *Principles of Sociology*. Appleton
- Tinbergen N (2010) On aims and methods of Ethology. *Zeitschrift für Tierpsychologie* 20 (4): 410-433. <https://doi.org/10.1111/j.1439-0310.1963.tb01161.x>
- Tremblin T (2005) Divergent religion: A dual-process model of religious thought, behaviour and morphology. In: Whitehouse H, McCauley RN (Eds) *Mind and religion. Psychological and cognitive foundations of religiosity*.
- Tylor E (1871) *Primitive culture*. John Murray
- Vial T (2006) How does the cognitive science of religion stack up as a big heory, a la Hume? *Method & Theory in the Study of Religion* 18 (4): 351-371. <https://doi.org/10.1163/157006806778665549>
- Wade N (2010) *The Faith Instinct: How Religion Evolved and Why It Endures*. Penguin Books
- Williams GC (1966) *Adaptation and Natural Selection*. Princeton University Press
- Wilson DS (2002) *Darwin's Cathedral*. University Chicago Press <https://doi.org/10.7208/chicago/9780226901374.001.0001>