sciendo

studia humana
QUARTERLY JOURNAL

Studia Humana
Volume 8:3 (2019)

Special Issue:
Evolutionary Perspectives on Unbelief

Edited by Kyle J. Messick, Konrad Szocik, and Joseph Langston

Contents

sciendo

studia humana
QUARTERLY JOURNAL

Studia Humana
Volume 8:3 (2019), pp. 1—6
DOI: 10.2478/sh-2019-0021

Evolutionary Perspectives on Unbelief: An Introduction from the Editor

Kyle J. Messick

Brain Belief, & Behaviour Lab
Centre for Trust, Peace and Social Relations
Coventry University
Cheetah Rd, Coventry CV1 2TL, United Kingdom

e-mail: psymessick@gmail.com

Abstract:
The scientific study of atheism and unbelief is at a pivotal turning point: past research is being evaluated, and new directions for research are being paved. Organizations are being formed with an exclusive focus on unbelief research, and large grants are funding the topic in ways that historically have never happened before. This article serves as an introduction to the state of the literature and study of evolutionary perspectives towards unbelief, which incorporates cognitive, adaptive, and biological contributors. This article serves to contextualize the subsequent articles, which all have distinct perspectives on the evolutionary factors that contribute towards unbelief.
Keywords: unbelief, atheism, non-belief, evolution, cognition, adaptive, functional.

1. Introduction

The scientific study of atheism and unbelief is on the cusp of major change. Traditionally, the study of unbelief has been problematic in the same way that studying any group based on religious categorization is problematic – the researchers are going to have a predisposition towards belief or non-belief, so bias is inevitable. Just as the psychology of religion has addressed these concerns in the study of religion [12], researchers are now criticizing early works on unbelief that claim that humans have an innate predisposition towards religious belief, and therefore to be non-religious is to have violated human nature. In criticizing early approaches to non-belief, researchers are also coming up with new ways to explain the phenomena of non-belief through a multitude of approaches, a number of which are covered in this special issue.

Unbelief is another term referring to non-believers or atheists that maintains the traditional dichotomy between religious believers and those who do not identify as religious. This introduction will primarily use the term ‘unbeliever’ to refer to a person that is non-religious, but the subsequent articles in this special issue leave the preferred terms up to the author’s discretion (e.g., atheist, non-believer, unbeliever). It should be noted, that as the authors of the subsequent articles in this special issue will use whichever term they prefer, that this is in no way to over-generalize to all non-

believers, as we know there are substantial differences between people who are not involved in organized religion [23], [28].

Early research on atheists approaches them from a default position of religion being innate and natural, and therefore making an absence of deist beliefs unnatural. In the last decade, social scientists have begun to criticize existing frameworks for studying atheism, as many of them investigate atheism as an afterthought or by-product of religion, rather than studying atheism in its own right. Recently, the study of unbelief has become a focal point for many researchers, with organizations such as the Nonreligion and Secularity Research Network (NSRN) promoting research on the topic, and some major funding initiatives are now underway, including the Unbelief Project funded by the John Templeton Foundation. This point in history marks the divergence between previous ways of thinking about unbelief (as a consequence of disobeying natural mechanisms), and the future of studying unbelief, which increasingly makes an argument for unbelief as similarly and/or equally evolutionarily natural through new cognitive, adaptive, and biological explanations – among others. This volume is intended to further promote the critical discussion that is now underway, which assesses existing empirical frameworks, and proposes alternative ways to study unbelief while accounting for the confounding baggage that studying anything in relationship to religion inevitably introduces. The primary focus of this special issue is on evolutionary perspectives towards unbelief, so this can exclude some social and affective explanations for a person being non-religious, but it is important to acknowledge that these too play a role in explaining unbelief. Evolutionary perspectives about non-religion are especially sparse, which is another problem that this issue brings to light. Due to the inter-disciplinary nature of this issue and the early stages of the topic, the definition of evolutionary perspectives here is broad, and allows the incorporation of many factors into explaining how unbelief has persisted and has spread across generations of people and societies. We are hopefully at the beginning of a new zeitgeist, where unbelief is not just studied from the default starting position of religion, but instead is progressed as a novel scientific discipline.

2. Explanations for Unbelief

There have been a number of explanations for the existence of the non-religious, but research towards each of those explanations is still in its formative stages, and as thus, it is often methodologically flawed, or contradictory. I've outlined some of the most influential approaches to unbelief, including cognitive, functionally adaptive, and biological explanations – all of which play a role in how unbelief has evolutionarily persisted across generations. These are only some examples of explanations that can be approached from an evolutionary perspective, which do not exhaust other possibilities that are not covered in this introduction, but these will help provide context to the articles that follow in this special issue.

2.1. The Cognitive Explanation

Some have argued that religious belief is the result of a more intuitive thinking style (e.g., [26]). One of the most prominent theories within the cognitive science of religion assumes that religious belief is natural, innate, and intuitive, and so, in order to be an unbeliever, one must first effortfully violate the cognitive predispositions towards religious belief [3], [18]. There have been growing criticisms of this theory, since studies applying it are consistently methodologically flawed, and the data is often contradictory [29], [17], [14], [31]. Some have even tested the theory directly, showing that there is no relationship between intuitive thinking and religious belief [8]. Even with all of the evidence and criticism of the contrary, the intuitive thinking explanation for non-belief persists as being one of the most prominent theories to explain the existence of unbelievers.

2.2. The Functional (Well-Being/Adaptive) Explanation

A stronger argument for an evolutionary role in religious belief and unbelief is the *functional* argument. Traits that are more functionally efficient are generally passed on to future generations because they assist in survival, so some have argued that religious belief is more natural because it is more adaptive than unbelief [4], [10]. With this argument, religion is not cognitively innate as much as it is functionally convenient and efficient. It is well documented that religious belief is adaptive [4], [10], [11], [15], [21], [24] but the perspective that is changing is about the adaptiveness of unbelief. Religious belief helps fulfil a number of psychological needs, including a need for social relatedness, reducing fears about mortality, providing security, well-being, and meaning in life. In areas of the world where those functions are fulfilled through other secular means (e.g., wealthier countries more easily provide a high standard of living for inhabitants), then those countries tend to be more secular [20], [19]. To give a specific example, involvement in societal groups lowers mortality rates, regardless of that societal group being religious or secular [27]. In other words, when the functions of religious belief are made redundant through other mechanisms, then religion tends to be less culturally dominant. In addition, we are beginning to understand the role of secular beliefs, such as believing that science is a moral guide to life, in being functionally adaptive in ways that are similar to religious belief [7], [1]. People that are well-off without religion are less likely to be religious because they don't have the functional need for religion, whereas people that struggle and experience much hardship are more likely to use religion as a means to find greater well-being. The functional argument has largely argued that religion is more functional and thus evolutionarily more efficient than unbelief, however, as we increasingly understand more about how psychological functions and needs are fulfilled for the non-religious through secular beliefs and societal mechanisms, this calls into question earlier claims of religion being more evolutionarily beneficial, adaptive, and efficient.

2.3. The Biological Explanation

There has been increasing evidence that parts of the brain are associated with religious belief and experiences or a lack thereof, but this research has yet to conclusively explain the evolution of belief and unbelief [16]. Some insight comes from brain lesion studies, as increases and decreases in religiosity can be observed dependent on which area of the brain has the lesion, as posterior lesions can lead to higher religiosity, whereas anterior lesions lead to lower [30], which hints at the biology of the brain playing a role in whether or not someone is religious. To give another example, the prefrontal cortex is associated with processing doubt, so people with damage to this area frequently exhibit higher levels of religiosity, and it is also not a coincidence that many religious conversions happen around adolescence, when the doubt processing part of the brain dramatically grows [2]. The prefrontal cortex also interprets religious imagery differently depending on if one is a believer or an unbeliever [32]. Besides parts of the brain, there is also evidence that the accessibility of hormones such as dopamine play a role in whether or not someone is religious [22], [25], [9], [5], [6]. Evidence for biological explanations are still new, and many of the findings are contradictory, but the evidence seems to point to there being a role of biology in being a non-believer; we just aren't sure exactly what that role is yet since replications and further research are still needed.

3. This Issue

Contained in this special issue of *Studia Humana* is a selection of papers from authors across various disciplines discussing different evolutionary perspectives towards unbelief. In reading over these articles, I was quick to identify that some of the claims made in this tome will generate strong responses, and that is largely the goal of releasing this special issue: to generate critical discussion about a topic that needs more of it to progress. Even though large strides have been made, the

scientific study of unbelief is still in its formative stages, and as such, it is important to learn not only from the difficulties of studying religion, but to also study unbelief in its own right, while acknowledging the interconnected nature that non-belief has with religion and the history of studying religion. Many have criticized the early works on unbelief as having come through the lens of religion, and many of those criticisms are legitimate, so this gathering of manuscripts across multiple disciplines hopes to add scope to how far those problems lie, elucidate and criticize them, and offer some suggestions moving forward. The scientific study of unbelief is now coming to a crossroads, where it is now increasingly being studied as something other than a by-product of religion, moving away from cognitive claims that unbelief results from the rejection of an innate, religious predisposition [29], [13], [31], [3], [18].

A variety of inter-disciplinary perspectives are included in this special issue. Lluis Oviedo provides a culturally adaptive sociological explanation for atheism, while warning of limitations. Jay Feierman gives a functional, biological perspective on how non-religion can be a by-product of in-group breeding clusters, explaining that as breeding clusters no longer need to compete, the by-product that is religion that stems from these clusters becomes obsolete. Religion becomes superfluous in his explanation, causing religion to be a deteriorating phenomenon because of modernity. The paper by Mikloušić and Lane makes an argument for the role of personality in determining the relationship that people have with an overseeing God, explaining through their own empirical work that the religious see God as having personality traits more similar to the self, whereas unbelievers have a perception of God that is less relatable to their own personality traits. Although similar investigations have been done looking at personality fusion with a divine being, Mikloušić and Lane's findings are novel in that they also incorporate sociosexual variables, which have previously been shown to play an important role in understanding religious attitudes and behavior. This special issue concludes with a paper by Alogna, Bering, Balkcom, and Halberstadt, which criticizes modern frameworks and questions the notion of unbelief entirely, since even self-processed atheists show signs of implicit supernatural belief, but the studies making these claims often overreach from what their data can support. This final paper serves as an appropriate word of caution when empirically investigating unbelief and its evolutionary correlates. This special issue should serve as a point of entry for seeing the breadth of directions in which unbelief is being approached evolutionarily, which should promote discussion, further criticism (including of the articles held within this volume), which will hopefully result in a further expanding of research, and eventually theories that are stronger when placed under vigorous scrutiny.

References

1. Aghababaei, N., Sohrabi, F., Eskandari, H., Borjali, A., Farrokhi, N., & Chen, Z. J. Predicting Subjective Well-being by Religious and Scientific Attitudes with Hope, Purpose in Life, and Death Anxiety as Mediators, *Personality and Individual Differences* 90, 2016, pp. 93-98.
2. Asp, E., Ramchandran, K., & Tranel, D. Authoritarianism, Religious Fundamentalism, and the Human Prefrontal Cortex, *Neuropsychology* 26 (4), 2012, pp. 414-421.
3. Barrett, J. L. *Born Believers: The Science of Children's Religious Belief*, New York, NY: Simon and Schuster, 2012.
4. Barrett, J. L. Metarepresentation, Homo religious, and Homo symbolicus, In C. Henshilwood and F. D'Errico (eds.), *Homo Symbolicus,* Amsterdam: John Benjamins Publishing Company, 2011, pp. 205-224.
5. Butler, P. M., McNamara, P., & Durso, R. Deficits in the Automatic Activation of Religious Concepts in Patients with Parkinson's Disease, *Journal of the International Neuropsychological Society* 16 (02), 2010, pp. 252-261.
6. Butler, P. M., McNamara, P., & Durso, R. Side of Onset in Parkinson's Disease and Alterations in Religiosity: Novel Behavioral Phenotypes, *Behavioural Neurology* 24 (2), 2011, pp. 133-141.

7. Farias, M., Newheiser, A. K., Kahane, G., & de Toledo, Z. Scientific Faith: Belief in Science increases in the Face of Stress and Existential Anxiety, *Journal of Experimental Social Psychology* 49 (6), 2013, pp. 1210-1213.
8. Farias, M., van Mulukom, V., Kahane, G. Kreplin, U., Joyce, A., Soares, P., Oviedo, L., Hernu, M., Rokita, K., Savulescu, J., & Möttönen, R. Supernatural Belief is not Modulated by Intuitive Thinking Style or Cognitive Inhibition, *Scientific Reports* 15100, 2017, pp. 1-8.
9. Harris, E., McNamara, P. Neurologic Constraints on Evolutionary Theories of Religion. *The Biological Evolution of Religious Mind and Behavior*, Berlin Heidelberg: Springer, 2009, pp. 205-215.
10. Johnson, D. *God is Watching You*, New York, NY: Oxford University Press, 2016.
11. Jones, J. W. *Can Science Explain Religion?* Oxford: Oxford University Press, 2016.
12. Ladd, K. L., Messick, K. J. A Brief History of the Psychological Study of the Role(s) of Religion, In W. Woody, R. Miller, & W. Wozniak (eds.), *Psychological specialties in historical context: Enriching the classroom experience for teachers and students*, 2016, pp. 204-216. Division 2, American Psychological Association, retrieved from https://teachpsych.org/ebooks/psychspec.
13. Lindeman, M., Svedholm-Häkkinen, A. M. Let Us Be Careful with the Evidence on Mentalizing, Cognitive Biases, and Religious Beliefs, *Behavioral and Brain Sciences* 39, 2016, pp. 33-34.
14. Lindeman, M., Jari, L. Diverse Cognitive Profiles of Religious Believers and Nonbelievers, *The International Journal for the Psychology of Religion* 26 (3), 2016, pp. 185-192.
15. McBrayer, J. P. The Wager Renewed: Believing in God is Good for You, *Science, Religion and Culture* 1 (3) 130, 2014, pp. 130-140.
16. McNamara, P., Durso, R., Brown, A., & Harris, E. The Chemistry of Religiosity: Evidence from Patients with Parkinson's Disease, In P. McNamara (ed.), *Where God and Science Meet, Volume 2 The Neurology of Religious Experience*, Westport, CT, US: Praeger Publishers/Greenwood Publishing Group, 2006, pp. 1-14.
17. Messick, K., Farias, M. The Psychology of Leaving Religion, In D. Enstedt, G. Larsson, & T. T. Mantsinen (eds.), *Brill Handbook of Leaving Religion*, Leiden: Brill, *in press*, pp. 307-322.
18. Norenzayan, A., Gervais, W. M. The Origins of Religious Disbelief, *Trends in Cognitive Sciences* 17 (1), 2013, pp. 20-25.
19. Norris, P., Inglehart, R. *Sacred and Secular*, New York: Cambridge University Press, 2004.
20. Norris, P., Inglehart, R. Are High Levels of Existential Security Conducive to Secularization? A Response to Our Critics, In D. Stanley Brunn (ed.), *The Changing World Religion Map*, Dordrecht: Springer, 2014, pp. 3389-3408.
21. Park, C. L., McNamara, P. Religion, Meaning, and the Brain, In P. McNamara (ed.), *Psychology, Religion, and Spirituality. Where God and Science Meet: How Brain and Evolutionary Studies Alter Our Understanding of Religion: The Psychology of Religious Experience*, Westport, CT, US: Praeger Publishers/Greenwood Publishing Group, 2006, pp. 82-104.
22. Schmack, K., Rössler, H., Sekutowicz, M., Brandl, E. J., Müller, D. J., Petrovic, P., & Sterzer, P. Linking Unfounded Beliefs to Genetic Dopamine Availability, *Frontiers in Human Neuroscience* 9, 2015, pp. 1-10.
23. Schnell, T. Dimensions of Secularity (DoS): An Open Inventory to Measure Facets of Secular Identities, *The International Journal for the Psychology of Religion* 25 (4), 2015, pp. 272-292.
24. Schumaker, J. F. (ed.). *Religion and Mental Health*, New York, NY: Oxford University Press, 1992.
25. Schwartenbeck, P., FitzGerald, T. H., & Dolan, R. Neural Signals Encoding Shifts in Beliefs, *NeuroImage* 125, 2016, pp. 578-586.
26. Shenhav, A., Rand, D. G., & Greene, J. D. Divine Intuition: Cognitive Style Influences Belief in God, *Journal of Experimental Psychology: General* 141, 2012, pp. 423-428.
27. Shor, E., Roelfs, D. J. The Longevity Effects of Religious and Nonreligious Participation: A Meta-analysis and Meta-regression, *Journal for the Scientific Study of Religion* 52 (1), 2013, pp. 120-145.

28. Silver, C. F., Coleman III, T. J., Hood Jr, R. W., & Holcombe, J. M. The Six Types of Nonbelief: a Qualitative and Quantitative Study of Type and Narrative, *Mental Health, Religion & Culture* 17 (10), 2014, pp. 990-1001.
29. Szocik, K. Adaptationist Accounts Can Tell Us More About Religion than Cognitive Accounts Can, In H. van Eyghen, G. van den Brink, & R. Peels (eds.), *New Developments in the Cognitive Science of Religion*, Cham: Springer, 2018, pp. 93-108.
30. Urgesi, C., Aglioti, S. M., Skrap, M., & Fabbro, F. The Spiritual Brain: Selective Cortical Lesions Modulate Human Self-Transcendence, *Neuron* 65 (3), 2010, pp. 309-319.
31. Van Eyghen, H. Religious Belief is Not Natural. Why Cognitive Science of Religion does not show that Religious Belief is Trustworthy, *Studia Humana* 5 (4), 2016, pp. 34-44.
32. Wiech, K., Farias, M., Kahane, G., Shackel, N., Tiede, W., & Tracey, I. An fMRI Study Measuring Analgesia Enhanced by Religion as a Belief System, *PAIN* 139 (2), 2009, pp. 467-476.

sciendo

studia humana
QUARTERLY JOURNAL

Studia Humana
Volume 8:3 (2019), pp. 7—20
DOI: 10.2478/sh-2019-0022

Atheism and Unbelief: Different Ways to Apply the Evolutionary Framework

Lluis Oviedo

Pontificia Universita Antonianum
Via Merulana 124
00185 Roma, Italy

e-mail: loviedo@antonianum.eu

Abstract:
Religion has been intensely studied in the last years inside an evolutionary frame, trying to discern to what extent it contributes to fitness or becomes an adaptive entity in its own. A similar heuristic can be tried regarding the opposite tendency: unbelief and atheism, since these cultural phenomena could help to better adapt to some social settings or become an adaptive socio-cultural niche on its own. The present paper examines some scenarios in which that question makes sense: the tradition of sociology of religion, with its different strands, including recent studies on 'non-religious'; the cognitive; and the philosophical-theological reflection. The proposed venues show to what extent the evolutionary model might reveal neglected aspects in the study of unbelief, and at the same time its limits or the open questions that such application raise.
Keywords: adaptation, niche construction, sociology, secularization, cognition, cultural evolution.

1. Introduction

Since religion is being extensively analysed in terms of evolutionary processes and can be explained in several of its dynamics as forms of adaptation or exaptation, it should not be a surprise if a similar pattern is applied to the study of unbelief or the absence of religious faith. After all, it is broadly assumed that cultural forms evolve, that atheism and secularization follow a pattern of growth through variations and adaptations since modern times, and that atheism and unbelief become cultural forms, or build their own social niches and reflect similar dynamics as many other cultural phenomena.

The study of religion in evolutionary terms knows a huge development with many research programs being followed and several lines that try to better apply that theoretical model [26]. Probably the question is not so much whether we can understand religious beliefs and behaviour in evolutionary terms, but to choose among a diversity of proposals on supply, depending on how evolution is intended – sheer biological, rather cultural, or both – or which are the selection units – individual, group, species or even religions – or which are the adaptive elements – solidarity, risk

and negativity coping, anxiety allying, symbolic capacity – that carry on the process or render religion and its alternatives more adaptive.

With unbelief and atheism some issues arise and the question as to what extent we can offer an almost symmetric presentation to religion's evolution becomes much more problematic. To start with, the main issue at stake, i.e. the evolution of unbelief, could possibly be seen less as a positive development, or a cultural phenomenon that grows on its own, and more as simply an extinction process of a cultural and social form, which is religion. Indeed, in many cases, the development of unbelief simply reflects the decline and eventual extinction of religious forms that have been very present and have occupied a huge social and symbolic space until recently. In that case, we would not be allowed to speak properly about "evolution of unbelief" but simply about the "decline and eventual disappearance of religious beliefs and practices", a process that has been broadly documented and analysed in the traditional field of "secularization studies".

The former explanation could be seen by many scholars following the long and persistent phenomenon of secularization in advanced societies as unsatisfying and too reductive. Indeed, for several voices and recent studies on non-religious, atheists and the like, we are not devising simply the demise of religious beliefs and the reduction of their symbolic and social space, but to the rise of a new cultural form, with a positive content and their own cultural references. Secularization in that case would be not simply an absence of religion, or an indifference and disinterest in transcendence and all that symbolic world, but an alternative movement that provides its own symbols, meaning systems and references [29], even if it lacks the institutional scaffolding we find in traditional religions and the material culture that has been so pervasive in religious forms and means, and which allows a better description of their evolution.

The present paper tries to deepen this argument and to explore to what extent secularization, unbelief and other related phenomena are better described in negative terms, as simply reflecting the extinction of religion and its adaptive capacities, or whether they can be analysed in terms of a positive cultural expression that evolves following similar patterns as other cultural forms. Or perhaps we need to admit to the tendency of secularization and unbelief to be so broad. We need to explore both evolutionary models, trying to make sense of two sides of the same coin: the loss of religion as consequence of a loss in its adaptive capacities in modern societies, and the birth of an alternative culture that could provide similar functions and performances as those traditionally provided by religious forms.

Three scenarios can be explored when trying to discern about that evolution. The first one is more sociological, and becomes the traditional framework in which secularization process has been studied and explained. The challenge now is to translate the accumulated knowledge in evolutionary language. The second scenario is the cognitive psychology and the recent attempts to describe religion as a cognitive process. Some scholars in this field have tried to apply their methodology to the study of unbelief and to show how their program can explain both: religion and non-religion, to contrast the criticism moved against a model that is unable to explain unbelief. The third scenario is more cultural and philosophical. After Charles Taylor's work "A Secular Age", which analyses in terms of cultural history the great extension that reaches a secular mentality, the rise of a new cultural expression, is seen not just as an absence of religion but as an alternative frame, the 'expressivist', often in contrast with traditional religious ideas and values. These three scenarios possibly justify a re-writing of non-religion as combining a process of religious fading away and the emergence of new or alternative cultural patterns.

An alternative way to follow in an evolutionary sense the development of unbelief is more ideological, and in that sense, harder to translate into an evolutionary model, but it is worthy to try, and could offer a fourth way to apply that model. I mean the theories developed by philosophers and theologians who have identified in Christian faith a pattern of its own religious denial. That pattern can be seen in terms of 'internal secularization'; of theological drift towards atheism; or as an inertia that can be identified with any version of religion's *Aufhebung* (sublation). In this case, the shared idea is that Christian faith would lead in a spontaneous way, and through a long historical

development to its own overcoming to become less a religion and more a secular set of values, memories and ethical impulses.

2. Secularization as an Evolutionary Process

The most obvious field in which the issue of unbelief needs to be studied is sociology of religion, which is dealing with that topic over more than a century. This was not an easy task, especially when we assume an evolutionary perspective. We have to consider two main hindrances: first, the short time available to measure a long-term process that was just starting its more apparent expressions when great authors like Durkheim and Weber started describing it; and second, the setbacks that such process knew in few decades, due to huge revival movements that exploded after the great wars and other deep economic and cultural crises taking place during the twentieth century; such religious come-backs apparently represented a debunking to the original secularization thesis, at least in its simple version that contemplated a linear and continuous religious decline and the extension of more and more secular societies and cultures, with less believers among their populations [5]. Nevertheless, the perspective we have gained after more than one hundred years of religious decline in several wealthy, highly educated and industrialize societies, has convinced most scholars about the presence of a socio-cultural trend that can be clearly measured through several indicators. Secularization has led to many lectures and interpretations, but what is uncertain in this historical moment is that we assist in the last decades to a steady leaking of congregation members and other expressions of religious commitment in many advanced societies, as the available figures clearly reveal, even if that process has known times of more and less intensity and even 'returns' to religious vitality in those societies, trends that could justify a new scepticism regarding the traditional 'secularization thesis' and the proposal of new theories about religious dynamics in late modernity.

The question that this paper aims to address is to what extent the verified process of religious decline might be analysed in evolutionary terms, or a process that entails variations, selections and adaptations. The most immediate answer is that it depends, and that probably such reading can be justified from a set of data, but not always that pattern will be fitting, except that we expand and broaden the original meaning and content of evolution or try to apply a new model of 'cultural evolution', fitting for the specific characteristics of religion. Several arguments by sociologists of religion dealing with secularization or religious decline can clearly be read in evolutionary terms, at least from Max Weber's analysis on the Protestant Ethic onward. To my knowledge, a later sociologist, Niklas Luhmann, has applied the evolutionary pattern in a more explicit way to religious processes in modern times, including secularization. However, some issues loom when trying to apply that paradigm to secularization process: the first one is − as already stated − the doubts rising about secularization or unbelief as an evolving process, since it could be seen rather as an extinction of religious cultural and social forms. This first issue needs to be addressed with the available studies that recently try to make sense of unbelief and non-religious populations. The second is bigger and more practical: to be the result of positive natural selection pressures, secularization would need to be adaptive, or render secularized populations better off than religious ones, at different levels. However, natural selection works both ways, as it is sometimes adaptive in an evolutionary sense to not have positive natural selective pressures on a trait and thereby let the trait, such as religion, become vestigial as part of an evolutionary cost: benefit analysis for the population, given that religion is 'expensive'. To grow, the benefit of religion has to exceed its cost.

Here the doubts are more consistent and threatening, especially when the fecundity issue is considered; indeed, several studies based on empirical data clearly show that in many cases secularization highly correlates with lower reproductive rates [16], [11]. Nevertheless, the problem might be only transitory or reveal a different or more complex adaptive strategy if for example, a continually growing population at some point could exceed some threshold and not be sustainable. At least biological success can be measured as the number of living individuals as well as the

longevity of the population or species. However, cultural evolution may entail maladaptive trends, as Robert Boyd and Peter Richerson have shown and adverted about their very threatening consequences [6].

Then, a third issue to consider is the one concerning a possible direction in the social evolution bringing to secularization. It is very tempting to identify a teleology or rule that leads the entire process we describe as religious loss and the emergence of a different kind of social order and culture. Here we just transfer into the field of cultural evolution issues that have been extensively discussed in the biological realm as well. Let us consider more in depth these issues through an analysis of two great classical sociologists working on secularization, Max Weber and Niklas Luhmann, plus recent developments in the study of unbelief and the non-religious.

Religion has evolved surely in its many kinds and along its plural history. Perhaps a good question arises when comparing different religions – at least those that can be called Post-Axial – to assess their distinct evolutionary rhythms and how they proceed, and to what extent evolution was following the standard established criteria. To my knowledge, such an exercise has not yet been tried, even if we count with a huge amount of historical data, especially in the case of Judeo-Christianity. What is relevant to our argument is that such evolution becomes more conscious in the work of early sociologists like Durkheim, Weber and Simmel, at least for Christianity.

Weber's masterwork "The Protestant Ethic and the Spirit of Capitalism" (1956 [1906]) can be read as a description of slow-moving but very effective changes taking place in modern Europe and leading towards a more in-worldly oriented religious form, giving rise in due time to a distinct cultural frame, in which religious motives and forms are displaced by a mentality more concerned about economic success and domination of nature. Weber's analysis will be latter applied to the history of other religions, but under a different interest: trying to explain the contrasting evolutionary directions that could be observed when comparing modern Christianity and Taoism or Hinduism, or – in other words – why only Christianity knows the described development leading to a greater rationalization and social differentiation. The point summarizing that process was published in a late short essay, "The Intermediate Reflections" (*Zwischenbetrachtung*) [31] in which a wider evolutionary model was developed to describe three different lines following the great religions but becoming more explicit in the Christian case: the mystical or out-of-the-world; the ascetic in the world; and the 'religion of fraternity'. In any case, these lines diverge and the ascetic one leads to a growing engagement with the world, trying to dominate it, to develop science and technology. Those trends would in the long run mean a self-defeating condition for that faith.

There can be perceived an evolutionary logic in Weber's description of such process which brings to social secularization, however the purist evolutionary reading would find some troubles after admitting that Weber describes a teleology or main forces guiding that development: rationalization, or a more or less conscious attitude that tries to adapt the means to the ends to get better outcomes; and differentiation, or a sort of specialization giving place to 'social spheres' – as he called them – with their own rules or internal logic. Both trends could be identified in the course of modern history, and evolution would be less a blind process of variations and selective adaptations, but some internally lead process working in a similar way as the Hegelian big Idea or Spirit conducting history towards its end and full rational expression.

It is quite apparent that for Weber the religious decline he observed and brilliantly analysed was a historical process that led to finding better ways to organize society and to transform the world for the benefit of all human kind. In other words, secularization and religious loss was the by-product of structural processes leading towards a more efficient way to ensure survival and to deal with human needs. Or was it? Two issues emerge in the described panorama that could justify an alternative interpretation. The first one concerns the order of things and the causality we can attribute to them. Indeed, for a different view, Weber's historical reconstruction could mean rather a different pattern: Protestant rational religion evolved following its own search for a better way to follow God's will and hence, to dominate the world, and secularization came out as a by-product of that sheer religious quest. In that case, the evolutionary criteria would apply better and we could even talk about an exaptation, or the rise of a new function arising from a form that was not

intended to work that way. In that sense, no teleology would preside the process, but the sheer case of an unintended successful variation, regarding what could be its original design. This is similar to the general biological principle that forms can and often do change functions during the evolution of a species and during the development of individuals. In cultural evolution, which certainly applies to religion, forms change to more effectively and efficiently carry out the same function over time. The general and most important function in this case is the survival and reproductive success of the population [7].

The second issue in Weberian analysis that could throw some doubt to a simple translation of his view into evolutionary categories is the negative and quite suspicious views about the success and the happy end of that process. This is clear in the gloomy tone that emerge in the last pages of "The Protestant Ethic" [32, p. 121], where the sociologist shows his sad predictions about the destiny of a culture too much technically driven and fixed with economy and gain; his metaphor to describe that reality is the 'iron cage', a symbol revealing a dark panorama. In my opinion, that gloom was never completely over, and I guess still less when witnessing the Great War, or when showing his scepticism before attempts to substitute religion with something else, like science, political engagement, art, or even emotional love. In short, for Weber, religion gives place to other cultural expressions as means to fill the human need for meaning, but he was not convinced that such a move could succeed and deliver a better world, or entirely replace the bliss and meaning that religion could provide. Applying the evolutionist framework, the pending question was to what extent that cultural process could be deemed adaptive or maladaptive.

The second most relevant case in our attempt to translate the secularization process into evolutionary categories is offered by another German sociologist arriving several decades later: Niklas Luhmann. He was during his academic life very concerned or perplexed – perhaps even haunted – about religion and its demise in advanced societies. Luhmann tries to understand secularization in his monographic essay "Funktion der Religion" (1977) in terms of systems theory and social evolution. In that framework, secularization is the consequence in the religious sub-system of social differentiation. Religion stops representing the entire society inside a hierarchical model, in which it assumed a leading role, and is reduced to a partial function: managing transcendence communication to address residual complexity and contingency, or, in other words, dealing with those issues that other social systems do not manage to tackle. That process means a re-structuring of religion in its relationship with the social system at large and each other social sub-system, like economy, politics or science. As a consequence, religion needs to adapt to the new conditions in modern societies, trying to re-define its functions and its performances (*Leistung*) in that new context.

Luhmann describes the secular realm in terms of a system able to survive and deal with its own environment, or to cope with almost every threat and trouble, but still keeping a place and function – even if much more limited – to religion. In that sense, a clear evolution can be observed: religion loses many leading functions towards society at large and the other socially differentiated sub-systems – economy, politics, science – while those know a greater development and growth: religion as a sub-system loses, but many others gain influence.

Apparently, society can subsist and develop with less religion, and even better. That circumstance is clearly an invitation to apply an evolutionary logic: societies that tried to get rid of too much religious presence performed much better in the long run. That process could simply be the result of comparative trials: the general impression was that those societies in which religion played a secondary role in the public realm were developing better, or better off than those in which religion was too ubiquitous and influential. In any case, things are not that simple, and still less for a systems theory looking for the new place of religion in advanced societies.

Luhmann was concerned about how the functions that traditionally religion has assumed might be substituted and exerted by other social systems or means. All that process is observed inside an evolutionary pattern, and indeed the central issue is expressed often in terms of adaptation to new environmental conditions. However, it is less sure that such an approach might allow for a

reconstruction of secularization as evolution, except that what evolves is less a secular realm, but an entire social system which has to 'learn' to proceed without religion.

A key in Luhmann's analysis lies in his understanding of religions' functions and to what extent they can be subsumed into a different realm. In those terms, the evolution of secularization would be about the process through which religion's functions are displaced and assumed by a different social system, rendering religion clearly redundant. That is not an easy task or path, since Luhmann has developed at least three different concepts about religion's function along his career and – to my knowledge – has not solved the problem arising from that demand. Secularization clearly means that religion becomes unable to perform its functions and to re-establish an integration with other social systems and society at large, in the new social conditions, but it is less clear how religion can address the described challenges, and still less, whether society can get rid of religion and articulate new functions that deliver similar outcomes or help in coping with the issues religion was used to do.

Luhmann has described religion's main function as a procedure to reduce indeterminacy, complexity and contingency, especially those which can be deemed 'residual' or unable to be dealt by other social systems. However, giving some steps further in a scale of greater abstraction, he describes that function in terms of de-paradoxizing or hiding the paradoxes that unavoidably arise in other social systems because of their closed and self-referential character [20]. Still later, in a posthumous work, "Religion der Gesellschaft" (Society's religion) [21] the German sociologist described that function in terms of dealing with the excluded and dark side that results from the communication codes applied in every social system. Those developments could appear as too speculative and having less relevance for our quest, but they show at the same time the very complex and difficult nature of any attempt to characterize the evolution of secularization in terms of a religion's substitution, at least in sociological terms, or theory of social systems. When what needs to be substituted becomes so intricate and abstract, nobody can be sure about its final outcome or the operation's final success.

To the question of religion's social needs, he has expressed different opinions during his academic life. For instance, in a chapter on religion's modern evolution he considered that religion is avoidable at the personal level, but not at the social level, where we will always need a social sub-system that performs the described functions [19]. However, the issue becomes subtler in later years, and my impression when reviewing his quoted posthumous book, is that religion keeps its meaning and function when it can be conceived as avoidable and unavoidable; or only if it becomes unnecessary, then it can exert its necessary and important function.

Which lessons can we extract from that development in our attempt to translate secularization into evolutionary dynamics? The first one is that the evolution of secularization is deeply linked and entrenched with religion's evolution or can be seen as the other side of the same coin. Second, that secularization does not evolve as an isolated feature; what evolves is society at large and social systems, like economy, politics or science, which all become more adapted to a social context without religion, or that learn to perform their functions filling the gaps religion has left open, without the security net that religion used to provide until recently. And third, that such a process is completely open and uncertain, in the sense that nobody knows whether it will succeed or find new ways to adapt to the current environments or to address the challenges that could arise from a religion-less social system. What is sure is that – in an evolutionary framework – the new societies in that condition are still trying thorough variations and selections the most adaptive strategies, and this is still a very open-ended process, which does not exclude large failures and setbacks.

The third scenario worthy to explore in our attempt to translate secularization process into an evolutionary perspective is offered by some recently published books dealing with non-religious people and unbelief, as phenomena that deserve an ad hoc study, and less put into a religious function context. The idea in all those studies is that a new social segment, or cultural framework, or life style or world view has been developing in the last few decades, and that this could be observed on its own terms, not as a simple lack of religious faith, but in positive ways, as a set of

values, meaning systems and life orientations that could be seen as an alternative to traditional religious systems and their means to provide purpose in life.

The published articles and books that have tried to make sense of the non-religious assume various strategies: anthropological, sociological and psychological [31], [34], [18], [36], [8], [14], [37], [28], [3]. Let's take for the sake of a quick survey the collective book of Zuckerman, Galen and Pasquale, "The Non-Religious: Understanding Secular People and Societies" (2016). Their argument is that we need a better knowledge about that social segment, a description of its own, less in negative terms, but as positive qualities. Some traits can clearly be framed into an evolutionary logic: the set we name as 'non-religious' or 'unbelievers' is quite diversified and cannot be taken as a homogeneous group; it can be said that it has evolved into different 'kinds': sceptical, atheists, just indifferent and even those against religion. This is a rather shallow way to characterize that evolution. Perhaps the most relevant issue in their description of non-religious is to what extent all the described traits might reveal an adaptive strategy. The book provides an analysis on the motives or reasons for such an attitude, and while some can be seen as reactions against perceived negative religious institutions or people, others are more positive, like the discovery of different cultures, moral enquiry, an expansive quest for meaning, or even sexual liberation. Most of these traits can be understood as a searching attitude, and hence as cultural or personal 'variations' looking for selection in the medium and long term. In that sense, the non-religious represent a possible alternative cultural or social niche that competes – to some extent – with the religious one for greater fitness in the conditions of advanced social environments, with all the often demanding and competing circumstances pressing on almost everybody.

Then, the book shows how frequently non-religiosity correlates with some personality traits, like openness to new experiences, a more enquiring cognitive style and tolerance. This almost describes an 'ecological niche' that could be culturally built for people sharing those features, and whose open mentality and curiosity could turn out to become more adaptive in the medium and the long run. This group would be pushing towards innovation, exploration and change, helping to achieve progress or at least giving place to an alternative socio-cultural space where such people and their initiatives would fit. Such a 'niche' would balance – hypothetically – those traits more present in religious populations: obedience, conservatism, or closeness to change, helping to develop in the alternative trend and groups new solutions that require some risk-taking.

The former argument builds on a set of data not always robust enough, as for instance the very discussed studies showing a negative correlation between reflexive cognitive style and religiosity, or even between measures of intelligence and religious sensitivity. The issue is far from being settled and in any case the correlations do not allow for firm conclusions, in the strong sense that higher measured intelligence would entail religious loss [13]. The data are also different on this matter when measured within or across different nations and are associated with lots of other variables that have to be considered. And, there are no general findings that apply to all the within-nation studies, as nations differ on this matter. It is too early indeed, and the data are too weak to deduce that atheism or unbelief would be the natural result from evolution towards a brighter, deeper knowledge acquired by generations better instructed in science and with higher cognitive skills.

A second problem arises when applying in this case the evolutionary model: the quoted book clearly states that the surveyed non-religious exhibit a tendency to delay or even avoid the formation of families, and have a lower fecundity rate [36, pp. 121 ff]. Once more, unless the non-religious know something most people don't know or act on in terms of long-term sustainability for the world's human population, those data throw a dark shade into the attempt to describe non-religion in terms of a successful adaptation, except that such adaptation drops one of its main biological features, and focuses on other traits, like niche construction and social bonding among people sharing similar personalities; let's leave reproduction for others!

Following our survey, possibly a new strand can be explored to justify the process of secularization and unbelief in evolutionary terms of one sort or the other – social, cultural or personal. This strand takes advantage of empirical studies showing significant negative correlations

between well-being, equality and religious indicators – as measured in social international indexes [24]. This thesis has found support from later research, but some dismissals as well from other scholars using similar international databases. The point is that – if the thesis would find overwhelming evidence – non-religion or unbelief would be clearly the result of a social evolutionary process leading to more equal and morally committed societies; or, in other words, when a society becomes able to establish effective solidarity structures, then we can expect a lesser role for religious beliefs. Here we find a conjunction of a hypothetic evolutionary line, pointing to greater altruism or a better social structure, able to provide universal care, and the positive rise of a culture which no longer needs religion, at least not for that end. Besides the problems with the empirical consistency of the thesis [35], [25], it is questionable whether this is the best way to describe social evolution, whether other issues, like reproduction and meaning provision, would be conveniently covered, and whether religion has the only function, which is highly improbable, of providing 'existential security' or perhaps other functions that could justify and even demand its presence in advanced societies.

3. Cognitive Games and the Evolution of Unbelief

The academic trade-mark 'Cognitive Science of Religion' (CSR) offers probably the most committed attempt to "explain" religion in cognitive and evolutionary terms – or a combination of both. To what extent this program has been successful and has managed to deliver what it promised is not the question here – indeed, the doubts and criticisms accrue in the last several years. What is interesting is to test the model advanced by its practitioners to "explain" unbelief and atheism, without leaving the evolutionary framework.

A paper published in 2013 by Norenzayan and Gervais – two leading members in CSR field – deals explicitly with that issue under the title "The Origins of Religious Disbelief" [23]. The paper has the merit to summarize in few pages the four factors that can explain the evolution of unbelief or the emergence of non-religious despite the evidence they have gathered showing that religious faith is the default position in human mind, while 'disbelief' would be effortful and costly in cognitive terms. However, if there are so many atheists around, and especially in modern societies, then possibly things need to be re-arranged to make place to this growing 'exception'. For the authors, the same logic that explains the rise and expansion of religion may contribute to the alternative position. The four factors that would assist in religious loss are: "lack of intuitive support or blind-mind atheism; apatheism or unmotivated to find gods; little cultural support for faith in gods; and analytic atheism." In short, the first point places the accent in impairments in theory of mind, that would render less intuitive and more difficult to conceive supernatural agents. The second motive resorts to the already described argument about existential security, or the link between religious faith decay and better or more efficient social State and welfare services. The third reason reflects a view quite widespread belief in CSR: the need for credibility enhancing displays (CRED) to convince people – despite their natural leaning towards religion – that the held beliefs are true and reliable; atheism would be the result of a fall in such displays. And fourth, the simple idea that amore analytical and inquisitive mind would entail fewer religious worldviews, since a more critical approach to reality would seriously undermine religious intuitive, but cognitively weak ideas.

A similar point can be seen in other authors applying the cognitive lenses. For instance, Robert McCauley states that religion is relatively easy while science is harder to believe, being more counter-intuitive [22]. The challenge lies in explaining why and how the harder cognitive style could prevail in so many cases and displace 'the easy way'.

The described model is quite simple and intuitive; indeed, perhaps too simple. Even if the authors are less explicit about the evolutionary meaning that could lead that tendency to growing atheism, it is relatively easy to sum up the points and to build a more explicit evolutionary pattern. Indeed, for CSR, religion's evolutionary value lies rather in the past conditions, or has had that value as a clue that explains its origins and strong expansion, probably rendering those holding such

beliefs better off or more adapted to the hostile conditions and the harsh competence for resources that can be imagined in the dawn of human societies. The issue about present value is more complex and nuanced, and it is less clear that religion can exhibit all those positive traits that could justify its expansion and permanence in the long run.

In any case, the evolution of unbelief seems to be based more on social-cultural and less on cognitive factors. Indeed, the first described factor is very weak; it would state that atheism is the trade of those with limited theory of mind. Despite their alleged data, other set of empirical and experimental research clearly shows that people in the autistic spectrum disorder (ASD) are by no means less religious than average in their own social environments [12]. In any case, that argument would explain no more than 5% of the variance for current atheism, a rather weak factor. The second and third arguments are clearly social – the thesis on existential security developed by sociologists – and cultural, or the idea that religion needs cultural support, beyond mental biases prompting religious faith. Really, the idea of CRED, supported by other cognitivists to explain atheism [17] sounds rather as a correction or complement to the cognitive persuasion that human minds are very prone to believe in deities or supernatural beings. The reason, in any case, is quite trivial: people stops believing because other people do the same and are not showing up for their commitment as to what they might profess; a too discreetly lived religion, as is the case in modern societies, would be of little help to keep beliefs despite their early mental strength and persistence. Then, this seems to be more an argument for religion extinction and less one for unbelief evolution.

The fourth argument in Norenzayan and Gervais proposal is more cognitive and certainly can be applied into an evolutionary frame: as soon as people start reflecting in a more conscious and critical way, religious beliefs will become less convincing or even something untenable from a higher cognitive level, reached at some stage of human or cultural maturation. This point would complement the social and cultural arguments, that – once more – renders the evolution of unbelief a rather social and cultural phenomenon. The cognitive maturity that would be reached by new generations can be seen as an evolutionary peak, together with a better functioning welfare State and other complementary conditions, like a better and more efficient entertainment industry. However, the issues already reviewed still loom when the cognitive approach is assumed: it is far from clear that unbelief exhibits a higher adaptive value in advanced societies than religious faith; at least the empirical evidence is rather scarce and poor.

An alternative venue can be explored when talking about cognitive evolution, but it represents a move that contrasts with the standards of CSR and is very hypothetical: possibly cognitive structures and mental frames evolve along historical long-term processes or through genetic or epigenetic dynamics. Some evidence points in that direction, as for instance what has been shown in the studies on 'neural reuse' [1], [10], or the rising of new connections and rebuilding of neural architecture during human evolutionary process, giving rise to some new cognitive abilities. Several studies have described processes of cognitive evolution in the human species bringing our own distinct traits [15]. However, few studies are on current changes taking place in shorter periods (about a century or less) and that lead to changes in our mental structure and functioning, like, for example, greater mathematical skills, learning new languages or simply rendering easier some worldviews – secular – than used to be. Without requiring dramatic neural changes, cognitive patterns apparently evolve, and many biases can suffer modification after several generations. This can happen simply from the effect of cultural evolution and scaffolding, or even through epigenetic processes that entail new forms of thinking or new mental abilities, or more probably through gene-culture co-evolution. However, the time span is still too short to suggest that such a process that could gradually change human minds and render them less prone to conceive of gods and be more comfortable – or less fatigued – with conceiving a world without transcendence. However, we are dealing with a cultural change, not a change in our DNA. This latter proposal will be hard to swallow for a tradition that found its strongest expression in the evolutionary psychology program and has claimed that our innate "mental structure", which to some is an oxymoron, is almost identical to the one humans developed until the Pleistocene and that few changes can be expected ever since. The issue is still: can human minds – at least Western minds – evolve in the

described direction? And, will such a hypothetical evolution help to achieve better social and personal adaptations?

4. Secularization as an Historic Process Leading to a New Cultural Frame

This paragraph will reflect on Charles Taylor understanding of "A Secular Age" (2007) and tries to read his widely received view on modern religious decline as an evolutionary process. Several features in his work justify that probably audacious move. Taylor clearly proposes a historical parcourse from the late Middle Ages on until current times to answer his central question: what could happen to explain why unbelief becomes in many modern social realms the default position for most Western people, while this was by no means the case until relatively recently.

A long process has happened that Taylor tries to reconstruct from its early stages and giving rise not just to 'unbelief' but to a new cultural reality, what he calls 'the immanent frame'. This is a broadly shared framework that encompasses scientific views, a more realistic stance on human and social processes and values, and an organization of many life dimensions that does not need to resort any longer to transcendence or the divine. For Taylor the presence and extension of such a cultural realm is out of doubt, and it is clearly the result of a long historical development. The problem arises when that frame becomes closed, as in the case of some forms of humanism and atheism, and when 'subtraction stories' try to justify a new order of things. Taylor defends that the immanent frame is not the same as a closed field unable to be open to transcendence. In that sense, the long cultural evolution he describes is not exactly the same as the evolution of unbelief, even if it underlies and nourishes it. Then, against several versions of a subtraction story, modern times and secular humanism are not the result of dropping religion to allow for focusing on human values and scientific development, or other expressions of progress, but the building of a new set of values and beliefs. This point is more akin to an evolutionary schema: what is growing in the new cultural proposals emerging in late modernity is less the void left by suppressing religion and more a positive work in progress aimed at providing alternative values, meaning and beliefs. As Taylor states:

> …the very self-understanding of unbelief, that whereby it can present itself as mature, courageous, as a conquest over the temptations of childishness, dependency or lesser fortitude, requires that we remain aware of the vanquished enemy, of the obstacles which have to be climbed over, of the dangers which still await those whose brave self-responsibility falters [30, p. 591].

'Unbelief' is clearly painted in these colourful sentences in terms of a positive, committed and courageous attitude, giving rise to an alternative set of values or worldview, which will compete in the long run with other worldviews, especially with religious ones. The new cultural-secular form arising can present good credentials as the one grown up from a sensitivity based on authenticity and freedom, one that builds on the free expression of one's own feelings and emotions, on self-building and personal realization. All them are ideals and values that have influenced a long season since modern times and that have grown from an initial status of an elitist movement in Romantic times, towards a cultural explosion that expanded to almost everybody and has constituted the currency of late modern times, again often in contrast with ideas, values and rules that were clumsily and stubbornly held by most churches, especially the Catholic, in Taylor's own opinion.

Taylor's view of current cultural pluralism and concurrence between proposals of distinct natures is highly illustrative of what could be described as a competition between species to adapt to a new environment and where each kind needs to fight for survival showing its own strengths or trying to convince in its milieu that it offers a better living plan, a better way to reach 'fullness of life'. In that condition, Christian faith and the respective churches must address the challenge to compete with other life programs on supply, or with any other way to provide happiness and self-fulfilment. The evolution of unbelief brings to a new cultural context that constrains each new

proposal to build a positive and constructive program and less to introduce itself in terms of subtraction or a non-religion.

5. Unbelief and Secularization as Internal Evolution of Christian Faith

The last proposed scenario is more philosophical and theological and makes good use of a tradition that stems from Hegel – at least – and other modern thinkers who stressed the destiny of Christianity in its own demise as a religion, and its self-overcoming (*selbst-Aufhebng*) as a traditional religious form, giving place to an ethical or rational worldview or thinking style, more fitted to the new historical conditions. The interest that awakes such approach is that it might fit quite well into an evolutionary model, and be represented as an adaptation, or perhaps, better, as an exaptation.

The described view knows several versions. In most cases they reflect an unconscious or unintentional process that nevertheless leads Christian institutions and beliefs to losing their religious salience or identity. For instance, the description of 'internal secularization' taking place in several Christian churches, suggested by Peter Berger in the sixties, and then further expanded in successive decades, is a good example: some theological and practical trends stress more the ethical and social dimensions in Christian life and thought, leaving aside or just neglecting more explicit religious motives, or the 'communication of transcendence', which appears as culturally discredited or not any longer needed [4], [9]. Such process could be seen simply as an inertia and a cultural contagion when churches have to adapt to very secular contexts, but alternative readings have been proposed showing more than that.

To my knowledge, a theological strand has developed from mid-twentieth century a 'secularization theology' (Bonhoeffer, Gogarten, Cox, and Metz), which, in its more radical form, claims that the natural destiny of Christian evolution is a complete secularization and loss of transcendent references. The arguments are variegated and combine often the historical de facto evolution in churches and their internal culture, and proper theological arguments, as those maturing from an interpretation of Christ death as a declaration of God's absence in history and reality [2].

For the sake of the present article, the described development simply invites one to think on the versatility of an evolutionary framework applied to Christian theology and bringing to its apparent opposite: an 'atheology'. However, this is an unintended consequence of observed historical processes with post-hoc theological explanations. Evolution in that case would mean that a religion morphs into a non-religion, something that clearly challenges most intuitive evolutionary thinking models. Furthermore, it is again questionable that such process can simply be designed as an evolution in the sense of an adaptation: adapting to a secular context should not entail one's own extinction, but rather the search for new forms, through variations, that could give place to more fitting models, or more resistant and durable forms in the new milieu. However, the evolution in this case may apply not just to the religious realm – perhaps doomed to gradual irrelevance in advanced societies – and more to the social body at large, which gets rid of religion, with uncertain consequences, at least in empirical terms.

6. Concluding Remarks: Many Ways to Apply Evolution to Unbelief

Summarizing the results from the reviewed scenarios in which unbelief could be described in evolutionary terms, let me indicate in short bullets the main possibilities that come into play:

- Unbelief and atheism are simply the outcomes or by-products of an internal evolution in the religious realm, after many external pressures, and leading to its gradual extinction.
- Unbelief and non-religious evolve as a distinct cultural realm with its own features and building a niche well fitting in new social and cultural environments.
- The evolution of unbelief is just the evolution of the entire social system adapting to new circumstances, after religion no longer performs reliably its main traditional functions.

- Unbelief is an entire cultural trend, which can be reconstructed as a historical process, and depends on social factors and events bringing to secular societies and mentalities.
- The secular realm, once in place, has to compete with the religious realm to reach a better adaptation at different levels, or greater survival and reproductive success.
- Unbelief evolves as a cognitive process that gradually leads to a change in mental structures or habit, due to cultural or to epigenetic factors, rendering religious faith more difficult, or secular thinking easier.

A question here arising is what is taken as the 'selection unit': the individual, the group, the society, a cultural form or a given religion. In any case, as repeatedly stated, it is far from sure that secularization, unbelief and atheism might be described in sheer adaptive terms, since it continues to be an open question, and the empirical data point in a double direction: some societies seem to adapt very well to a secular frame, while others do not manage to deal with some challenges after religion wanes, especially with required reproductive rates and family stability. Such outcome invites to assume a more nuanced view on that question, and to accept that a secular majority is good and makes sense in some cases, but not in others. The future will better reveal about such an enigmatic condition, or to explain why and when more secularization is adaptive and why and when it becomes counter-adaptive.

A convenient caveat to the offered analysis needs to remind its cultural limits: it is clearly inscribed in the Western Christian settings, and it does not reflect possible dynamics in other religious and cultural milieus, as those dominated by Hinduism, Buddhism or Islam, whose developments may be quite distinct and where the study of unbelief is less known. The open question is to what extent the offered analysis could become normative and universal, or need to be limited and contained to its own context.

The suggested application of an evolutionary framework to the study of unbelief and atheism offers an attempt at testing the application of such conceptual pattern for a better understanding of cultural processes, as those characteristic of religions and alternative ways to build meaning in life. As has been already stated, this analysis calls for empirical tests to assess to what extent some cultural tendencies might become more or less adaptive at different levels and areas. Such an assessment, however, requires an in-depth discernment after many factors or variables are measured and contrasted.

References

1. Anderson, M. L.Neural reuse: a fundamental organizational principle of the brain, *Behavioral and Brain Science* 33-4, 2010, pp. 245-266.
2. Avakian, S. Christianity and Secularisation in the West and the Middle East: A Theological Stance, *Journal of Religious History* 40-3, 2015, pp. 368-384.
3. Bainbridge, W. S. *Dynamic Secularization: Information Technology and the Tension Between Religion and Science*, Dordrecht, Heidelberg: Springer, 2017.
4. Berger, P. L. *The Sacred Canopy: Elements of a Sociological Theory of Religion*, New York: Doubleday, 1967;
5. Berger, P. L. *The Desecularization of the World: Resurgent Religion and World Politics*, Grand Rapids, Mi: Eerdmans, 1999.
6. Boyd, R. Cultural Adaptation and Maladaptation: Of Kayaks and Commissars, In S. V. Gangestad, J. A. Simpson (eds.), *The Evolution of Mind: Fundamental Questions and Controversies*, New York: The Guilford Press, 2007, pp. 327-331.
7. Boyd, R., Richerson, P. J. *The Origin and Evolution of Cultures*, Oxford: Oxford University Press, 2005.
8. Brown, C. *Becoming an Atheist: Humanism and the Secular West*, London: Bloomsbury, 2017.
9. Chaves, M. Intraorganizational Power and Internal Secularization in Protestant Denominations, *American Journal of Sociology* 99-1, 1993, pp. 1-48.

10. D'Errico, F, Colagè, I. Cultural Exaptation and Cultural Neural Reuse: A Mechanism for the Emergence of Modern Culture and Behavior, *Biological Theory* 2018, doi.org/10.1007/s13752-018-0306-x.
11. Eberstadt, M. *How the West Really Lost God*: *A New Theory of Secularization*, Conshohocken, PA: Templeton Press, 2014.
12. Ekblad, L., Oviedo, Ll. Religious cognition among subjects with Autism Spectrum Disorder (ASD): Defective or different? *Clinical Neuropsychiatry* 14 (4), 2017, pp. 287-296.
13. Farias M. et al. Supernatural Belief is Not Modulated by Intuitive Thinking Style or Cognitive Inhibition, *Scientific Reports* 7, 15100, 2017.
14. Harrison, P. (ed.). *Narratives of Secularization*, London: Routledge, 2017.
15. Herrmann, E. et al. Humans Have Evolved Specialized Skills of Social Cognition: The Cultural Intelligence Hypothesis, *Science* 317, 5843, 2007, pp. 1360-1366.
16. Kaufmann, E. *Shall the religious inherit the earth? Demography and politics in twentieth-first century*, London: Profile, 2011.
17. Lanmann, J. A. The Importance of Religious Displays for Belief Acquisition and Secularization, *Journal of Contemporary Religion* 27 (1), 2012, pp. 49-65.
18. Lee, L. *Recognizing the non-religious*, Oxford, New York: Oxford University Press, 2015.
19. Luhmann, N. Die Ausdifferenzierung der Religion, In *Gesellschaftsstruktur und Semantik*, 3, Frankfurt a. M.: Suhrkamp, 1989, pp. 259-357.
20. Luhmann, N. Society, meaning, religion: Based on self-reference, *Sociological Analysis* 46-1, 1985, pp. 5-20.
21. Luhmann, N. *Religion der Gesellschaft*, Frankfurt a. M.: Suhrkamp, 2000.
22. McCauley, R. *Why religion is natural and science is not*, Oxford, New York: Oxford University Press, 2013.
23. Norenzayan, A., Gervais, W. M. The Origins of Religious Disbelief, *Trends in Cognitive Science* 17 (1), 2013, pp. 20-5.
24. Norris, P., Inglehart, R. *Sacred and secular: Religion and politics Worldwide*, Cambridge, New York: Cambridge University Press, 2004.
25. Norris, P., Inglehart, R. Are high levels of existential security conducive to secularization? A response to our critics, In S. D. Brunn (ed.), *The changing world religion map*, vol. 5, Dordrecht: Springer, 2015, pp. 3389-3408.
26. Oviedo, Ll. A multi-level approach to religion's evolution, In J. Feierman and Ll. Oviedo (eds.), *The Evolution of Religion: A Biological, Psychological, and Theological Perspective*, London: Routledge.
27. Quack, J., Schuh, C. (eds.). *Religious Indifference: New Perspectives from Studies on Secularization and Nonreligion*, Dordrecht, Heidelberg: Springer, 2017.
28. Steinvorth, U. *Secularization: An Essay in Normative Metaphysics*, London: Palgrave Macmillan, 2017.
29. Taves, A., Asprem, E., & Ihm, E. Psychology, meaning making, and the study of worldviews: Beyond religion and non-religion,*Psychology of Religion and Spirituality* 10 (3), 2018, pp. 207-217.
30. Taylor, Ch. *A Secular Age*, Cambridge Ma.: Harvard University Press, 2007.
31. Voas, D., S. McAndrew. Three Puzzles of Non-religion in Britain, *Journal of Contemporary Religion* 27-1, 2012, pp. 29-48;
32. Weber, M. Religious Rejections of the World and Their Directions [1915], In H. H. Gerth, C. W. Mills (eds.), *From Max Weber*, London: RKP, 1948.
33. Weber, M. *The Protestant Ethic and the Spirit of Capitalism* [1906], London: Penguin Classics, 2002.
34. White, J. E. *The Rise of the Nones: Understanding and Reaching the Religiously Unaffiliated*, Ada, MI: Baker Books, 2014;
35. Yu, Ch. H. A Triangulated and Exploratory Study of the Relationships Between Secularization, Religiosity, and Social Wellbeing, *Social Indicators Research* 131, 2017, pp. 1103-1119.

36. Zuckerman, Ph., Galen, L. W., & Pasquale, F. L. *The Nonreligious: Understanding secular people & societies,* Oxford, New York: Oxford University Press, 2016.

sciendo

studia humana
QUARTERLY JOURNAL

Studia Humana
Volume 8:3 (2019), pp. 21—38
DOI: 10.2478/sh-2019-0023

The Biology of Secularization

Jay R. Feierman

University of New Mexico (retired)
Rio Rancho, New Mexico 87144, USA

e-mail: jay.feierman84@gmail.com

Abstract:
For the past 500 years, to varying degrees, the processes of religious secularization have been occurring in what today are the wealthy, highly educated, industrialized nations of the world. They are causing organized religion, as a social institution, to go from being a very important influence on the lives of people and the nations in which they live to being a smaller influence, or almost no influence at all. Various disciplines from theology to psychology to sociology have tried to explain secularization, each discipline contributing something unique. One discipline that has not contributed has been biology. From a *biological* perspective, based on observation and reasoning, at least one of the ultimate functions of the physical forms associated with religion appear to be that of in-group marker for a breeding population, which, as will be shown, is how all religions start. Religions structure larger human populations into smaller "clusters" that are separate in-group breeding populations. The clustering into smaller in-group breeding populations prevents the spread of contagious diseases and creates inter-group competition and intra-group cooperation, both of which have contributed to human eusociality, a very rare type of social organization that will be explained. As the physical forms of religion are losing this in-group-marker function of clustering populations with modernity, a general biological principle comes into play, which is "form follows function, and as function wanes, so does form." When applied to religion, "form" means the physical components by which all religions are built. The specific meaning of "physical," as used here, will be explained in the article. This biological perspective, which is counter-intuitive and can generate testable hypotheses, should complement, not compete, with perspectives from other disciplines. Physical forms in biology can and often do have more than one function, so the same form with a biological function can also have psychological and theological functions. The physical forms of religion are its objects of natural (genetic and cultural) selection. As socio-economic modernity spreads through the world, the evolutionary biological trajectory suggests that religion, as a social institution, will eventually become extinct.
Keywords: biology, breeding population, eusocial, evolution, extinction, gene-culture co-evolution, in-group marker, marriage, natural selection, religion, secular, secularize, secularized, secularization.

1. Introduction

The common meaning of the transitive verb "secularized", which requires an object, is to make secular; separate from religious or spiritual connections or influences. The word "secular" is an adjective, which must modify a noun. Something has to be secularized or be secular. Both "secularized" and "secular" are not stand-alone concepts. They both tell us something about something else. There are related terms as well, such as the noun "secularization," which is used in the title of this article and means the physical processes of secularizing. There are other related noun words as well: "secularity" (a view or position that is secular), "secularism" (indifference and rejection of anything religious) and "secularist" (an individual who advocates the separation of the state from religious institutions). Secularization is a series of processes, marked by gradual changes that lead toward a particular result.

From a *biological* perspective, "a particular result" is not a goal or purpose of the processes of secularization, as natural selection has no goals. It only operates in the present and has no brain to think about the future. To presume it can have a goal or purpose sometime in the future is called teleological thinking, which is discouraged in the life sciences. Where the processes of secularization are heading can only be predicted, almost to within the realm of scientific certainty, by looking back over the past 500 years. But, hindsight-generated foresight does not a scientific theory make. Any prediction made by hindsight is one made by simple observation of what has been occurring over the past 500 years and then applying deductive reasoning that the trajectory will continue in the future.

Before one writes about these secular-related terms from the perspective of biology, one must know what is/are the noun(s) object(s) to which they will refer?" There are many possibilities. Examples include views, positions, beliefs, experiences, paradigms, individuals, families, in-groups, polity (political entities from tribes to nations), social organizations, social institutions, and even historical ages, as in Charles Taylor's *opus magnus*, "A Secular Age" [42].

Although "religions" can be defined in many different ways, in this article, religions are human-made social institution, as compared to "religiosity" which is a more anthropological term that reflects how people practice religion and includes such things as religious feeling, thoughts and beliefs, spirituality and other private religious experiences. There are also secular social institutions, such as political parties and secular states. In much of the modern world today, (generic) church and state imply two separate social institutions. But in other parts of the world, such as some Muslim theocracies and many tribal societies, the two are not separate. At other times, the distinction between what is religious (sacred) and secular (profane) breaks down [12]. For example, in many historical and some extant cultures, religion is not even a separate category from all that makes up the culture. In some societies people do not even have an equivalent word in their language for what people of the Abrahamic faiths in English call "religion." The Old Testament and the Qur'an are both religious and law books. Sharia Law is religious law.

Although it is difficult to speak generally about "religion", given the diversity of world religions, the article is not about theistic religion any more than deistic religion, which really has to do with whether a god who is believed to have made the world, intervenes in it or not. What is being said has as much to do with animist tribal religions as it does with the post-axial world religions. That being said, many of the examples come from the theistic, Abrahamic religions primarily because of better author-familiarity. To understand what is secular, one must first understand what is religious, although almost any single definition of "religion" will have exceptions and fail. With that understood, there is the concept of "a-religious", which means non-committal or professedly neutral concerning religious matters. A-religious is in contrast to atheism ("I don't believe there is a God") and agnosticism ("I don't know if there is a God, but at least I've thought about the question"). On census forms in some jurisdiction, when one's "Religious Preference" is queried, there is now often one choice called "None". Sociologists of religion have studied "Nones" [47], who are not necessarily a-religious, atheists, or agnostics. Many "Nones" claim that they are religious but don't profess to any particular organized religion or denomination

within a particular religion. Some just refer to themselves as "Christians" or "believers". There are also those who claim to be spiritual but not religious [19], religious without God [10], and to believe in God without religion [38].

From a biological perspective, the physical forms that make-up human culture can evolve. They are considered a part of human biology. Genetic and culture selection are two kinds of Darwinian natural selection. Although the mere mention of the word "evolution" can sometimes cause great distress in religious fundamentalists in all three of the Abrahamic faiths, this article is not about whether God or natural selection created life in general and human life in particular. Rather, the article just uses Darwinian evolution by natural selection as a well tried and tested general biological theory with good predictive potency to understand a small component of the processes of secularization.

Because several different disciplines study the processes of secularization, it is important to appreciate that "explaining" these processes, which is what each of the disciplines try to do, is not a one-zero sum game, where for one explanation to be useful all others have to be rejected. There are many different biological, psychological, and theological perspectives that can address the question of why the wealthy and well-educated industrialized nations of the world are in varying stages of the processes of secularization. Each discipline that studies secularization acts like the blind man touching only one part of the elephant. Only a fool would believe that a single discipline-generated explanation about features of the elephant's tail could give one a comprehensive explanation of this elephant in particular, or worse, all elephants in general. Hopefully, the collation of all of these different discipline-generated explanations of the processes of secularization will one day give a broader picture than what can be achieved from any one discipline alone.[1]

Only scientific theories whose predictive potency have been well tried and tested should be used as explanations for empirical data on secularization. Otherwise, all we have are *post hoc* "just so" stories being explained by the currently in-fashion paradigms *du jour*, most of which rarely stay fashionable for more than a few academic generations. A discipline-specific scientific theory of the processes of secularization with predictive potency need not be applicable across all the disciplines that study the processes of secularization. There can be biology, chemistry, and physics theories of a bending knee joint, each theory useful primarily to the particular discipline.

One should already appreciate the complexity of what we call "religion," and as a result, the complexity of what is called "secularization". Irrespective of how "religion" is defined, it is presumed that all readers believe that the three Abrahamic faiths – Judaism, Christianity, and Islam – are "religions." In the next Section we will explore some extant religion-like social institutions that are, so to speak, around the edges of religion and that blur the distinction between the sacred and the profane. This must be taken into consideration in understanding secularization, as these types of institutions could very well continue to exist even when the more formal, recognized religions eventually give way to secularity.

2. Religion-Like Social Institutions

Quakers (or The Society of Friends) [2], which has several divisions, believe that God is within everyone; and when one speaks sincerely from the heart, it is the "Word of God." A minority of Quakers have unstructured "Meetings for Worship" services with no clergy or leader. The congregants walk in to a plain, unadorned-walled room, except for a large clock on the wall. They sit for an hour on chairs around the four walls facing inward and looking at each other. There is total silence in the room. At any time within the hour, anyone can stand up and speak for as long as he or she wants. Or, no one can speak at all for the hour. Based on the time on the clock, everyone stands up and leaves one hour after the meeting started. Is it a religion?

There is also secular humanism [23], which acts like a religion without a deity and which is contentious for religious tax-free status as a religion in various jurisdictions.[2] Although there are many other religion-like examples that could be given, including what some people would include "the new religion" of environmentalism and global warming [42], Alcoholics Anonymous ("AA")

is a good place to end the religion-like discussion. AA is an international, non-profit, free of charge fellowship, started in 1939, by and for persons who need help because of their use of alcohol. They believe in a non-specified "power greater than ourselves" who can restore the alcoholic to sanity. According to AA's own data, their "Big Book," which is analogous to a canonical sacred text, has sold more than 30 million copies in the English language alone and can even be downloaded free of charge [3]. It has been translated into 67 languages. AA exists in over 170 countries and claims a membership of at least 2 million. The fellowship considers themselves spiritual but not religious.

3. The Noun Object(s) of Secularized and Secular in This Article

Given the above discussions of religion-like social institutions, it should be obvious that secular is not a mutually exclusive category from religious. Secular is one end of a continuum with strict religiousness or religiosity at the other end. One could even say, although there would be objections, that secular is part of a normal distribution of religion with secularists with little religion in the left tail of the normal distribution and religious fundamentalist extremists (in any of the Abrahamic faiths) with too much religion in the right tail. We now need to determine what the noun-object(s) of secularized and secular will be in this article, given the large number of choices. Because this a biological and methodological naturalism approach, the noun-object(s) of secular and secularized has or have to be a form or forms that are observable with the senses. The term "form", which is distinct from "function", will be discussed in the next Section. In this article *the noun-objects of secularized and secular will be human persons and also the nations in which they live*.

The nations are important to consider because some of the demographic data on secularization refer to particular nations and the percentage of the population who consider themselves to be secular, measured in many different ways. As an example, in 2018, The Pew Research Center found that only 8% of Swedes went to church at all [32]. Compare that to the Philippines, considered to be one of the most religious Christian nations in the world. Although church attendance is declining, especially among young people, 41% of Roman Catholics in the Philippines still attend weekly Mass [44]. Obviously, Sweden is a more secularized nation than the Philippines.

4. Forms, Functions, and Ontological Realms

To better understand the relationship between forms and functions and why only forms but not functions can be objects of selection, it helps to realize that form and function are the life sciences' two different ontological realms. It is the life sciences' version of ontological dualism that has very little in common with Cartesian ontological dualism. Forms are what things are. Forms exist in the "physical" ontological realm that contains mass, energy, force, space, time and information. Functions are what the forms do conceptually and usually are expressed as present participle verbs that end in "ing," as in "praying". Functions do not exist in the "physical" ontological realm. Functions come into existence (or come "to be") by how they are formally defined and how they are used in discourse.

As an example, the human heart is a form. "Pumping" blood is the non-material conceptual answer to the question, "What does the heart do?" which a less precise way of asking, "What is the function of the heart?" Functions are the answer to "What?" questions. They have to be distinguished from the answer to "How?" questions, such as "How does the heart pump blood?" The answer to this "How?" question will use what is known from physiology and biochemistry and will contain anatomical forms (also called anatomical structures) and their interactions in the "physical" ontological realm.

5. The Initial Objects of Study

In all of the natural sciences, there has to be an initial object of study that is observable with the senses. Sometimes, the initial object of study is chosen to learn something about something else, which is being done in this article. One might ask, "Why are religions themselves not the initial object of study to understand secularization? They seem to be observable with the senses". The reason is that although religion evolved by natural selection, different religions themselves are too heterogeneous and complex and contain to many functional and purely subjective features that are not all forms that potentially can be objects of selection and adaptations. The transition from religion to secular is through a series of evolutionary processes, but they are not acting on religion itself as a whole, just certain aspects of religion that are forms.

Religion has some components that are not forms but are completely subjective (e.g., the "feeling" of God's presence), which in the author's opinion, are wrongly called an "illusion" [45] or delusion [8] by some authors. Subjectivity and function-only defined concepts, which are not forms, cannot be "objects of selection," which have to be forms. If we are to understand how religion's evolutionary trajectory is heading towards secularity as a by-product of the decreasing positive natural selection pressures on religion's forms in the wealthy, highly educated, industrialized nations (with of course exceptions), our initial objects of study must be forms that can also be "objects of selection." In summary, forms within religion can be direct objects of natural selection, but religion as a whole, just like people and nations as a whole, cannot be.

In this article, the initial "object of study", which will be used to understand the biology of the processes secularization of people and nations, which are the noun-objects of "secular" and "secularized," will be certain forms within religion that are called *Structural Design Features*, hereafter referred to by the acronym, *SDFs*. They are animate or inanimate forms that have static or moving architectural mass by which they can be defined (not just described). *Architectural mass* means a deliberately-constructed, function-related form. To help understand the word "form", animate forms are the same as "anatomical structures."

There are other evolutionary processes on the path from religion to secular that don't necessarily produce adaptations in populations, like immigration, emigration, cultural imposition, and what is called "genetic drift" and its analog, "cultural drift." Genetic and cultural drift are caused by random (in genetic evolution) or sometimes by mistake or deliberate (in cultural evolution) changes in SDF forms, usually with the same functions, as they are passed across or (with cultural evolution) within generations. In cultural evolution such changes, when deliberate, usually lead to technological advances with new devices doing the same function (e.g., communicating) better.

In terms of inanimate forms, a piece of black volcanic obsidian is not an inanimate SDF form but an arrowhead made from the obsidian with human hands and flaking tools is. The compilation of letters "mosidu" is not an inanimate SDF form but "sodium" is, as the same inanimate letters are "deliberately constructed" in a specific order to be an agreed-upon linguistic symbol in the English language for a particular chemical-element referent. The linguistic symbol "sodium" can be used in speech or writing to functionally answer a question, such as "What is the metallic element in table salt?"

The value of SDFs is that they can be inanimate or animate, objects of both cultural and genetic natural selection, and potential adaptations. The term "Structural Design Feature", which was first used by Feierman in 2009 [14], gives one a common terminology by which to understand genetic and cultural natural selection as well as their important interaction as gene-culture co-evolution.

6. Secularization of People and Nations as By-Products of Changing Selection Pressures on Religious SDF Forms

First, some terminology. "Ultimate function" is what SDF forms, such as the tails of monkeys or the various animate and inanimate religious SDF forms, were doing when they were first under positive natural selection pressures in an ancestral environment and where they increased in frequency in the population over time. "Proximate use function" is what the SDF form is doing in the current environment. If the environment changes from ancestral times to the present, the proximate use function of an SDF form could have diminished usefulness, compared to its usefulness at the time of the ultimate function. With diminished usefulness, positive natural selection pressures, which kept the SDF form common in the population in the ancestral environment, get reduced. When that occurs, the SDF form reduces in frequency in the population and sometimes in size or complexity in the individuals harboring it, whether the form is animate or inanimate. If there are no positive selection pressures at all on an SDF form, it could eventually disappear, like the inanimate, SDF-form telegraph keys.

The argument in this article is that human persons and nations secularize as a by-product of the reduction of positive natural selection pressures on the animate and inanimate religious SDF forms within religion and upon which religions are built. Appreciate that a reduction in positive natural selection pressure (i.e., it is of little use but does no harm) is very different from the presence of negative natural selection pressure (i.e., it does harm). In biology, "harm" is short for that which produces a reduction in survival and reproductive success, especially of the in-group breeding population to which in-group members belong.

With that as background, it should not be too difficult to appreciate that "secular" (of persons and nations) can result from the relative decrease of proximate use function in previously ultimate functioning animate and inanimate religious SDF forms. Clearly, the ancestral environment in which pre-doctrinal religions first evolved was a very different environment from the current environment in a wealthy, highly educated industrial nation in which doctrinal religions exist [9]. And, as the (ultimate to proximate) function of the religious SDF form decreases, so does its frequency in the population as well as how often it is carried out in individual persons in the population. As an example, even in persons who are relatively secularized, religion can play a small part in their lives during major life changes, such as weddings and funerals. The reduction of religious SDF forms (i.e., how often they are seen or displayed in nations as well as in persons) as their proximate use function wanes is analogous to the reduction in the bones of the human coccyx ("tail bone") when we lost our tails.

The human coccyx is the result of an evolutionary trajectory that started with our monkey-like primate ancestor's tails. Around 20-25 million years ago, our monkey-like ancestors, whose descendants eventually became us, came down from the trees, where tails had been useful in grasping and balancing. Once life was no longer lived in trees, these primates became what are known as the savannah apes as well as the savannah-dwelling old-world tailless monkeys that we call baboons. When the ultimate function (grasping and balancing) of tails waned on the savannah, so did the size and shape of the bony SDF forms (i.e., vertebrae) that had formed the tail. What is left of our ancestral tail is the small vestigial group of fused vertebrae at the end of our spine called our coccyx. There is no reason for natural selection to put a lot of valuable time and energy into building an SDF form whose (ultimate to proximate) function is waning. Consider how this applies to the animate and inanimate SDF forms with which religions are built.

In reference to the vestigial concept as applied to cultural evolution, in "The Foundation of Ethology", Konrad Lorenz [27] wrote about this vestigial principle in reference to changes in military uniforms over the centuries. Certain pieces of metal armor that were originally designed to protect the throat and chest of fighting knights in armor were changed over many centuries to smaller cloth-made status decorations on the front of the uniforms of officers.

This most general biological principle, which applies to both genetic and cultural evolution – "form follows function, and as function wanes, so does form" – is what is being used to

understand the secularization of people and nations in this article. The argument is that there is a reduction in the positive natural selection pressures on animate and inanimate, religious SDF forms in the wealthy, highly educated industrialized nations. These religious SDF forms are in varying stages of becoming vestigial (i.e., of secularizing). They have not acquired new proximate use functions to replace their waning ultimate ones. What these SDF forms are and what their functions are will follow.

7. What Are Some Animate and Inanimate Religious SDF Forms

Religious SDF forms can be *animate*, as in parts of the body, including the brain. They can also be movements of the body. Religious ritualized behaviors (movements) are also animate religious SDF forms. Examples include the "signing of the cross" in most branches of the Christian religion and even the stylized non-vocal behavioral aspects of a priest presiding at a Roman Catholic Mass. The vocalizing behaviors used to produce oral prayers and oral hymns, but not the sounds of the oral prayers or hymns themselves, are animate, religious SDF forms. Similarly, the behaviors used to write sacred texts, but not the written words themselves, are animate religious SDF forms. Religious facial hair, like the Muslim "religious beard", the Orthodox Jewish curled sideburns ("payot"), the Medieval-originated tonsure (bald shaving of the top of the head) of monastic Christian monks and friars, the bald, shaved heads of Buddhist monks, and the circumcised penises of Jewish and Muslim males are all animate religious SDF forms.

Religious SDF forms can also be *inanimate*. Written sacred religious texts containing religious mythical stories, belief-word-prefaced propositions, and the written words of hymns and prayers are all inanimate religious SDF forms. If spoken and when between mouths and ears, the vocalized words in religious mythical stories, belief-word-prefaced propositions, hymns, and prayers are all inanimate religious SDF forms, as they are really just patterned vibrating air molecules. Religion-specific identifying pieces of clothing are inanimate, religious SDF forms. This would include the Roman collar, the vestments worn by priests saying mass, the Muslim hijab and bourka, the Jewish skull cap, etc. The currently fashionable small gold crosses with religious symbolism worn around the neck on delicate gold chains of some Christian women also are inanimate religious SDF forms. In centuries to come, it would not be surprising if small gold-crosses on delicate gold chains around a woman's neck and without any religious meaning became the last vestige of a religious, inanimate SDF form in a previously Christian nation. One can see that today in Japan, where many non-Christian teenage girls wear small gold crosses around their neck purely as jewelry and as a Western-emulating fashion statement.

8. Religious SDF Forms as In-group Markers for Breeding Populations

If we just consider the western, industrialized democracies, especially the heterogeneous "melting pot" ones like the United States, how does one tell the religion of someone else? For some religions, like Islam and Orthodox Judaism, inanimate SDF dress and animate SDF hairstyle are easy give-a-ways. However, for mainline Protestants, Catholics, and non-Orthodox Jews, one usually can't tell someone's religion just by outward appearance other than by racial and ethnic clues and the religion most common among such groups. However, subtle signs, like the inanimate-SDF form small gold cross on a gold chain around a woman's neck, although not able to say which Christian denomination to which the woman belongs, gives an appearance, at least in the present time, that she is not a Muslim or Jew. "Appearance" is the correct word rather than "indication", as a number of Jewish women, who passed as Christians during the Holocaust, wore small gold crosses around their neck. In the language of behavioral ecology, a gold cross around a woman's neck is not a costly nor a hard to fake signal.

In the men's locker room, it used to be possible to determine someone's religion as Jew or Muslim in Europe by their circumcised penis's SDF form, something that did not go unnoticed for Jewish males during the Holocaust, where Jewish women had a better chance of surviving by

passing as Christian than Jewish men. However, in a country like the United States today, about 50 to 60% of all male babies born are circumcised, even though Jews and Muslims make up only 1.4% and 1% of the total population, respectively. So, in the United States, circumcision is no longer a religious SDF in-group/religion marker. And realistically, the presence or absence of a foreskin is not the usual way in any country for casual friends and acquaintances to determine someone else's religion. The same issue applies to female genital mutation, a grotesque animate SDF form that is peculiar to mainly Muslim countries and a few small animist groups. Although theoretically not a religious SDF form, it still acts as one, as the practice is unheard of among people of non-animists, non-Muslim religions. In terms of circumcision, although it is not an outward in-group marker, when a man and a woman get sexually intimate with one another, a Jewish or Muslim woman can identify the man with whom she is with as part or not part of her in-group. And, when the Nazis were suspicious that a man might be a Jew during the Holocaust, they made the man take down his pants to see if he had or did not have a circumcised penis.

For mainline Protestants, Catholics and non-Orthodox Jews, apart from knowing if someone attends a particular religious institution, the usual way that one determines someone else's religion is based on what they say in terms of their expressed belief-word-prefaced propositions, values, etc. And, that is also a relatively easy thing to hide or fake. There are few times in one's life where one has to verbally declare one's religious beliefs to others involuntarily. However, when people do say things that reveal their religion, it is usually in the form of belief-word-prefaced propositions which occur during conversation. This supports the argument about how religious SDF forms act as in-group/religious markers for breeding populations.

In earlier times, especially when humans lived in tribal societies, everyone was of the same religion. There were many in-group markers from language to dress to hairstyle to adornments to religious behaviors and rituals. Religious SDF forms were just one of many intra-tribal SDF forms that signified tribal in-group identity. Orally transmitted religious mythical stories bound the in-group together along with religious behavioral rituals.

9. The Waning of Assortative Mating by Religion

Clergy of all religions are notorious for advocating, in the strongest of terms, that their congregants should only marry people of the same religion. This is especially true among Orthodox Jews [39] and Muslims [22], even though Sharia Law reluctantly allows a Muslim man to marry a Jewish or Christian woman but not a Hindu woman, as she is considered an idolater. However, according to Sharia Law a Muslim woman can only marry a Muslim man. Sunni-Shia marriages are still strongly discouraged as are Roman Catholic-Protestant marriages. In recent times, things are changing in the wealthy, highly educated, industrialized nations. Christian and non-Orthodox Jewish clergy are losing their ability to dissuade their congregants from marrying someone of another faith. Perhaps their advice, at least among the not-yet-secularized, should be considered if one puts a high value on long term marriages. With a few exceptions, evidence supports that same-faith marriages, at least in the United States, have a longer duration than inter-faith marriages [24].

The important thing to appreciate about all these religion-associated SDF forms is that they identify people with a particular religion/in-group within which almost everyone, at least historically, married. Even today in most of the relatively non-secularized world, religion's influence is similar to age, race, socio-economic status, and ethnicity in terms of who marries whom. This especially applies to people of different religions who live in close proximity to one another, often in the same neighborhood, and when there are no physical barriers between them. The preference to marry someone with a feature similar to one's own is called "assortative mating". Religion is one of the main features determining who marries whom in both Western [46] and Asian [20] samples. The barrier to gene flow can be completely cultural, given that particular religions are cultural social institution.

In the United States, which is secularizing slower than Europe [54], assortative mating over the past half century on the basis of religion has been slowly declining among Protestants, Catholics

and Jews with the largest decline among Jews. [36] According to a 2013 Pew Research Center survey [27], between the years 2005 and 2013, 58% of American Jews married non-Jews. Before 1970, it was between 11 and 17%, and in the 1950 census it was only 7% [34].

In Canada, a predominantly Christian nation, only 6% of marriages were inter-faith in 1927 but by 1967, it had risen to 16% [5]. By 2001, the percentage of inter-faith marriages in Canada had only increased to 19%, not much higher than in 1967. That surprisingly small change is because of the sharp rise in religious: non-religious marriages, which do not count as "inter-religious marriage." The population of Canadians who profess "no religion" has increased from 7% in 1981 to 17% in 2001. Ironically, marriage between a person who professes a religion and someone who professes no religion in Canada was higher in 1981 (38%) than in 2001 (25%). That lowering of percentage is thought to be because people who profess no-religion, who are becoming more numerous in the Canadian population, also have assortative mating and tend to marry one another. According to the 2001 Canadian Census, people of almost all religions, living in communities with a low concentration of co-religionists of the opposite sex, are more likely to be in interreligious unions than people in communities with high concentrations of co-religionists [7].

10. Religious Diversity, Not Amount of Religion in a Nation, Determines if Religious SDFs Will Be Significant In-Group Markers

Even though there are large differences between most irreligious [50] and most religious nations of the world [49], SDF forms are acting as in-group markers for a breeding population as a function of the religious diversity within a nation. Religious SDF forms are not going to act as in-group markers for an in-group breeding population in a nation in which the population describes themselves as 98% religious where virtually everyone in the nation is of the same religion. The most religious nations in the world are the also poorest. Very few persons in these poor, almost single-religion nations have ever been outside of the nation to even see someone of marriageable age of a different religion.

In the countries in which 98% of the population considers themselves "religious", there is lots of variance among these countries in religious homogeneity. In Burundi, there are 67% Christian (62% Catholic and 5% Protestant), 32% indigenous beliefs, and 1% Muslim [11]. In Djibouti, 94.1% of the population are Muslim, almost all Sunni [13]. In Somalia, over 99% of the population are Sunni Muslims with 0.01% Christian, 0.01 % traditional religion animists, and 0.1% Hinduism, Buddhism, or unaffiliated.

11. Modern China as an Example of the Difficulty in Evaluating Religious SDF Forms as In-Group Marking Barriers to Gene Flow

In the country claimed by many studies to be the least religious (or most secularized) in the world, China (although it sometimes ties with Sweden) with 90% of the 1.4 billion people claiming to be "irreligious", still has 140 million claiming some religious affiliation. The other problem is simply claiming to not have a religion does not mean one practices nothing that could be considered religious. Just because one claims to not have a religious affiliation, does not mean that one does not have religious feelings, beliefs and behaviors. This applies to Europe as well as to China. By a 2015 Gallup poll, there are five state-recognized religions in China: Buddhism, Catholicism, Daoism, Islam, and Protestantism [1]. One can be imprisoned for practicing a "non-approved" religion.

Religion in China is very complex, which makes understanding secularism even more difficult. In a 2005 survey of five major Chinese cities, only 5.3% of the surveyed population actually belonged to a religious organization while 51.8% belonged to no religious organization and could be by some definitions considered to be "non-religious". However, 23.8% of this so-called "non-religious" sample claimed to regularly worship venerated ancestors, 23.1% claimed they worshipped Buddha or at least self-identified as Buddhist, and 38.5% had beliefs and practices in

folk religions or celestial powers. Many Chinese also claim to have more than one religion and may practice both, one, or neither. Only 32.9% claimed to be committed atheists [52]. City dwellers are easier to systematically poll than rural farming peasants. With hundreds of millions of rural farming peasants left out of the polling, one can't generalize most studies to all of China.

In a 2007 book, Rodney Stark, one of the most respected sociologists of religion, claimed that there were "40 to 50 million devoted followers of Christ in China" [40, p.335]. Only a few years later, 2010 Pew Research Center publications estimated that there were 67 million Christians in China [30]. Whether such a rapid increase in Christianity is plausible in such a short period of time has to be evaluated in light of a number of non-Evangelical Christian religious scholars accusing the Evangelicals of being too optimistic in terms of the number of Christians in China.

It is difficult to get English-language data on the frequency of inter-religious marriage in China today. Most of the data released by the Chinese government are on "mixed marriages", meaning a Chinese national marrying a non-Chinese national spouse, although one can presume that many of these mixed marriages were also inter-religious. In 2006, there were 68,000 mixed marriages "registered" in China [53], a country of 1.4 billion people.

There is evidence that inter-religious marriages don't naturally or usually occur in some parts of China. The data (in English) come from Western China in Cherchen County in southern Xinjiang Province, population 10,000 of which 73% are Uighurs and 27% Han Chinese. The Chinese communist government is offering financial cash incentives as well as housing, schooling and health benefits for the Han Chinese (predominantly Taoists, Buddhists, and traditional religions) to marry the Turkic-speaking, Muslim Uighurs [25]. The issue is both a cultural difference and a religious difference, although, at least among the Muslims, it is difficult to separate the non-religious cultural factors from the religious ones.

It also was reported (in English) by Xing, using 1990 census data from 476 cities in China, that the urban Muslim Hui, who have adopted most of the majority Confucianism Han culture and differ primarily on religion, do marry occasionally with variance in frequency across different cities. Traditionally the majority Han have no restrictions to "out-marriages" but the Muslim Hui have strong taboos, prohibiting its members, especially women, from "out-marrying" with non-Muslims. The literature is conflictual as to how often such "out-marriages" within the nation of China occur [51]. In summary, the degree to which China is really the most irreligious or most secularized nation in the world is contentious given the control of information coming out of the country by the communist government.

12. Eusociality and the Biology of the Processes of Secularization

In order to understand the role of religious SDF in-group markers in the processes of secularization, one must understand eusociality, which is the most successful animal social system on earth. Eusocial animals make up about 1% of all animal species but they are more than half of the number of individual animals alive and their combined biomass is more than the other 99% of species. Most eusocial species are social insects, such as ants, bees and termites. There are only two eusocial vertebrates (teleost fish, amphibians, reptiles, birds, and mammals): two species of mole rats and human beings. There are a number of more-or-less agreed upon criteria for eusociality. They are (1) multi-generations living together, (2) defense of a home locale containing juveniles and often food stuff, (3) cooperative care of the young, and (4) a division of labor that is more than just between the two sexes. Eusociality can be divided into "loose" eusociality and "strict" eusociality. The difference between the two is that in strict eusociality, as part of the division of labor, there is a (potentially-reversible in some species) reproductively suppressed caste and what is called "reproductive skew", where the non-reproducing individuals within the "breeding population" outnumber the "breeders" to varying degree. As of today, human beings in the wealthy, highly educated, industrialized nations easily meet criteria for "loose" eusociality.

There is evidence that as a species, we (i.e., *Homo sapiens*) are moving toward a "stricter" eusociality, as we do have increasing sub-specialization as well as an emerging and growing group

of individuals who are reproductively suppressed by different mechanisms. They include religious celibates, homosexuals, asexuals, transsexuals, and the 30% or more of forty-year old women in many of the industrialized democracies who have never had a child. For all eusocial species, (1) individuals within the in-group breeding population have a way of identifying other individuals as members of their in-group, and (2) all individuals in the in-group breeding population put the welfare and survival of the in-group above that of self. Eusociality's evolution can be modeled by two different "book keeping" methods: kin selection (nepotism) and multi-level selection (selection on both the individual and the in-group breeding population) [48].

Eusocial ants, for example, use chemical pheromones to identify individuals as members of their in-group breeding population, even though they don't distinguish among individuals within the colony. The argument being proposed in this article is that humans use other in-group markers to identify individuals within their in-group breeding populations, but somewhat like ants, they don't always distinguish (i.e., recognize as familiar or know the names of) particular individuals. Among humans, think of soldiers in a large infantry division, who only recognize other in-group members by their uniform and not by personal recognition.

Recall that all religions started out as in-group breeding populations and today, there is still very strong assortative mating for the same religion, stronger in some religions (e.g., Orthodox Judaism and Islam) than others. All ingroup markers have to be SDF forms as they have to be recognizable with the senses. Human beings have many in-group breeding population markers. They include, not in any order of importance, language, dress, hair style, adornments, habits and customs, and many different religious SDFs, from clothing to hair to religion-identifying jewelry and even religion-identifying variations on the general postural theme used in the non-vocal aspects of petitioning prayer [15]. A knowledgeable person can tell, with a fair degree of certainty and by the behavior alone, if someone in petitioning prayer is a Jew, Christian or Muslim.

13. Human In-Group and Out-Group Relations

The argument has been made in the literature that one of religion's primary *biological* functions is clustering larger human populations into separate and smaller, non-gene-exchanging groups. There are two main reasons supporting why this appears to be the ultimate *biological* function of the religions SDF forms, the frameworks upon which religions are built. One reason is that clustering larger human populations into smaller non-gene-exchanging in-groups through taboos against inter-religious marriage, produces a reduction in the spread of contagious diseases for which humans are especially vulnerable. The density of religions (religions/area) increase in direct proportion to the amount of contagious diseases in an area globally [17].

Second is that religions, as in-group breeding populations, create competition between human in-group breeding populations. As a general biological principle, when resources get scarce, in-group breeding populations within the same species get competitive with one another. Competition also makes everything better, which is why free competitive market economies produce better goods and services and are more prosperous than socialism and communism. As a result of the competitive advantage, there would be positive natural selection pressures on the animate and inanimate SDF forms, whose functions lead to competitiveness. And ironically, inter-group competitiveness requires intra-group cooperativeness, so that in multi-level selection, there would also be positive natural selection pressures on the animate and inanimate SDF forms whose functions are in-group cooperativeness, sometimes also called altruism in humans. At times, different human in-group breeding populations also form coalitions to compete with a common enemy or threat. NATO (North Atlantic Treaty Association) is a good example.

The main natural selection pressures on human in-group breeding populations over the past 300,000 years have not been the environment or even predators. Rather, they have been other human in-group breeding populations. In competition for resources, human in-group breeding populations are continually trying to out-smart one another and garner more resources. One common form of human inter-group competition is warfare, where victory depends on the

development of better strategy, tactics, and technology, all of which improve with higher intelligence. Our extremely high intelligence for an animal species is thought to have evolved, at least in part, by sexual selection [29].

This is how sexual selection works. If nubile women preferred higher intelligent men, who usually become higher status men, higher intelligence in humans would evolve in both sexes by sexual selection. In contrast to natural selection, which does not have a brain, women do. A female brain is sexually selecting for a better a male brain, taking cultural factors into consideration. For example, in the 21st century, a mild-mannered, un-muscular certified public accountant has higher "mate value" in terms of being able to better provision a woman and her children than a large and brawny, somewhat aggressive, relatively un-educated brute of a man, who probably could have swung a club and protected the woman and her children better ten thousand years ago. Women's brains are faster than natural selection in keeping up with rapid cultural changes, especially in technology.

In summary, in all the above-mentioned examples, because we as humans are a eusocial species, especially in times of inter-group competition, individuals put the welfare and survival of their in-group over that of themselves.

14. The Emotional Need for In-group Identification and Membership

The argument has already been made that one of the obvious, main *biological* functions of religious SDF forms, which are the core upon which all religions are built, are that of in-group markers for religions/in-group breeding populations. Although this seems true in the early stages of religion's evolution, in the wealthy, highly educated industrialized nations, religious SDF forms are performing this in-group marking function less and less. That is because there are so many other in-groups to which individuals can simultaneously belong. In such wealthy, highly educated and industrialized nations, individuals, especially those with high degrees of eusocial specialization, can have many different in-groups besides religion to which they can belong at the same time and which often contain people with whom breeding (i.e., marriage) is not prohibited. Examples include nation (i.e., nationalism, whose origin is tribalism), state, neighborhood, job, profession, academic discipline, academic organization and society, trade association, union, political party affiliation, sports team, etc. Identification with and doing volunteer work for a political party with which one shares very strong political beliefs is a good example of an in-group that meets many of the same emotional needs of belonging that one has in a religion. That's especially true because of the many areas of commonality between politics and religion, which are still one in the same today in the Muslim theocracies.

15. Form Follows Function, and As Function Wanes, so Does Form, with Special Reference to Religion

To review, one of the most general principles of *biology* – and especially true of comparative anatomy where one traces the evolutionary history of forms through different species – is that *as the function of a form wanes (especially if not replaced by another function), so does the form whose function it is*. The form becomes vestigial, as applied to religion, the forms are the animate and inanimate SDF forms associated with particular religions. There are many reasons why religious SDF form's functions as in-group markers for breeding populations are waning. One of them, which is being emphasized in this article as it has the most biological salience, is the fact that in the wealthy, highly educated industrialized nations, religions are now competing with other social institution in-groups that meet the human need of in-group belonging. That was covered in its own Section above.

When children get to middle school, high school, and for some the university, they have to weigh these simple religious answers against what they are learning in biology, chemistry and physics. They also have to compare these simple answers they were taught in religion classes based

on religious mythical stories to what they see and learn on the internet, from teachers and then professors, from talking to other children of different religions or who are secularized. They also have to weigh what they learned once they realize that they can think for themselves about the big questions in life. So now, in the wealthy, highly educated, industrialized nations, religion is competing with science for answers to life's big questions. By the time that children get out of elementary school and begin to learn science, many come to believe that science provides better answers than religion. That might cause at least some of them to doubt other things they were taught about life and other aspects of living by their religion.

As one specific example, on page 7 of the New Saint Joseph Baltimore Catechism [37], under the Section, Prayers for Every Day, it says, "after an ejaculation, boys are supposed to say a particular prayer: 'My Jesus, mercy. Most Sacred Heart of Jesus, have mercy on us, Mother of mercy pray for us. Jesus, Mary and Joseph, bless us now and at the hour of our death.'" Appreciate that this is being taught to "upper elementary school children", who probably don't even know what the word "ejaculation" means. By the time that these children get to middle and high school, the presumption for adolescent boys (but not for adolescent girls, who don't ejaculate but who also masturbate, almost as often) is that orgasms outside the "benefit of marriage" and not open to procreation are bad. Appreciate that this book was published in 1969, in the middle of the sexual revolution.[3]

By the time these previously catechized Roman Catholic teenagers became middle age in the United States, according to a 2006-2008 National Survey of Family Growth by the Guttmacher Institute [35], among a sample of over 13 million Roman Catholic women who had ever had sex, married or not, 98% of them had used a contraceptive method other than natural family planning, which according to the Magisterium of the Roman Catholic Church, constitutes "gravely sinful matter" that is "intrinsically immoral" and "is thus never permissible for any reason or purpose whatsoever" [6].

Historically, one of the most important theological, proximate use functions of the written teachings (which are inanimate SDF forms) of the Roman Catholic Church has been to teach and guide its members toward behavior considered to be moral. However, in modernity, at least since the sexual revolution of the 1960s, that function of the Church is waning both for the issue of masturbation, which is virtually universal among all young teenagers, and for what is called "artificial contraception", which at 98% use among Roman Catholic women who have ever had sex, is even more universal.

In earlier times, even a few centuries ago, religious SDF forms found in religious mythical stories were culturally isolated from individuals who believed other religious mythical stories. Today, educated persons, certainly at the post high-school level, have knowledge of more than one religion's mythical stories, even if just cursory. However, that's enough information to know that if two religions opine differently on the same topic, one must be false if the other is true. An educated person realizes that her religion might not be true. An example is whether or not Jesus is considered a deity or just a prophet, about which Christianity and Islam are not in agreement.

Another reason for the waning of religion's functions in the wealthy, highly educated industrialized nations is economic security. With a few exceptions, the most religious nations in the world, most of which are now in the peri-equatorial parts of the world between the Tropics of Cancer and Capricorn, are very poor. People have lots of economic insecurity. There are many sociological studies of religion that show that the most economically insecure nations are the most religious. The opposite is also true. Being the most economically secure correlates with high degrees of secularism with socialist democracies in Scandinavia being good examples.

Starting in the 1960s, with the so-called sexual revolution, primarily because of the discovery of oral contraceptives for women, what was once a religious in-group breeding population turned into a contracepted mating population with much "looser" borders that were no longer constructed by religion. If one is not going to have a baby as the result of sex, then the religion of the person with whom one is engaging in sex becomes irrelevant. Once sex became uncoupled from the probability of pregnancy, religion's function of regulating with whom and

under what conditions (i.e., "the benefit of marriage") one could be sexual with someone else waned.

As a part of the sexual revolution, homosexual sexual relations, which were condemned so heavily by organized religion, especially the more conservative factions thereof, became socially acceptable even to the degree of legalizing homosexual marriage in some nations. The objection to "same sex unions" by all but the most liberal religious denominations, were discordant with the values of many young people today, causing them to question religion's function regarding sexual morality. And, causing even more doubt on the purveyor of sexual morality function of the Roman Catholic Church clergy has been the sexual abuse scandals, starting in the 1980s, of celibate male clergy's sexual behavior mostly with peri-pubescent boys.

In more heterogeneous nations, such as the United States, which contains people of hundreds of different religious denominations, the situation is different from the primarily one-religion nations and one-religion parts of nations in Northern Europe. There are so many different religions in the United States because, apart from all of the standard and mainstream world religions, there is a current trend of free-lance, entrepreneurial "Christian" churches that are not centrally-controlled and franchised branches of more established religions (e.g., Catholic, Lutheran, Baptist, Methodist, etc.). These freelance churches have nondenominational-identifying names. Some of the more entrepreneurial pastors in the large "mega-churches" become multi-millionaires from their non-taxable church "businesses". These one-of-a-kind, nondenominational Christian churches do not have the same cultural barriers against marriage between their congregants and members of other similar freelance, one-of-a-kind congregations, again causing a waning of the in-group marker function of SDF forms within particular religions.

16. Religion's Diminished Function as an Authority on Sexual Morality

The institution of marriage itself is on the decline in the United States as well as the other wealthy, well-educated, industrialized nations, with of course variation among them. Going against centuries of organized religion's control over people's inter-personal sexual lives, an increasing number of people of marriageable age no longer feel the need to be married to someone with whom they live and with whom they are in a sexual relationship, without or with the creation of children. Even when the analysis is restricted to adults over the age of 30, self-identified atheists, agnostics and those whose religion is nothing in particular are still somewhat less likely than Mormons, Jews, evangelical Protestants, mainline Protestants and Catholics to be married [28]. According to the 2010 U.S. Census data, over 7.5 million unmarried couples live together (which translates into 15 million people). This is a 138% increase since 1990, and an increase in 13 % from 2009 alone. Forty percent of unmarried households have children [26].

To the woos of almost all organized religions, according to a 2017 Pew Research Center Study [41], as marriage rates in the U.S have fallen, the number of U.S. adults in cohabiting relationships has continued to climb, reaching about 18 million in 2016. This is up 29% since 2007, when 14 million adults were cohabiting, according to the U.S. Census Bureau data. Approximately half of cohabiters – those living with an unmarried partner – are younger than 35. However, an increasing number of Americans ages 50 and older are in cohabiting relationships, according to a new Pew Research Center analysis of the Current Population Survey. In fact, cohabiters ages 50 and older represented about a quarter (23%) of all cohabiting adults in 2016. Since 2007, the number of cohabiting adults ages 50 and older grew by 75%. This increase is faster than that of other age groups during this time period and is driven in part by the aging of the post-World-War-II born Baby Boomers.

Against all religious admonitions, with the United States as the example and based on the data above, the trend towards cohabitation "without the benefit of marriage" is steadily rising. Combine this trend with the fact that even among the Americans who marry, almost all have had premarital sex. Data from four cycles of the National Survey of Family Growth, 1982–2002 indicate

that by age 20, 75% had had premarital sex. By age 44, 95% of respondents had had premarital sex [18].

Given all of the above, if one of the main *biological* functions of the SDF forms within organized religion were, as its ultimate function and is as its proximate function, to act as barriers to gene flow between clusters of humans in stratified populations, then the behaviors that ordinarily, without the use of contraception, would lead to gene flow, are less and less under strong cultural selection pressures to be curtailed by organized religions. And as function wanes – prohibiting all sex, with self or others, outside of marriage and even within marriage, only sex that is open to procreation and with someone of the opposite sex to whom you are lawfully married and of your same religion – so does form, where the forms are the SDF forms around which organized religions are built.

The end results are the secularizing processes of persons and nations. The *biological* component, which is the in-group marker for a breeding population component, is just one among many. However, all together the forces diminishing organized religion's functions are strong and in a predictable trajectory heading for religion's eventual extinction. A sad reminder to the author was the magnificent medieval Bremen Cathedral, whose construction began in around 789 A. D. There is now a 1 Euro entrance fee. When the author asked a University of Bremen religious studies professor colleague, "Why do I have to pay to go into a church?" the colleague said, "Oh, no one prays here anymore. It is just a national treasure protected by Germany's Monument Protection Act".

It should also be mentioned that when people mate assortatively by religion, they are not necessarily getting the best mates any more than if they did not assortatively mate by religion. Within a particular religion, presuming the principle of female choice, there is variance among the reproductive values of males. There is some match in mate value between the couple. And, what counted as good mate value in a male hundreds of years ago is not necessarily what counts as good mate value today, as the brains of women know. In a secular society today, individuals are not so limited as to where they can look, as was the case when people assortatively mated more by religion. In Europe today, there is still strong assortative mating by religion among Muslims, who have more than enough religious SDF in-group markers by which they can identify one another. The same can be said of the Orthodox Jews, the few who are still left in Europe.

17. All Roads Lead to Rome Secularization

Art galleries, restaurants, and concert halls now occupy deconsecrated churches in Rome. Today in Western Europe 46% of people, who are now the majority, identify as "non-practicing Christians", 18%, who are predominantly older people, identify as "church attending Christians", and 24%, primarily the younger people, identify as "religiously unaffiliated" [4]. In Italy in particular, it had been widely thought that between 30 and 50% of Italians attended Mass more than once a month. However, a 2004-2005 study by The Patriarchate of Venice showed that the actual Italian church attendance at least once a month was no more than 22.7%, with 7.7% attending one to three times a month, and with only 15% attending every Sunday [21]. Based on all that has been presented in this article, and especially on the historical trend toward secularization that started around 500 years ago, when the time comes, religion will go. Religion's fond farewell says nothing about God, just about religion; and at least from the author's perspective, the transient role religion might have had in facilitating our species eusocial evolution [16].

18. Summary

The role of *biology* in the processes of secularization has been presented in this article with the disclaimer that the forms within religion that are of interest to biology have different functions in psychology and theology. Biology's unique contribution is that it can address how these religious forms can evolve by natural (i.e., genetic and culture) selection. Biology does not pre-empt any

other discipline in its attempt to understand the processes of secularization. Hopefully, it's contribution will complement those of other disciplines, most of which do not even address the issue of how forms in religion could have evolved by natural selection. Psychology and the Cognitive Science of Religion are more concerned with functions than forms, the meaning and significance of which hopefully can now be understood. Theology's contributions are best left to others to explain. Contributions by all disciplines are important and hopefully, one day will fit together into a more comprehensive understanding of the processes of secularization.

References

1. Albert, E. Council on Foreign Religions, Religion in China, https://www.cfr.org/backgrounder/religion-china [Retrieved 28 July 2018].
2. Angell, S. W., Dandelion, P. *The Cambridge Companion to Quakerism*, Cambridge: Cambridge University Press, 2018.
3. Anonymous. *Alcoholics Anonymous, 4th Edition*, Alcoholic World Services, Inc. http://www.portlandeyeopener.com/AA-BigBook-4th-Edition.pdf, 2001 [Retrieved 30 July 2018].
4. Being Christian in Western Europe, Pew Research Center, Religion in Public Life, http://www.pewforum.org/2018/05/29/being-christian-in-western-europe/, 2018 [Retrieved 9 August 2018].
5. Bumpass, L. The trend of interfaith marriage in the United States, *Social Biology* 17 (4), 2010, pp. 235-259.
6. Ciccone, L. Is Contraception Sinful? Catholic News Agency, Taken from *L'Osservatore Romano*, Weekly Edition in English, December 4, 1996, page 9, https://www.catholicnewsagency.com/resources/life-and-family/humanae-vitae/is-contraception-sinful-by-fr-lino-ciccone-cm [Retrieved 8 August 2018].
7. Clark, W. Interreligious Unions in Canada, *Statistics Canada*, https://www150.statcan.gc.ca/n1/pub/11-008-x/2006003/9478-eng.htm, 2008, [Retrieved 28 July 2018].
8. Dawkins, R. *The God Delusion*, Wilmington, Massachusetts: Mariner Books, 2008.
9. Dunbar, R. I. M. What's missing from the scientific study of religion, *Religion, Brain & Behavior* 7 (4), 2017, pp. 349-353.
10. Dworkin, R. *Religion without God*, Cambridge, Massachusetts: Harvard University Press, 2013.
11. *East Africa Living Encyclopedia*, African Studies Center, University of Pennsylvania, https://www.africa.upenn.edu/NEH/breligion.htm [Retrieved 28 July 2018].
12. Eliade, M. *The Sacred and the Profane: The Nature of Religion*, New York: A Harvest Book/Harcourt, Inc, 1959 [1957 in French].
13. *Encylopaedia Britannica*, Djibouti, https://www.britannica.com/place/Djibouti [Retrieved 28 July 2018].
14. Feierman, J. R. How some major components of religion could have evolved by natural selection, In E. Voland and W. Schiefenhövel (eds.), *The Biological Evolution of Religious Mind and Behavior*, Heidelberg: Springer, 2009, pp. 51-66.
15. Feierman, J. R. The Evolutionary History of Religious Behavior, In J. R. Feierman (ed.), *The Biology of Religious Behavior: The Evolutionary Origins of Faith and Religion*, Santa Barbara, California: Praeger/ABC-CLIO, 2009, pp.71-86.
16. Feierman, J. R. Religion's Possible Role in Facilitating Human Eusocial Societies: A Behavioral Biology (Ethological) Perspective, *Studia Humana* 5 (4), 2016, pp. 5-33.
17. Fincher, C. L., Thornhill, R. Assortative Sociality, Limited Dispersal, Infectious Disease and the Genesis of the Global Pattern of Religious Diversity, *Proceedings of the Royal Society B* 275, 2008, pp. 2587-2594.
18. Finer, L. B. Trends in Premarital Sex in the United States, 1954-2003, *Public Health Rep*. 122 (1), 2007, pp. 73-78.

19. Fuller, R. C. *Spiritual, but not Religious: Understanding Unchurched America*, Oxford: Oxford University Press, 2001.
20. Hur, Y-M. Assortative Mating for Personality Yraits, Education Level, Religious Affiliation, Height, Weight, and Body Mass Index in Parents of a Korean Twin Sample, *Twin Research and Human Genetics* 6 (6), 2003, pp. 467-470.
21. Italy's Last Catholic Generation? Mass Attendance in "Collapse" among the Under-30s, *Lifesite News*, August 9, 2010, https://www.lifesitenews.com/news/italys-last-catholic-generation-mass-attendance-in-collapse-among-under-30s [Retrieved 9 August 2018].
22. Khwaha, J. Inter-Religious Marriage and Islam, https://www.islamicity.org/9534/inter-religious-marriage-islam/ [Retrieved 28 July 2018].
23. Kurtz, P. *What is Secular Humanism*, Amherst, New York: Prometheus Press, 2007.
24. Leherer, E. L., Chiswick, C. U. Religion as a Determinant of Marital Stability, *Demography* 30 (3), 1993, pp. 385-404.
25. Li, M. To Temper Unrest in Western China, Officials Offer Money for Intermarriage, *New York Times*, September 2, 2014, pp. A-11.
26. Living Together and the Law, https://www.nolo.com/legal-encyclopedia/free-books/living-together-book/chapter1-1.html [Retrieved 29 July 2018].
27. Lorenz, K. Z. *The Foundations of Ethology*, New York: Springer-Verlag, 1981.
28, Masci, D., Gecewicz, C. *Share of Married Adults Varies Widely across U.S. Religious Groups*, Pew Research Center, http://www.pewresearch.org/fact-tank/2018/03/19/share-of-married-adults-varies-widely-across-u-s-religious-groups/, 2018 [Retrieved 29 July 2018].
29. Miller, G. *The Mating Mind: How Sexual Choice Shaped the Evolution of Human Nature*, New York: Anchor Press/Penguin-Random House, 2001.
30. Pew Forum on Religion and Public Life: "Global Christianity: A Report on the Size and Distribution of the World's Christian Population," The Pew Research Center, Appendix C, December 19, 2011, http://www.pewforum.org/files/2011/12/ChristianityAppendixC.pdf. [Retrieved 8 August 2018].
31. Pew Research Center, A Portrait of Jewish Americans, http://www.pewforum.org/files/2013/10/jewish-american-survey-full-report.pdf, 2013, [Retrieved 28 July 2018].
32. Pew Research Center, Being Christian in Western Europe, http://www.pewforum.org/2018/05/29/being-christian-in-western-europe/ [Retrieved 27 July 2018].
33. Popper, K. *The Logic of Scientific Discovery*, 2nd Edition, London and New York: Routledge/Taylor & Francis Group, 2002 [1959].
34. Rate of Intermarriage in U.S Was Higher in Early Years of Jewish Settlement Than Today, Jewish Telegraphic Agency Archive, https://www.jta.org/1967/08/11/archive/rate-of-intermarriage-in-u-s-was-higher-in-early-years-of-jewish-settlement-than-today#ixzz2bOq0C2DK [Retrieved 8 August 2018].
35. Religion and Family Planning Tables, The Guttmacher Institute, https://www.guttmacher.org/religion-and-family-planning-tables [Retrieved 8 August 2018].
36. Rosenfeld, M. J. Racial, Educational, and Religious Endogamy in the United States: A Comparative, Historical Perspective, *Social Forces* 87 (1), 2008, pp. 1-32.
37. *Saint Joseph Baltimore Catechism: The Truths of Our Catholic Faith Clearly Explained and Illustrated*, New York: Catholic Book Publishing Company.
38. Saranam, S. *God without Religion: Questioning Centuries of Accepted Truths*, Dallas, Texas: BenBella Books, 2008.
39. Shemtov, E. On Intermarriage: The Basis for the Jewish Opposition to Intermarriage, Chabad.org, https://www.chabad.org/library/article_cdo/aid/148995/jewish/On-Intermarriage.htm. [Retrieved 28 July 2018].
40. Stark, R. *Discovering God: The Origins of the Great Religions and the Evolution of Belief*, New York: Harper One, 2007.

41. Steepler, R. Number of U.S. Adults Cohabiting with a Partner Continues to Rise, Especially among Those 50 and Older, Pew Research Center, http://www.pewresearch.org/fact-tank/2017/04/06/number-of-u-s-adults-cohabiting-with-a-partner-continues-to-rise-especially-among-those-50-and-older/ [Retrieved 29 July 2018].
42. Taylor, B. Dark *Green Religion: Nature Spirituality and the Planetary Future*, Berkeley: University of California Press, 2010.
43. Taylor, C. *A Secular Age*, Cambridge, Massachusetts: The Belknap Press of Harvard University Press. 2007.
44. UCA News, Church attendance in Philippines declines, https://www.ucanews.com/news/church-attendance-in-philippines-declines-/78988 [Retrieved 27 July 2018].
45. Wathey, J. C. *The Illusion of God's Presence: The Biological Origins of Spiritual Longing*, Amherst, New York: Prometheus Books, 2016.
46. Watson, D., Klohnen, E. C., Casillas, A., Simms, E. N., Haig, J., & Berry, D. S. Match Making and Deal Breakers: Assortative Mating in Newlywed Couples, *Journal of Personality* 72 (5), 2004, pp. 1029-1068.
47. White, J. E. *The Rise of the Nones: Understanding and Reaching the Religiously Unaffiliated*, Ada, Michigan: Baker Books, 2014.
48. Wilson, D. S. *Does Altruism Exist?: Culture, Genes and the Welfare of Others*, New Haven: Yale University Press, 2015.
49. World Atlas, Most Religious Countries in the World, https://www.worldatlas.com/articles/most-religious-countries-in-the-world.html [Retrieved 28 July 2018].
50. World Atlas, The Least Religious Countries in the World, https://www.worldatlas.com/articles/least-religious-countries-in-the-world.html 2018. [Retrieved 28 July 2018].
51.Xing, W. *Inter-Religious Marriages between Muslim Hui and the Majority Han in Urban China: Regional Variations and Structural Factors*. Population Association of America, Annual Meeting, New York, Poster Session 4, 2007, http://paa2007.princeton.edu/abstracts/71437 [Retrieved 28 July 2018].
52. Yao, X. Religious Belief and Practice in Urban China 1995-2005, *Journal of Contemporary Religion* 22 (2), 2007, pp. 169-185.
53. Zhuoqiong, W. Mixed Marriages on the Increase, *China Daily*, http://www.chinadaily.com.cn/china/2007-06/14/content_893808.htm. [Retrieved 28 July 2018].
54. Zukerman, P. Secularization: Europe Yes, – United States No. *Skeptical Inquirer*, March/April 2004, htpp://www.skeptic.ca/secularization.htm.

Notes

1. Appreciate also the difference between "explanations" of secularization and a scientific theory of secularization. Most of what we believe today about secularization comes from discipline-specific explanations, none of which meet Popperian-like [33] criteria for a scientific theory: (1) be able to predict, within the realm of scientific certainty, that which has not yet occurred and which can't be predicted by common sense (i.e., the prediction has to be counter-intuitive), and (2) the prediction can't be made by simple observation and inductive reasoning.
2. In many jurisdictions religious institutions are given tax free status, meaning they do not have to pay taxes to the government, like a charity. Secular humanism is contentious in some jurisdictions as a religion, as it has no higher power or deity, which most governments consider one of the elements of a religion.
3. Other functions in the same Baltimore Catechism on page 9, which children had to memorize, address the "Big" questions in life for children, like "Who made us?" and after the answer, "God", the next question for the children to answer is "Why did he make us?" This is all just rote memorization.

Studia Humana
Volume 8:3 (2019), pp. 39—57
DOI: 10.2478/sh-2019-0024

How the Non-Religious View the Personality of God in Relation to Themselves

Igor Mikloušić

Institute of Social Sciences Ivo Pilar
Trg Marka Marulića 19
10000, Zagreb, Croatia

e-mail: igor.miklousic@pilar.hr

Justin E. Lane

Center for Modeling Social Systems
Prospectus Solutions AS, Kristiansand
Sørlandets Kunnskapspark, Universitetsveien 19
4630 Kristiansand, Norway

e-mail: jelane@bu.edu

Abstract:
In this study we examined the applicability of personality measures to assessing God representations, and we explored how the overlap between personality judgments of self and God relate to strength of (dis)belief and closeness to God among atheists and agnostics. Using sample of 1,088 atheists/agnostics, we applied Goldberg's Big Five bipolar markers as a standardized measure of personality dimensions, along with measures of identity fusion with God, belief strength, and sociosexuality, as this trait has been shown to be relevant in predicting religiosity. Our study revealed that personality measures can be used for research on the personality of supernatural agents. We also found that personality self-assessments were related to the assessments of God personality. Agreeableness was positively related to the perception of emotional stability of God, while conscientiousness and surgency were negatively related to perceived intellect and surgency of god, respectively. Also, intellect of the participants was related negatively to perceptions of God's emotional stability and intellect. Perceived distance between the assessment of one's own personality and the personality of God predicted the strength of (dis)belief, thus opening new interpretations into possible sources of belief and disbelief. Finally, echoing previous studies, we found that conscientiousness of God had a negative effect on SOI-R score.
Keywords: Atheism, personality, fusion, sexuality, big-5, personality of god.

1. Introduction

As the number of people who report having no religious affiliation keeps growing in the West [68] research interest has been focusing more towards understanding atheist and agnostic populations [63], [64], [85]. Simultaneously, studies examining how people view God and other religious figures have also been gaining prominence in the past decades [80]. The studies focusing on representations of God in individuals offer a unique way of understanding the interaction between the traits of believers, their environment, the way doctrinal religious narratives are understood and how they affect their belief and life outcomes. So far this approach has been fruitful as the representations of God have been related to psycho-social functioning and wellbeing [39], [81]. However, this approach has been also wrought with a score of theoretical and methodological problems [80] and rarely applied to the understanding of the atheist population. The aim of this paper was therefore to examine how the difference between assessment of self and perceived God personality relates to the strength of (dis)belief and closeness to God while also examining the validity of applying personality measures to the study of the representation of God. Our study focuses on god representations of non-believers because, although it is a truism that they hold some representation of God, how they view God in relation to themselves is often overlooked. In this way, our study aims to fill this gap in the literature, while furthering our understanding of the attribution of personality to religious superhuman agents (or Gods).

2. The Representation of God

Research has shown that Gods, spirits, demons and other supernatural entities fundamentally are perceived and described as somewhat human, and are often attributed both human and superhuman traits [9]. This anthropomorphic property of many cultural and religious concepts, and the easiness in which we project human traits onto God, deities, or even various aspects of the natural world is considered by some to be the central tendency of our religious belief [40], [49], [83]. Gods are seen mostly through their psychological attributions, as intentional agents that feel, have memories, wishes and desires and interact with people [3], [5], [6], [9], [40], [49]. These supernatural agents are often conceptualized as a form of a mind that exists free of the constraints of the body, but still exhibits humanlike psychological traits that are not necessarily limited to theological claims such as infinite goodness, love, morality, ever-presence or immortality [83]. Interestingly, it has also been shown that the breadth of theological knowledge does not protect people from these anthropomorphic views [4], [87].

Since we view God in somewhat human terms, several researchers aimed to explore how God and other supernatural agents are conceptualized in the human mind, and what these traits that we attribute of God tell us about the believers themselves. The way to empirically approach this issue was however less straightforward. Sharp et al [80] identified 73 measures of representation of God, and out of those the most popular by far were the self-report ones. They identified three types of these measures, based on their focus. Relationally focused measures assess the perceived relationship between self and God, the attitudes and emotions people hold towards God, as well as their perceived closeness or attachment to God. Functionally focused measures, on the other hand, deal with roles God plays in peoples' lives, whether it's coping, support or just general presence in their day to day living. Finally, a number of measures that authors named God description measures resembled personality assessment measures in a way that they contained lists of either statements or adjectives participants could use to describe how they view God. Some of these were theoretical or contained a number of terms authors deemed appropriate or worth investigating while some used existing personality measures. In addition to studies that list adjectives or statements on which the responders then judge God [20], [38], [46], [89] some studies also used open ended questions asking respondents to generate words that describe God [52], or used both of the approaches [57]. Also, a distinction between doctrinal and experiential representations of God could be made [19], [80], [102] whereas the former relates to theological understanding of God (i.e. what I should

believe God is like) and the latter relates to personal experience or belief of what God is like (i.e. what I feel God is like). Finally, some studies extended the research to include the ratings on religious figures such as Jesus [66], other members of the Holy Trinity [81] or even Satan [7].

3. The Personality Assessments of God

A small number of researchers interested in the descriptive aspect of the representation of God turned to the Big five or the Five factor model (FFM) measures of personality as a tool for studying this aspect of religious belief [17], [70], [71]. Integrating the study of the representations of God with a well-studied psychological construct such as personality provides theoretical depth and enables the findings to be integrated into a larger framework of studies illuminating further the relationship between personality, emotions, motivations, behaviors and real-life outcomes such as well-being and life satisfaction [70]. It also paves the way for cross-cultural comparison of the results allowing the integration of the existing religious scholarship with a wider set of findings from other social sciences [70], [71].

The most widely used framework of understanding and assessing personality was the Big Five [33], [34] or the closely related Five Factor Model of personality (FFM) [18], [58] which has established itself as a way of efficiently assessing cross-culturally identifiable and persistent [21], [30], [33], [60], evolutionary relevant [14], [15], [23], [55], [56], [62] and various life outcome related individual differences that are also related to religious belief or disbelief [59], [74], [75], [85].

The studies that have used this approach are still few and far between, but they do demonstrate its potential. For example, Piedmont, Williams, and Ciarrocchi [71] used an extensive adjective list that included the FFM terms and created an historiographic personality profile of Jesus showing that Jesus was perceived as an agreeable individual with traits such as compassion, consideration and warmth, who was also high on Extraversion with highlighted qualities such as activism and courageousness. Further research extended those findings to creating personological profiles of Satan, who was believed to be low on the dimension of Emotional stability [7], as well as Joseph and Mary, alongside those of God and Jesus [17]. In the latter, Mary was perceived to be more introverted and less emotionally stable than Jesus, whilst God was perceived to be emotionally stable and highly agreeable. The above studies showed it is possible to apply personality related terms to create meaningful personality profiles of religious figures as well as demonstrating that people are not only capable of judging and holding coherent profiles of God but also various religious figures. These findings were expanded by the research of Sharp, Rentfrow and Gibson [81] who showed people hold both propositional (doctrinal and theologically inspired) and more experiential and emotional images of the members of the Holy Trinity. Their research, which used a brief measure of the Big Five personality traits (BFI-10) [72], showed personality traits were more discernible in God and Jesus than in the Holy Spirit and echoed previous research showing that God and Jesus were perceived as high on Agreeableness and Emotional Stability with the addition of Conscientiousness. Also, since self-report measures, regardless of how reliable they are, have some inherent flaws, limitations and biases [29], the study also measured salience of certain traits. Positive terms were more salient in the perception of Jesus and God than the Holy Spirit, while Holy Spirit proved to be understood more by supernatural terms with human-like attributes being more salient for Jesus.

4. The Atheist Representation of God

Research has shown that various interpersonal differences, such as age or gender [43], culture ([66]), attachment style [50], [51] and even psychological disorders [25] are related to one's representation of God. Not surprisingly, there also seems to exist a difference in the perception of God and other religious figures between believers and atheists. And although it might seem that assessing the representation of God might not be applicable for atheists, research indicates that they

are capable of holding a specific cognitive schema or identify a set of traits of God and other religious figures and that these concepts can be both salient and coherent [28], [29]. In some way it could be understood like holding a belief about the traits of any fictional character that you don't necessarily believe exists, such as characters from Star Wars, Lord of the Rings, or the characters from Game of Thrones. In a study by Bradley, Exline and Uzdavines [11] it was shown that out of 458 atheist or agnostic individuals, 85.8% replied they were able to form a coherent representation of a hypothetical God. Of those individuals who could draw a representation of God, the reaches provided three sources of the representation of God: image held earlier in life, religious teaching and their own personal ideas, all of which they held to be non-exclusive. Most of the participants reported conjuring the image of God from multiple sources. Majority (90.6%) drew this image from the image of God present in their culture and religious teachings, or from the image of God they endorsed earlier in life before becoming atheist (77.6%), with a smaller percentage reported having their own independent ideas of what God might be like if he existed (58.3%). Atheists and believers do however differ in the way they perceive God or other religious figures. For instance, Christian believers attribute more positive traits to God, whist atheists, although capable of drawing a stereotypically positive image of God, hold a more negative personal concept of God [28] and perceive God to be crueler [11]. In terms of assessing the personality of religious figures, Rouse [73] found Christian groups to endorse the image of Jesus as a person high in Agreeableness and Conscientiousness, whilst atheists judged Jesus as having higher level of Neuroticism. Interestingly, in the same study there were significant differences even within believers and non-believers, with non-denominational Christians viewing Jesus as having higher level of Conscientiousness and Openness than Catholics, and agnostics perceiving Jesus to be higher in Agreeableness, Conscientiousness and Emotional stability than atheists.

5. Individual Differences and the Representation of God

Our group identities that religious affiliation is not the only influence in how people create representations of God. Our perception of God also seems to be related to our culture and religious tradition as well as internal sources such as personal self-image and our own personality [71]. For instance, some studies linked the image of God with self-evaluations such as the sense of self-worth or self-esteem and showed that higher self-evaluations on these traits correlated with a more loving forgiving accepting image of God [7], [8], [13], [27], [88]. In a study by Braam et. al. [10] similar results emerged as Agreeableness was related to perceiving God as more supportive, with Neuroticism being related to negative God image. These interpersonal traits even performed better in explaining the variance of the image of God than various socialization-related measures [13]. Some ways of interpreting these findings are that our representation of God is the result of our projections of our own traits, or that our personality serves as a filter through which we interpret the ambiguous stimuli in our environment – including God or another supernatural agent, who views us and treats the way we see ourselves or believe deserve to be treated [8], [13]. Further support for this egocentric view of God, came from a study by Epley et al. [24] who completed several survey and experimental studies on a diverse set of samples to demonstrate how people consistently judge God's stance on important social and ethical issues to be similar to their own. This bias was present when judging about God's beliefs but not when estimating beliefs of other people. Using neuroimaging studies, the authors have also shown that thinking about the beliefs of God resulted in higher activation of self-referential thinking areas than it was the case when estimating the beliefs of other people. However, the extent to which this effect persists among atheists remains understudied, and studies that have focused exclusively on the relation between the perception of self and God in atheists have been scarce. In one such study by Bradley, Exline and Uzdavines [11] agnostics and atheists, who were able to imagine a hypothetical image of God, were asked to describe this hypothetical God using a relational ten item measure that was prior validated in believers. Of all the participants' personality traits Agreeableness was most related to the image of God, with agreeable people judging God to be less cruel and more loving. Also, Openness to

experience was related to seeing God as more distant. Somewhat expectantly, a good predictor of current image of God was the history of feelings toward God throughout one's life. Also, being more engaged in some form of atheist activism and putting energy towards thinking about belief and disbelief was related to a more negative image of God, although admittedly authors also state that the causality of this relation can go both ways.

Studies using personality measures for both self and God, although limited, have found further proof for this similarity in assessment. Piedmont, Williams, and Ciarrocchi, [71] were the first ones to use FFM to assess personality of self and God, or in their case Jesus, and compare it to the personality of the believers. On a sample of 77 women and 38 men, from which they selected those that had a Christian background, they applied both a 300-item adjective measure (the Adjective Check List) and the NEO Five Factor Inventory by Costa and McCrae [18]. The Adjective Check List was used to describe Jesus on 33 different scales, but the items that were related to the FFM were also selected to create a personality assessment of Jesus. The personality assessment of participants was done with the NEO-FFI measure. The researchers found that self and Jesus personality assessments were related for all traits, except Agreeableness (possibly due to restricted variance of the latter when describing Jesus). Furthermore, 11% of variance in the assessment of the personality of Jesus could be attributed to participants own personality, and that the effect was mostly carried through the Openness and Extraversion dimensions. Furthermore, the perception of higher Conscientiousness of Jesus was related to the higher religiosity of the participants, while more educated participants were seeing Jesus as more emotionally stable. Francis and Astley [26] have shown significant correlations between ratings of self and Jesus on Eysenck's personality dimensions of Psychoticism and Neuroticism. The study was conducted on a sample of non-religious high schoolers, religious studies students and regular church goers, and significant correlations were found even for the Extraversion dimension but only for the believers. Nevertheless, these findings of similarity in self- and God-personality even in atheist sample led them to infer that this effect is more likely to be the product of projection then socialization or culture. These results were not replicated in a study by Strawn and Alexander [90], which measured personality structure on judgements of both self and Jesus using the FFM. Using a sample of 241 participants (153 undergrad psychology students with 130 self-reporting as Christian and 23 as non-Christian, 23 protestant pastors, and 55 Protestant laypeople) they have shown positive correlations between self and Jesus, but only for the Christian subsample. Overlap was found for the dimensions of Extraversion (Warmth, Gregariousness and Positive Emotions subscales), Agreeableness (Straightforwardness and Tender-Mindedness subscales) and Conscientiousness (Competence and Dutifulness subscales) at the whole sample level, with Openness proving significant for the Christian student and Pastor subsamples, and Neuroticism for the laypeople subsample. For the non-Christian subsample, no self and Jesus personality correlations were found, and that was put forth by the authors as one of the most significant findings of the study. The cause of this self/Jesus overlap authors see in ether people projecting their own perceptions of the personality of Jesus or because of the devoted population is trying to shape their behavior to be more in line of how they view God or Jesus to be. The findings from all of the above studies should however be considered with caution as the samples were extremely small, and the causality mechanisms were only implied.

A study by Oisihi et al. [66] however provided more detailed look on the relation between the overlap of personality of self and God. A 44 item "Big Five Inventory" [44] was used to assess personality of participants (83 students from Korea and 200 students from the U.S.) and the personality of Jesus. Since this scale consists of statements rather than just adjectives the researchers had to rephrase items in order for them to be applicable to Jesus (i.e. I tend to see Jesus as someone who was talkative). The results showed that Americans viewed Jesus to be happier, and higher on Agreeableness, Conscientiousness, Extraversion and Openness to experience than Koreans. Incidentally, those are exactly the traits on which their self-ratings were higher than those of Koreans. The authors assumed that it was the personality of God, or in their case Jesus, that was in part responsible for the differences in self ratings found between those two samples, but reverse moderation analysis showed how the opposite can be true also. National differences in perception of

Jesus were predicted in part by national differences in perceptions of self on the FFM personality dimensions, adding further evidence towards the hypothesis that we project our own traits when judging the image of God.

Perhaps the most detailed exploration into the nature of the relationship between the perception of self and God was conducted by Hodges et al. [42] who used multiple methods of measuring self-God overlap, from counting the number of positive and negative traits assigned to both self and God to using measures that were developed to assess interpersonal closeness such as the ‘‘Inclusion of Other in the Self’’ scale [2]. They also compared these results with the religiousness of the individuals. In the first study the authors compared 16 atheists to 23 Christians on the way they described themselves and God. Using a 73 item measure consisting of both positive and negative traits the results have shown that, although there is some overlap in both believers and non-believers, believers tend both to report of sharing more traits with God, but also almost all the positive traits they recognized in themselves they also assigned to God. Interestingly this overlap was shown to be greater for God than for one’s mother, for which there were found no differences between the believers and non-believers. The second study used the aforementioned adjective list, the Awareness of God subscale of the Spiritual Assessment Inventory [41], and a pictorial measure of inclusion of self in others (similar to the pictorial fusion measure [95], which was chosen because it measures relation to God similar to the way interpersonal closeness is measured in romantic and other relationships. This measure has been appropriated to measure fusion, which is a psychological state where there is a porous boundary between oneself and their social group [48] or other belief that represents the group [53], [54], [84]. Fusion has recently been shown to be related to many aspects of religious devotion including self-sacrifice [91], [92] ritual and cooperation [100] and has been related to extremism and fundamentalism [54], [84], [99], [61], [82]. As predicted, Hodges et al. found that both the overlap of traits and the result in the inclusion of self in God scale was related to the awareness of God. Fundamentalism was related to the Inclusion of self in God scale, replicating results on the identity fusion and religious and other forms of fundamentalism [92], [94]. The authors compared these results to the findings in studies on interpersonal, romantic relationships where romantic devotion is related to higher inclusion of self in that person.

6. The Current Study

All of the above scholarship on the nature of religiosity and its relationship with personality, although relatively scarce in comparison to some other approaches in the evolutionary and cognitive science of religion, suggests that this approach has much to offer our understanding of how we envision, form and maintain our relationship with supernatural agents [42], especially through the concept of self-God overlap as the this relationship has been demonstrated to be important in understanding the quality of other interpersonal relations [79], [101].

The studies so far, although providing valuable insights, are for the most part plagued by small samples and a lack of consistency in both terminology and the measures used for both self and God assessment. Although some of the authors [12], [70], [71] recognized the perks of using the existing personality measures in this manner, their use has been inconsistent and limited to the FFM leaving out dimensions such as morality [37], [47] and sexuality [67], [77], [86] that have shown to be related to religiosity. Most of these studies have also been correlational and have not been able to answer whether self/God overlap is the cause or the result of religious devotion. Furthermore, this metric of personality overlap has not been compared to other factors important to the evolutionary and cognitive science of religion, particularly in regard to outcomes such as general religiosity, identity fusion, and wellbeing. And finally, the non-religious have for the most part been completely left out of these studies, and with almost nonexistent discrimination between different types of non-religiosity.

In order to begin to fill this gap in the literature, the aim of the present research was to examine the perception of the personality of God on a large atheist sample and to see if a coherent five factor structure would emerge even within atheist judgements of Gods personality.

Furthermore, the aim was to explore perception of the personality of God to their own personality and to examine if this relationship could predict the strength of their closeness or detachment from God. Furthermore, we aimed at expanding the scope of personality estimates to include sociosexuality, a dispositional orientation towards sexual diversity and uncommitted, short term sexual relationships. Sociosexuality can best be viewed as a separate disposition or a trait, but it has shown to be consistently and cross-culturally related to the Big five personality dimensions with Extraversion and low Agreeableness and Conscientiousness being related to various aspects of short term mating orientation [78].

The importance of sexual behavior or attitudes in understanding religiosity has been extensively documented. Weeden, Cohen and Kenrick [97] have showed, on multiple samples, how church attendance was better predicted by items related to sexuality, marriage and sociosexuality of the individuals, as well as various reproductive morals, then demographic or other personality measures. The study has shown how more restricted sociosexuality with fewer partners and commitment towards long term relationships was more prominent in the church goers. Furthermore, moral attitudes regarding sexual behavior were shown to be better predictors of religiosity than did cooperative morals [98]. These consistent relationship between restricted sexual behavior and religiousness indicates that possible evolutionary causes of religion, which by discouraging sexual permissively and behaviors such as mate poaching and short-term sexual encounters, could have deleterious consequences on health and in-group cooperation through a fitness enhancing effect [77], [97].

Since sexual behaviors and attitudes have also been shown to mediate the relationship between the Big Five traits and religiosity [97] we believed it was crucial to expand the studies on the representation of God to include this aspect of human personality also.

As such, our research set out to test the following key questions: 1) are measures of the FFM used in personality research valid for the study of God's personality (i.e., does the same five-factor structure emerge); 2) do positive correlations exist between one's self ratings of the different factors in the FFM and the perceived ratings of God on those same measures; 3) is there a positive relationship between fusion with God and the distance between one's own personality and their attributed personality of God with more overlap being related to higher fusion; and 4) is there a positive relationship between fusion with God and sociosexuality where people higher on sociosexuality will imagine God to be more extroverted, less conscientious and agreeable.

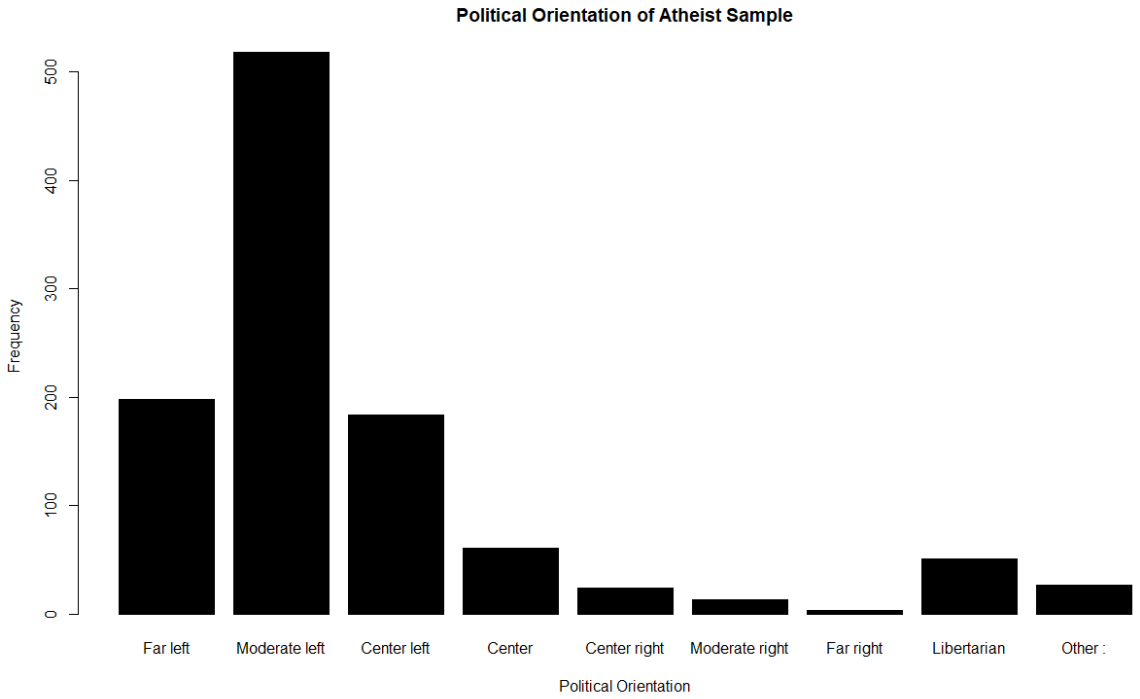
7. Method

Participants

The study was conducted on a large online sample. Participants were not compensated for participation. Initially, responses were collected from n = 1225 individuals. However, after removing those who currently identify with a religious tradition, we were left with n = 1080 responses. Participants' ages ranged from 18-63 with a mean age of 26.11. The sample had 429 males, 640 females, and 11 "other". The sample included both Atheists (n = 953) and Agnostics (n = 127). Participants came from a wide range of religious backgrounds prior to converting to nonbelief: Catholic (n = 302); Protestant (n = 331); Evangelical (n = 89); Jewish (n = 17); Muslim (n = 3); Buddhist (n = 1); other (n = 146). Of the currently identified atheists and agnostics, only 78 were raised atheist and 133 were raised agnostic. Participants were generally residents of Western countries, particularly the United States (n = 777), Canada (n = 80), United Kingdom (n = 47), Australia (n = 39), Croatia (n = 32), New Zealand (n = 11), countries were not included if they did not have more than ten residents in the sample.

Lastly, while the vast majority of atheists in our sample never attended religious services (n = 943), a small number were attending services once a month or less (n = 124), while 4 reported weekly attendance and 6 reported going to church multiple times a week. Similarly, we found that in our sample, frequency of prayer was generally low, 1035 claimed to never pray, while 36

claimed they pray once a month or less, 6 claimed to pray 2-3 times a month, and 2 claimed to pray 2-3 times a week or more. We also found that the atheist sample had a clear bias toward the "left wing" of the political spectrum, with frequencies decreasing as the categories moved further right. There were, however, comparable amounts of participants identifying as "libertarian" or "other" as there were centrists in the sample; however, our results suggest that atheists and agnostics tend to skew overwhelmingly to the left of the political spectrum, in line with previous studies [69] (Pew Research Center, 2015).



8. Instruments

Below, we review the key measures in our study. In addition to these measures we also collected data on standard demographics (including location and education) as well as frequency of religious behaviors (such as religious attendance and prayer).

Big Five Personality Traits

Big five personality traits of participants, and God, were measured using Goldberg's [31] 50 bipolar personality markers. This list of personality descriptors was developed to measure Big five personality dimensions – Surgency (Extraversion), Agreeableness, Conscientiousness, Emotional stability and Intellect, with ten items measuring each dimension. Participants had to first rate themselves and then God using 50 adjective pairs, both describing opposite pole of a single trait on a nine-item scale (i.e. from very timid to very bold). Although unipolar markers have shown to provide a more unambiguous representation of the Big five, since the target of the rating in this study was somewhat different than usual in personality assessments, we opted for using a bipolar measure which explicitly states both poles of a certain trait. Finally, a measure consisting of adjectives rather than statements, found in the now more prevalent measures such as the IPIP [33] or NEO-PI [18], was used since adjectives tend to be more applicable to both God and people, and we did not have to intervene into the content of the scales. For instance, some of the IPIP items which might be less applicable to God would be "I am the life of the party" targeting Extroversion, or "I leave a mess in my room" targeting Conscientiousness.

In self ratings the participants were instructed to use the list of common human traits to describe themselves as accurately as possible. They were instructed to describe themselves as they see themselves at the present time, not as they would wish to be in the future and as compared with any other persons they know of the same sex and roughly same age. This was adapted for the assessment of the personality of God in a way such that the participants were asked to use the same list of common human traits to describe God as accurately as possible. They were also instructed to describe God as they see God at the present time, or if they are a non-believer to describe how they believe God is perceived or depicted in sermons or scripture and as compared to what an average person would be.

SOI-R

Individual differences in Sociosexuality, a trait-like preference for sexual diversity and uncommitted sexual relations, was measured using the Revised Sociosexual Orientation Inventory (SOI-R) [67]. The inventory assesses three domains of Sociosexuality with three items measuring past behavioral experiences (i.e. With how many different partners have you had sex in the past 12 months), three items measuring attitudes toward uncommitted sex (i.e. „Sex without love is ok"), and three items measuring sociosexual desire (i.e. How often do you have fantasies about having sex with someone with whom you do not have a committed romantic relationship?). Sociosexuality score can be calculated for each subscale or as a global sociosexuality metric with higher score being indicative of an unrestricted sociosexual outlook and increased interest in short term mating opportunities.

Fusion

We employed the pictorial measure of fusion to measure fusion with God, fusion with family, friends, other members of the same nationality, others who believe in the same God (co-religionists), and fusion with the participant's homeland. The pictorial measure of fusion [35] depicts two overlapping circles (one representing the self and the other representing the target group) and is based on earlier measures on the phenomena of "inclusion of self in other" [2].

Belief Strength

To measure belief strength, we used a self-report measure that prompted the participant to answer the question "To what extent do you believe that God or something divine exists?" and asked them to respond on a scale anchored at 1 (not at all) and 5 (to a very great extent).

9. Results

First, we wanted to explore if the five-factor model, as measured through Goldberg's 50 bipolar markers would reveal a 5-factor personality structure for the attributed personality of God. To test this, we used the Lavaan SEM library for R. We used a maximum likelihood estimator and found that the model achieved an acceptable fit (*ML* = 4257.53; *DF* = 1165; χ^2 $p < .01$; *CFI* = 0.84; *TLI* - .83; *RMSEA* = .08; *95% CI for RMSEA* = [.078 - .083]). All factors and covariates achieved significance at a level of $p < .01$.[1] This leads us to conclude that the five-factor model is sufficiently valid to map the perceived personality of god.

Second, we wanted to test the hypothesis that there would be negative correlations between participants' self personality ratings and God's personality ratings. We found several significant correlations, including an unexpected positive correlation between self-Agreeableness and God-Emotional Stability, reported in the table on the next page.

Third, we wanted to investigate if there is a relationship between fusion and the distance between one's own perceived personality and that of God's. To investigate this effect, we ran a

linear regression where one's fusion with God (as measured with the pictorial fusion scale) was the DV and the average distance between one's self and God ratings for each of the five factors were entered as IVs. Doing so revealed that the only significant variable was the distance between one's self and God on the extraversion factor (β = .04, *SE* = .02, *t* = 2.02, *p* = .04). We also found that there was a significant relationship between a non-believer's fusion with people who share their religious beliefs (or non-religious beliefs in this case), as measured with the pictorial fusion scale, and their average personality distance with God (β = .06, *SE* = .02, *t* = 2.68, *p* < .01). Running a regression with each of the personality factors separated revealed that the only significant relationship is actually between fusion with co-religionists and the distance between one's own and God's perceived extraversion (β = .06, *SE* = .02, *t* = 2.40, *p* = .02). Suggesting that as the perceived extraversion of god increases, the perceived distance between one's own personality and god's also increases.

In order to further understand the relationship between God beliefs and personality similarities, we also ran a regression where we entered belief strength (assessed by an idem asking participants "To what extent do you believe that God or something divine exists**")** as our DV and average personality distance between self and god as the IV. We found that there is a significant negative relationship between belief strength and distance between self and god personality (β = -.05, *SE* = .01, *t* = -4.88, *p* < .01), suggesting that greater belief strength is associated with a greater overlap between how one views themselves and how they view god. To investigate this further, we used the Lavaan package in R to create a mediation model whereby the relationship between self-god personality distance and fusion to god was mediated by belief strength. Overall, we found that there are significant paths between the variables, but no significant direct effect between self-God distance and fusion.

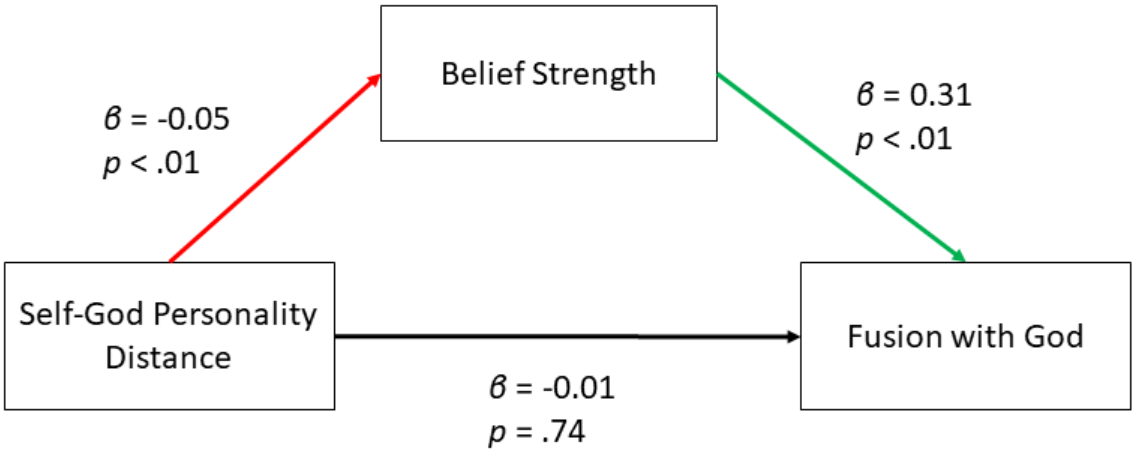


Figure 1: SEM output testing the exploratory hypothesis that the relationship between self-god overlap. Red lines represent significant negative relationships, green lines represent significant positive relationships, and black lines represent insignificant relationships

	God-Conscientiousn	God-Agreeableness	Self-Intellect	Self-Surgency	Self-Emotional Stability	ess
God-Conscientiousn						
God-Agreeableness						
Self-Intellect						
Self-Surgency				1		
Self-Emotional Stability			1	0.38**		
ess						

Correlation table for self and god personality ratings. * p<.05 ** p<.01

Lastly, we used the data to investigate if people who are higher in sociosexuality (SOI-R) will imagine God to be more extroverted, open to experience, and less conscientious, while they would view themselves as more extroverted. We ran correlations between the SOI-R score (as well as the subscales of SOI-R behavior, SOI-R desire, and SOI-R attitude), as well as gender and age. The correlations are presented in the table below:

	SOI-R Total	SOI-R Behavior	SOI-R Desire	SOI-R Attitude	God Emotional Stability	God Extraversion	God Ingelligence	God Conscientiousness	God Agreeableness	Age	Gender
SOI-R Total	1										
SOI-R Behavior	.78**	1									
SOI-R Desire	.80**	.27**	1								
SOI-R Attitude	.44**	.27**	.21**	1							
God Emotional Stability	-0.02	-0.02	<.01	-0.03	1						
God Extraversion	-0.04	-0.05	-0.04	0.05	0.47**	1					
God Ingelligence	-0.04	-0.05	-0.03	-0.01	0.73**	0.55**	1				
God Conscientiousness	-0.06	-0.04	-0.06	-0.01	0.81**	0.56**	0.81**	1			
God Agreeableness	-0.04	-0.01	-0.04	-0.05	0.82**	0.54**	0.73**	0.86**	1		
Age	0.03	.14**	-0.06	-.09*	0.05	0.03	0.03	0.09*	0.08	1	
Gender	-.32**	-0.07	-.45**	-0.04	0.1*	0.12**	0.13**	0.1**	0.1*	-.11**	1

Correlation table for SOI-R scores, age, and gender. * p<.05 ** p<.01

We then used linear regression to test that the variance in SOI-R scores could be captured in part by personality, controlling for age, and gender. We found that the perceived conscientiousness of God had a negative effect on SOIR scores. Gender also had a significant effect. Country of origin was not believed to be an important factor in this study, as we assume that these variables are not as affected by cultural information as they would be by cross-cultural cognitive structures. When adding country to the analysis, it was not found to be significant, nor were there significant differences on SOI-R scores by country ([$F_{(38,625)} = 0.66$, $p = .94$]).

Variable	B	SE	T	P
God Emotional Stability	.04	.04	0.99	.32
God Extraversion	.01	.03	0.38	.71
God Intelligence	.06	.04	1.62	.11
God Conscientiousness	-.11	.05	-2.47	.01
God Agreeableness	.01	.04	0.15	.88
Age	.001	.003	0.50	.61
Gender	-.64	.09	-7.54	<.01

We found that self perceptions of greater extraversion and intelligence had a positive effect on SOI-R, and conscientiousness had a negative relationship. Gender also had a significant effect.

Variable	B	SE	T	P
Self Emotional Stability	-.05	.04	-1.55	.12
Self Extraversion	.15	.04	4.16	<.01
Self Intelligence	.11	.05	1.99	.05
Self Conscientiousness	-.15	.05	-3.23	<.01
Self Agreeableness	.03	.05	.57	.57
Age	.001	.003	.20	.84
Gender	-.68	.08	-8.47	<.01

10. Discussion

Although several studies used the Big five or the Five factor model (FFM) to assess the perceived personality of Jesus [26], [71], [90], God [17] or various other religious figures and concepts [81] of both believers and non-believers [12], [73] none of the researchers so far have examined that the measure conforms to the predicted Five factor model. Although we can presume that the measures would be applicable even to the concept of God, as it is the case when using a measure in a new language, in a new culture or on a new and previous unstudied demographic the presumption of the applicability of the scale should be tested before interpreting its relation between to other scales. Our study has thus shown, at least for the Goldberg's 50 bipolar markers [31], the Five factor model achieved acceptable fit and can be used for future research studying the perceived personality of deities and supernatural agents**.**

Secondly, we wanted to expand on the literature studying the overlap between the perception of self and God. Since personality similarity has been shown to be an important factor affecting relationship quality [79], [101] we wanted to examine how is God perceived within a community that hasn't established a personal relation with God or formed a religious affiliation.

The relationships we found are small but have generally replicated previous findings that had previously mostly investigated the phenomena among religious believers; for example, of the overlap in Surgency or Extraversion, as found by Strawn and Alexander [90]. Overall, we found that participants Agreeableness, Conscientiousness, Surgency and Intellect was related to perceived Emotional stability, Intellect, Surgency. In our sample of non-believers personal Intellect was negatively related to God's perceived Intellect and God's Emotional stability. Although the Intellect factor from the Big Five model is somewhat different than the Openness to experience factor measured within the Five Factor Model [76], [96] they are comparable and the research on non-believers [12] has shown that Openness was related to seeing God as more distant, whilst Rouse [73] showed atheists depict Jesus as being lower on Emotional stability then believers did. This suggests that the more people deemed themselves to be creative, imaginative, reflective and analytical the less they tend to perceive God to be like themselves and tend to judge God to be more emotionally unstable and characterized as envious, emotional, and moody. This finding can be indicative of the link between analytical thinking style and disbelief but also showing how the atheist who see themselves as more intelligent and cultured focus on traits that have been given to an "Old Testament" type God by the "new atheists". Similarly, conscientiousness of the participants was negatively related to the perceived Intellect of God, which is particularly interesting since Conscientiousness is one of the personality traits regularly related to religiosity [74]. Perhaps, among many "atheists" or "free thinkers" who value intellect highly, beliefs about God are in some way dissonant. Further research should therefore incorporate measures that dig deeper into intellectual aspects of religious and atheist beliefs, in particular, future research could investigate the extent to which personality variables interact with one's religiosity and knowledge and openness toward science.

More importantly we wanted to explore to what extent this perceived distance between self-personality and God's personality is related to fusion with the idea of God. Although Hodges et al. [42] showed how both self/God trait overlap and the inclusion of self in God predict various aspects of religiosity, the relationship between the two constructs hasn't been studied. Our data suggests that self-God personality discrepancies are related to belief strength which in turn is related to fusion with God showing a possible pathway of how imagining God to be more or less similar to oneself reflects how integrated in a belief system we become. Surprisingly, the effect, although small, has proven to be robust enough to manifest itself even in our atheist sample. However, the exact mechanism underlying this relationship is still underexplored. It is possible that people see themselves as distant from the image of God (acquired through culture) can't relate to God, and therefore reject religion, or that people that have the same traits as the image of God promoted in the culture find him easily relatable and become religious more easily. Otherwise, it is possible that some people are inherently religious and are motivated to a) change their self-image to be more like God or b) imagine God to be more like them and project their traits to God, as proposed nearly two decades ago by Francis and Astley [26].

We also aimed to, for the first time that we are aware of, explore the relationship between sociosexuality and the perceived personality of God. As significant amount of religious morals revolves around reproductive behavior this trait seems to have been unjustly left out. We found that in our atheist sample the perceived Conscientiousness of God had a negative effect on SOI-R score, reflecting the findings in Self rating and indicating into the importance of including also these measures when expanding on the studies of the personality of God and self/God personality overlap. This further adds weight to the argument that people project their own personality and values to the image of God, even when they are not believers, as Conscientiousness is consistently related to lower Sociosexuality score, as is sex, with females being less open to short term mating behaviors as reflected through their lack of openness to sexual relationships without commitments.

Future research should aim to replicate these results with larger samples, drawn from a wider range of societies. Also, although adjective lists and validated personality measures are useful for capturing predetermined dimensions of God, they limit the study of the perception of God in numerous ways. Without having a theoretical outline or an empirical framework from which to

choose and with which to organize the terms, the study of the concept of God is likely to remain marginalized from the larger body of psychology and in a state of disorganization, which can, in turn, prevent the findings from being compared and better understood. In many ways it resembles the state of personality research before the emergence of the Big Five model of personality. Following the lexical tradition [1], [16], [45], [65] which provided both a theoretical rationale and methodological guidelines for the selection of the traits it enabled creation of valid and easily applicable measures, cross-cultural replications of the initial emic studies and subsequent comparison of the resulting factor structures [22], [30], [32]. The adjective lists that yielded this five factor structure of personality were only later replaced by universally applicable, easily administered questionnaires which then further propelled the field [18], [32], [33]. By enabling researchers to easily implement these measures in their research, compare their findings and accumulate knowledge on the impact of personality on real life outcomes in a relatively short period of time it brought personality psychology back into focus.

We believe the same methodology can and should be applied to unravel emic personality of God structure across religions and cultures and develop measures that can assess the personality of God universally.

Also, the question on the source of this self/God overlap, or the causal process of whether self-perceptions shape the perception of God, and or vice versa, remains unanswered. Are people that view God as more similar to them more likely to form a strong bond with God or does a strong bond with God shape our perceptions of God to be more similar to ourselves? Do religious people model their behavior and traits to become more similar to the image of God drawn from the scripture or does our perception of self-God overlap on important personality traits lead us to be more open to believing in God and be more intimately involved, just as it is the case in romantic relationships or friendships. In order to answer this a more nuanced statistical models as well as experimental work needs to be implemented

Finally, measures of strength of identification to their religious affiliation (i.e., Atheist, Agnostic, Protestant, Buddhist, etc.) should also be employed to better understand the nuances of religious and non-religious identities insofar as they effect personality variables of themselves or their image of God. Nevertheless, we believe that the measures employed and results reported here can serve as an interesting point for future work in understanding the relationship between personality psychology and religiosity.

References

1. Allport, G. W. *Personality: A psychological interpretation*, New York: Holt, 1937.
2. Aron, A., Aron, E. N., & Smollan, D. Inclusion of Other in the Self Scale and the Structure of Interpersonal Closeness, *Journal of Personality and Social Psychology* 63 (4), 1992, pp. 596–612.
3. Atran, S., Norenzayan, A. Religion' s evolutionary landscape: Counterintuition, commitment, compassion, communion, *Behavioral and Brain Sciences* 27, 2004, pp. 713–770.
4. Barlev, M., Mermelstein, S., & German, T. C. Representational coexistence in the God concept: Core knowledge intuitions of God as a person are not revised by Christian theology despite lifelong experience, *Psychonomic Bulletin and Review* 25 (6), 2018, pp. 2330–2338.
5. Barrett, J. L. *Why would anyone believe in God?* In *Cognitive Science of Religion*, Walnut Creek, CA: AltaMira Press. 2004.
6. Barrett, J. L., Keil, F. C. Conceptualizing a nonnatural entity: anthropomorphism in God concepts, *Cognitive Psychology* 31 (3), 1996, pp. 219–247.
7. Bassett, J. F., Williams, J. E. Protestants' Images of Self, God, and Satan as Seen in Adjective Check List Descriptions, *The International Journal for the Psychology of Religion* 13 (2), 2003, pp. 123–135.
8. Benson, P., Spilka, B. God Image as a Function of Self-Esteem and Locus of Control, *Journal for the Scientific Study of Religion* 12 (3), 297, 1973.
9. Boyer, P. *Religion Explained: The Evolutionary Origins of Religious Thought*, New York: Basic

Books, 2001.
10. Braam, A. W., Mooi, B., Jonker, J. S., van Tilburg, W., & Deeg, D. J. H. God image and Five-Factor Model personality characteristics in later life: A study among inhabitants of Sassenheim in The Netherlands, *Mental Health, Religion and Culture* 11 (6), 2008, pp. 547–559.
11. Bradley, D. F., Exline, J. J., & Uzdavines, A. The God of Nonbelievers: Characteristics of a Hypothetical God, *Science, Religion and Culture* 2 (3), 2015, pp. 120–130.
12. Bradley, D. F., Exline, J. J., & Uzdavines, A. Relational reasons for nonbelief in the existence of Gods: An important adjunct to intellectual nonbelief, *Psychology of Religion and Spirituality* 9 (4), 2017.
13. Buri, J. R., Mueller, R. A. Psychoanalytic theory and loving god concepts: Parent referencing versus self-referencing, *Journal of Psychology: Interdisciplinary and Applied* 127 (1), 1993, pp. 17–27.
14. Buss, D. M. Social Adaptation and Five Major Factors of Personality, In J. S. Wiggins (ed.), *The five-factor model of personality: theoretical perspectives* 1996, pp. 180–207, retrieved from https://labs.la.utexas.edu/buss/files/2015/09/social_adaptation-1996.pdf.
15. Buss, D. M. How Can Evolutionary Psychology Successfully Explain Personality and Individual Differences ? *Perspectives on Psychological Science* 4 (4), 2009, pp. 359–366.
16. Cattell, R. B. The description of personality. I Foundations of Trait Measurement, *Psychological Review* 50, 1943, pp. 559–594.
17. Ciarrocchi, J. W., Piedmont, R. L., & Williams, J. E. "Who Do You Say I Am?" Personality and Gender Dimensions in Men and Women's Images of Jesus, Mary, and Joseph, *Research in the Social Scientific Study of Religion* 9, 1998, pp. 127–146.
18. Costa, P. T., Mccrae, R. R. Normal Personality Assessment in Clinical Practice: The NEO Personality Inventory, *Psychological Assessment* 4 (1), 1992, pp. 5–13.
19. Davis, E. B., Moriarty, G. L., & Mauch, J. C. God images and god concepts: Definitions, development, and dynamics, *Psychology of Religion and Spirituality* 5 (1), 2013, pp. 51–60.
20. Davis, M. H., Conklin, L., Smith, A., & Luce, C. Effect of Perspective Taking on the cognitive Representation of Persons: A Merging of Self and Other, *Journal of Personality and Social Psychology* 70 (4), 1996, pp. 713–726.
21. De Raad, B. The replicability of the Big Five personality dimensions in three word-classes of the Dutch language, *European Journal of Personality* 6 (1), 1992, pp. 15–29.
22. De Raad, B., Perugini, M., Hřebíčková, M., & Piotr, S. Linga Franca of Personality: Taxonomies and Structures based on the Psycholexical Approach, *Journal of Cross-Cultural Psychology* 29 (1), 1998, pp. 212–232.
23. Denissen, J. J. A., Penke, L. Motivational individual reaction norms underlying the Five-Factor model of personality: First steps towards a theory-based conceptual framework, *Journal of Research in Personality* 42 (5), 2008, pp. 1285–1302.
24. Epley, N., Converse, B. A., Delbosc, A., Monteleone, G. A., & Cacioppo, J. T. Believers' estimates of God's beliefs are more egocentric than estimates of other people's beliefs. *Proceedings of the National Academy of Sciences* 106 (51), 2009, pp. 21533–21538.
25. Exline, J. J., Yali, A. M., & Sanderson, W. C. Guilt, discord, and alienation: The role of religious strain in depression and suicidality. *Journal of Clinical Psychology* 56 (12), 2000, pp. 1481–1496.
26. Francis, L. J., Astley, J. The Quest for the Psychological Jesus: Influences of Personality on the image of Jesus, *Journal of Psychology and Christianity* 16, 1997, pp. 247–259.
27. Francis, L. J., Gibson, H. M., & Robbins, M. God images and self-worth among adolescents in Scotland, *Mental Health, Religion and Culture* 4 (2), 2001, pp. 103–108.
28. Gibson, N. J. S. *The Experimental Investigation of Religious Cognition* (Queen's College, University of Cambridge), 2006.
29. Gibson, N. J. S. Chapter 11. Measurement Issues in God Image Research and Practice, *Journal of Spirituality in Mental Health* 9 (3–4), 2008, pp. 227–246.
30. Goldberg, L. R. An Alternative "Description of Personality": The Big Five Factor Structure.

Journal of Personality and Social Psychology 59 (6), 1990, pp. 1216–1229, retrieved from http://cmapspublic2.ihmc.us/rid=1LQBQ96VY-19DH2XW-GW/Goldberg.Big-Five-FactorsStructure.JPSP.1990.pdf.
31. Goldberg, L. R. The Development of Markers For the Big Five Factor Structure, *Psychological Assessment* 4 (1), 1992, pp. 26–42.
32. Goldberg, L. R. A broad-bandwith, public-domain, personality inventory measuring the lower-level facets of several five-factor models, pp. 7–28, In I. Mervielde, I. J. Deary, F. De Fruyt, & F. Ostendorf (eds.), *Personality Psychology in Europe*, Tilburg, The Neatherlands: Tilburg University Press, 1999.
33. Goldberg, L. R. *International Personality Item Pool*, 2005.
34. Goldberg, L. R., Johnson, J. A., Eber, H. W., Hogan, R., Ashton, M. C., Cloninger, C. R., & Gough, H. G. The International Personality Item Pool and the Future of Public-Domain Personality Measures, *Journal of Research in Personality* 40 (1), 2006, pp. 84–96.
35. Gómez, Á., Brooks, M. L., Buhrmester, M. D., Vázquez, A., Jetten, J., & Swann, W. B. On the nature of identity fusion: insights into the construct and a new measure, *Journal of Personality and Social Psychology* 100 (5), 2011, pp. 918–933.
36. Gorsuch, R. L. The Conceptualization of God as Seen in Adjective Ratings, *Journal for the Scientific Study of Religion* 7 (1), 1968, pp. 56.
37. Graham, J., Haidt, J., Koleva, S., Motyl, M., Iyer, R., Wojcik, S. P., & Ditto, P. H. Moral Foundations Theory: The Pragmatic Validity of Moral Pluralism, In *Advances in Experimental Social Psychology*, 1st ed., 2013, pp. 55-130.
38. Graham, J., Nosek, B. a, Haidt, J., Iyer, R., Koleva, S., & Ditto, P. H. Mapping the moral domain, *Journal of Personality and Social Psychology* 101 (2), 2011, pp. 366–385.
39. Grimes, C. Chapter 2. God Image Research, *Journal of Spirituality in Mental Health* 9 (3–4), 2008, pp. 11–32.
40. Guthrie, S. *Faces in the Clouds: A New Theory of Religion*, New York: Oxford University Press, 1993.
41. Hall, T. W., Edwards, K. J. The Spiritual Assessment Inventory: A Theistic Model and Measure for Assessing Spiritual Development, *Journal for the Scientific Study of Religion* 41 (2), 2002, pp. 341–357.
42. Hodges, S. D., Sharp, C. A., Gibson, N. J. S., & Tipsord, J. M. Nearer My God to Thee: Self-God Overlap and Believers' Relationships with God, *Self and Identity* 12 (3), 2003, pp. 337–356.
43. Janssen, J., De Hart, J., & Gerardts, M. Images of God in Adolescence, *International Journal for the Psychology of Religion* 4 (2), 1994, pp. 105–121.
44. John, O. P., Srivastava, S. The Big-Five trait taxonomy: History, measurement, and theoretical perspectives, pp. 102-138, In L. A. Pervin, O. P. John (eds.), *Handbook of Personality: Theory and Research*: *Volume 2*, New York: Guilford Press, 1999,
45. John, O. P., Angleitner, A., & Ostendorf, F. The lexical approach to personality: A historical review of trait taxonomic research, *European Journal of Personality* 2, 1988, pp. 171–203.
46. Johnson, K. A., Okun, M. A., Cohen, A. B., Sharp, C. A., & Hook, J. N. Development and validation of the five-factor LAMBI measure of God representations, *Psychology of Religion and Spirituality* 2018, https://doi.org/10.1037/rel0000207.
47. Johnson, K. A., Hook, J. N., Davis, D. E., Van Tongeren, D. R., Sandage, S. J., & Crabtree, S. A. Moral foundation priorities reflect U.S. Christians' individual differences in religiosity, *Personality and Individual Differences* 100, 2016, pp. 56–61.
48. Jong, J., Whitehouse, H., Kavanagh, C., & Lane, J. E. Shared Trauma Leads to Identity Fusion via Personal Reflection, *PLoS ONE* 10 (12), 2016, pp. e0145611.
49. Kelemen, D. Are Children "'Intuitive Theists'"? Reasoning About Purpose and Design in Nature, *Psychological Science* 15 (5), 2004, pp. 295–301.
50. Kirkpatrick, L. A. An Attachment-Theory Approach Psychology of Religion An Attachment-Theory Approach to the Psychology of Religion, *The International Journal for the Psychology of Religion* 2 (1), 1992, pp. 3–28.

51. Kirkpatrick, L. A., Shaver, P. R. An Attachment-Theoretical Approach to Romantic Love and Religious Belief, *Personality and Social Psychology Bulletin* 18 (3), 1992, pp. 266–275.
52. Kunkel, M. A., Cook, S., Meshel, D. S., Daughtry, D., & Hauenstein, A. God Images: A Concept Map, *Journal for the Scientific Study of Religion* 38 (2), 1999.
53. Lane, J. E. *The evolution of doctrinal religions: Using semantic network analysis and computational models to examine the evolutionary dynamics of large religions*, University of Oxford, 2019.
54. Lane, J. E., Shults, F. L., & Wildman, W. J. A potential explanation for self-radicalisation. *Behavioral and Brain Sciences* 41, 2018, pp. e207, retrieved from https://www.cambridge.org/core/journals/behavioral-and-brain-sciences/article/potential-explanation-for-selfradicalisation/46180567213843B94D217E50C7F1193E
55. MacDonald, K. Evolution, the Five-Factor Model, and Levels of Personality, *Journal of Personality* 63 (3), 1995, pp. 525–567.
56. MacDonald, K. Evolution, Culture, and the Five-Factor Model, *Journal of Cross-Cultural Psychology* 29 (1), 1998, pp. 119–149.
57. May, R. W., Fincham, F. D. Deity Representation: A Prototype Approach, *Archive for the Psychology of Religion/Archiv Für Religionpsychologie* 40 (2–3), 2018, pp. 258–286.
58. McCrae, R. R., Costa, P. T. Conceptions and Correlates of Openness to Experience, pp. 825–847, In R. Hogan, J. Johnson, S. Briggs (eds.), *Handbook of Personality Psychology*, 1997, https://doi.org/10.1016/b978-012134645-4/50032-9.
59. Mikloušić, I., Mlačić, B., & Milas, G. Paranormal Beliefs and Personality Traits in Croatia, *Drustvena Istrazivanja* 21(1 (115)), 2012, pp. 181–201.
60. Mlačić, B., Ostendorf, F. Taxonomy and Structure of Croatian Personality-descriptive Adjectives, *European Journal of Personality* 152, 2005, pp. 117–152.
61. Moaddel, M., Karabenick, S. Religious Fundamentalism among Young Muslims in Egypt and Saudi Arabia, *Social Forces* 86 (4), 2008, pp. 1675–1710.
62. Nettle, D. The evolution of personality variation in humans and other animals, *American Psychologist* 61 (6), 2006, pp. 622–631.
63. Norenzayan, A., Gervais, W. M. Secular rule of law erodes believers' political intolerance of atheists, *Religion, Brain and Behavior* 5 (1), 2013, pp. 3–14.
64. Norenzayan, A., Gervais, W. M. The origins of religious disbelief, *Trends in Cognitive Sciences* 17 (1), 2013, pp. 20–25.
65. Norman, W. T. Toward an adequate taxonomy of personality attributes, *Journal of Abnormal and Social Psychology* 66 (6), 1963, pp. 574–583.
66. Oishi, S., Seol, K. O., Koo, M., & Miao, F. F. Was he happy? Cultural difference in conceptions of Jesus, *Journal of Research in Personality* 45 (1), 2011, pp. 84–91.
67. Penke, L., Asendorpf, J. B. Beyond Global Sociosexual Orientations: A More Differentiated Look at Sociosexuality and Its Effects on Courtship and Romantic Relationships, *Journal of Personality and Social Psychology* 95 (5), (2008), pp. 1113–1135.
68. Pew Research Center. *"Nones" on the Rise: One-in-Five Adults Have No Religious Affiliation, 2012*, retrieved from https://www.pewresearch.org/wp-content/uploads/sites/7/2012/10/NonesOnTheRise-full.pdf.
69. Pew Research Center. *U.S. Public Becoming Less Religious: Modest Drop in Overall Rates of Belief and Practice, but Religoiusly Affiliated Americans Are as Observant as Before*, 2015, retrieved from https://www.pewforum.org/2015/11/03/u-s-public-becoming-less-religious/
70. Piedmont, R. L. Strategies for Using the Five-Factor Model of Personality in Religious Research, *Journal of Psychology and Theology* 27 (4), 1999, pp. 338–350.
71. Piedmont, R. L., Williams, J. E. G., & Ciarrocchi, J. W. Personality Correlates of One's Image of Jesus: Historiographic Analysis Using the Five-Factor Model of Personality, *Journal of Psychology and Theology* 25 (3), 1997, pp. 364–373.
72. Rammstedt, B., John, O. P. Measuring personality in one minute or less: A 10-item short version of the Big Five Inventory in English and German, *Journal of Research in Personality* 41(1),

2007, pp. 203–212.
73. Rouse, S. V. Differences among religiously unaffiliated and Christians in the perceptions of the personality of Jesus, *Journal of Beliefs and Values* 39 (4), 2018, pp. 463–473.
74. Saroglou, V. Religion and the five factors of personality: A meta-analytic review, *Personality and Individual Differences* 32, 2002, pp. 15–25.
75. Saroglou, V. Religiousness as a cultural adaptation of basic traits: A five-factor model perspective, *Personality and Social Psychology Review* 14 (1), 2010, pp. 108–125.
76. Saucier, G. Openness versus intellect: Much ado about nothing? *European Journal of Personality* 6 (5), 1992, pp. 381–386.
77. Schmitt, D. P. Sociosexuality from Argentina to Zimbabwe: A 48-nation study of sex, culture, and strategies of human mating, *Behavior and Brain Sciences* 28, 2005, pp. 247–311.
78. Schmitt, D. P., Shackelford, T. K. Big Five Traits Related to Short-Term Mating: From Personality to Promiscuity across 46 Nations, *Evolutionary Psychology* 6 (2), 2008.
79. Selfhout, M., Denissen, J., Branje, S., & Meeus, W. In the Eye of the Beholder: Perceived, Actual, and Peer-Rated Similarity in Personality, Communication, and Friendship Intensity During the Acquaintanceship Process, *Journal of Personality and Social Psychology* 96 (6), 2009, pp. 1152–1165.
80. Sharp, C. A., Davis, E. B., George, K., Cuthbert, A. D., Zahl, B. P., Davis, D. E., et al. Measures of God representations: Theoretical framework and critical review, *Psychology of Religion and Spirituality* 2019, https://doi.org/10.1037/rel0000257.
81. Sharp, C. A., Rentfrow, P. J., & Gibson, N. J. S. One God but three concepts: Complexity in Christians' representations of God, *Psychology of Religion and Spirituality* 9 (1), 2015, pp. 95–105.
82. Sheikh, H., Gómez, Á., & Atran, S. Empirical Evidence for the Devoted Actor Model, *Current Anthropology* 57 (13), 2016, pp. S204–S209.
83. Shtulman, A., Lindeman, M. Attributes of God: Conceptual Foundations of a Foundational Belief, *Cognitive Science* 40 (3), 2016, pp. 635–670.
84. Shults, F. L., Gore, R., Wildman, W. J., Christopher, J., Lane, J. E., & Toft, M. D. A Generative Model of the Mutual Escalation of Anxiety Between Religious Groups, *Journal of Artificial Societies and Social Simulation* 21 (4), 2018.
85. Silver, C. F., Coleman, T. J., Hood, R. W., & Holcombe, J. M. The six types of nonbelief: a qualitative and quantitative study of type and narrative, *Mental Health, Religion and Culture* 17 (10), 2014, pp. 990–1001.
86. Simpson, J. A., Gangestad, S. W. Individual Differences in Sociosexuality: Evidence for Convergent and Discriminant Validity, *Journal of Personality and Social Psychology* 60 (6), 1991, pp. 870–883.
87. Sloan, J. *Theological Incorrectness: Why Religious People Believe What They Shouldn't*, Oxford: Oxford University Press, 2004.
88. Smither, J. W., Walker, A. G. The relationship between core Self-Evaluations, views of god, and Intrinsic/Extrinsic religious motivation, *Psychological Reports* 116 (2), 2015, pp. 647–662.
89. Spilka, B., Armatas, P., & Nussbaum, J. The Concept of God: A Factor-Analytic Approach, *Review of Religious Research* 6 (1), 1964, pp. 28–36.
90. Strawn, B. D., Alexander, M. Correlation of self-perception and image of Christ using the five-factor model of personality, *Pastoral Psychology* 56 (3), 2008, pp. 341–353.
91. Swann, W. B., Gómez, Á., Buhrmester, M. D., López-Rodríguez, L., Jiménez, J., & Vázquez, A. Contemplating the Ultimate Sacrifice: Identity Fusion Channels Pro-Group Affect, Cognition, and Moral Decision Making, *Journal of Personality and Social Psychology* 106 (5), 2014, pp. 713–727.
92. Swann, W. B., Gómez, Á., Dovidio, J. F., Hart, S., & Jetten, J. Dying and killing for one's group: identity fusion moderates responses to intergroup versions of the trolley problem, *Psychological Science* 21 (8), 2010, pp. 1176–1183.
93. Swann, W. B., Gómez, Á., Huici, C., Morales, J. F., & Hixon, J. G. Identity fusion and self-sacrifice: arousal as a catalyst of pro-group fighting, dying, and helping behavior, *Journal of*

Personality and Social Psychology 99 (5), 2010, pp. 824–841.
94. Swann, W. B., Gómez, Á., Seyle, D. C., Morales, J. F., & Huici, C. Identity fusion: the interplay of personal and social identities in extreme group behavior, *Journal of Personality and Social Psychology* 96 (5), 2009, pp. 995–1011.
95. Swann, W. B., Jetten, J., Gómez, Á., Whitehouse, H., & Bastian, B. When group membership gets personal: a theory of identity fusion, *Psychological Review* 119 (3), 2012, pp. 441–456.
96. Trapnell, P. D. Openness versus intellect: A lexical left turn, *European Journal of Personality*, 8 (4), 1994, pp. 273–290.
97. Weeden, J., Cohen, A. B., & Kenrick, D. T. Religious attendance as reproductive support, *Evolution and Human Behavior* 29 (5), 2008, pp. 327–334.
98. Weeden, J., Kurzban, R. What predicts religiosity? A multinational analysis of reproductive and cooperative morals, *Evolution and Human Behavior* 34 (6), 2013, pp. 440–445.
99. Whitehouse, H. Dying for the group: Towards a general theory of extreme self-sacrifice, *Behavioral and Brain Sciences* 41, 2018, pp. 1–12.
100. Whitehouse, H., Lanman, J. A. The Ties that Bind US: Ritual, Fusion, and Identification, *Current Anthropology* 55 (6), 2014, pp. 674–695.
101. Youyou, W., Stillwell, D., Schwartz, H. A., & Kosinski, M. Birds of a Feather Do Flock Together: Behavior-Based Personality-Assessment Method Reveals Personality Similarity Among Couples and Friends, *Psychological Science* 28 (3), 2017, pp. 276–284.
102. Zahl, B. P., Gibson, N. J. S. God Representations, Attachment to God, and Satisfaction With Life: A Comparison of Doctrinal and Experiential Representations of God in Christian Young Adults, *International Journal for the Psychology of Religion* 22 (3), 2012, pp. 216–230.

Notes

1. Additional information, analyses, data, and code are found in the electronic appendix.

Studia Humana
Volume 8:3 (2019), pp. 58—68
DOI: 10.2478/sh-2019-0025

Religious Intuitions and the Nature of "Belief"

Victoria K. Alogna

University of Otago
William James Building, 275 Leith Walk
Dunedin 9016, New Zealand

e-mail: victoria.alogna@gmail.com

Jesse Bering

University of Otago
William James Building, 275 Leith Walk
Dunedin 9016, New Zealand

e-mail: jesse.bering@otago.ac.nz

Evan Balkcom

University of Otago
William James Building, 275 Leith Walk
Dunedin 9016, New Zealand

e-mail: evanbalkcom@gmail.com

Jamin Halberstadt

University of Otago
William James Building, 275 Leith Walk
Dunedin 9016, New Zealand

e-mail: jhalbers@psy.otago.ac.nz

Abstract:
Scientific interest in religion often focusses on the "puzzle of belief": how people develop and maintain religious beliefs despite a lack of evidence and the significant costs that those beliefs incur. A number of researchers have suggested that humans are predisposed towards supernatural thinking, with innate cognitive biases engendering, for example, the misattribution of intentional agency. Indeed, a number of studies have shown that nonbelievers often act "as if" they believe. For example, atheists are reluctant to sell the very

souls they deny having, or to angrily provoke the God they explicitly state does not exist. In our own recent work, participants who claimed not to believe in the afterlife nevertheless demonstrated a physiological fear response when informed that there was a ghost in the room. Such findings are often interpreted as evidence for an "implicit" belief in the supernatural that operates alongside (and even in contradiction to) an individual's conscious ("explicit") religious belief. In this article, we investigate these arguably tenuous constructs more deeply and suggest some possible empirical directions for further disentangling implicit and explicit reasoning.
Keywords: unbelief, supernatural belief, implicit belief, explicit belief.

1. Introduction

Religion presents a puzzle to cognitive scientists [24], [49], [61]: believers sacrifice substantial material and cognitive resources in adherence to beliefs for which they have no evidence. One proposed answer to the puzzle is that humans are cognitive predisposed, if not evolutionarily hard wired, to hold supernatural beliefs [9], [14]. The strongest evidence for these provocative claims is the fact that, in some situations, even die-hard nonbelievers behave *as though* they believe [10], [34], [39], [42], [43], [47]. People may, for example, feel uncomfortable taking God's name in vain, even though they feel confident that God does not exist, or refuse to sell their soul for cash despite believing that they do not possess one. Such contradictions are sometimes taken to reveal beliefs that people did not know they had.

We argue, however, that such behaviors raise more – and more interesting – questions than they answer: Are behaviors evidence of belief, a form of belief, or something else altogether? When self-report and behavior conflict which one, if either, reflects a person's "real" belief? If both do, how is the contradiction cognitively and emotionally managed? In the current paper, we first discuss in more detail the puzzle of belief and the "solution" of cognitive predisposition. We then consider the meaning of "belief" in the cognitive sciences, and three attempts to incorporate "behaving as if one believes" into these frameworks. While we do not resolve the questions above, we hope to provide researchers and theorists with enough conceptual clarity to bring them closer to their own answers.

2. The Puzzle of Religious Belief

The importance of religious belief is difficult to overstate: a recent study of 230 countries estimated that 84% of the world's population was affiliated with an established religious group [61]. Furthermore, it is likely that many of the "nonreligious" people surveyed are functionally religious as well; other studies have estimated that only 7% of the global population claims not to believe in a god or gods [44], [78].

The near universality of religious belief is something of a conundrum, not only because of its basis in empirically unsubstantiated faith, but also because it comes with nontrivial material and social costs. These costs can take the form of sacrifices (e.g., tithing, time-consuming rituals, proscriptions on food or sex, etc.) or, in more extreme cases, physically demanding or even dangerous pilgrimages and practices. For example, every 12 years Hindus from around the world travel to Pryang, India to bathe in the waters of the Ganges and Yamuna rivers as part of the Purna Kumbh Mela pilgrimage [24], [49]. The financial costs associated with such a pilgrimage are significant, and the Purna Kumbh Mela presents additional health risks as well: the Ganges is one of the most polluted, and polluting [46], rivers on the planet and poses a serious health threat [16]. (For a discussion on the possible social signaling function of religious rituals, see [71].)

Given the ubiquity and costliness of religious devotion, it is easy to see why social scientists have struggled to resolve the "puzzle of belief." One proposed resolution is that humans are cognitively "predisposed" to be religious, that our evolved cognitive architecture innately biases us to think in supernatural terms – to envision the self as surviving biological death, for example [11], to see patterns in ambiguous stimuli [33] and intentional agency where none exists [6], or to think that important events happen "for a reason" [3], [38]. Thus, the logic goes, all humans, even nonbelievers, are believers (e.g., see [9]; [14]).

In a study on afterlife beliefs by Bering [10], for instance, some individuals who self-identified as "extinctivists" (i.e., they explicitly and confidently believe that personal consciousness ceases at death) nevertheless reasoned that a dead person retained psychological capacities (e.g., that the person would "know" that they were dead). Even participants who consistently rejected the possibility of postmortem emotional and epistemic states struggled when reasoning about them (e.g., it took them longer to say that the deceased no longer *believed* or *loved* than to say that he or she could no longer be *hungry* or *sleepy*). Bering interpreted this as evidence of a simulation constraint on humans' ability to consciously represent the absence of consciousness in dead others, a cognitive hurdle that lends itself to afterlife ascriptions of certain categories of mental states over others – even among those who profess a strident materialist stance.

Other studies have led to similar findings, all indicating a discrepancy between what people say they believe and how they actually reason. For example, Haidt, Bjorkland, and Murphy [34] notoriously observed people's reluctance to sell their soul to the experimenter, even when they denied believing in souls and were told the sales contract was not legally binding and would be shredded following the experiment (see also [62][1]). In her work on teleofunctional reasoning (i.e., assumptions about the purpose or design of an object, in this case the universe), Kelemen and her colleagues [39], [42], [43] have shown that people who explicitly reject beliefs about intelligent design or a purposeful universe nevertheless endorse such statements under time pressure. Barrett and Keil [5] demonstrated that people frequently describe God in human terms in direct contrast with their explicit God beliefs (e.g., that an "omnipresent" God can in fact only attend to one problem at a time). Lindeman, Heywood, Riekki, and Makkonen [47] reported that atheists were just as physiologically uncomfortable (as measured via skin conductance) as believers when challenging God (at the experimenter's request) to harm their friends and family, even though they claimed to find the challenges less unpleasant than did believers.

Studies of behavior also show that people are similarly influenced by exposure to religious and supernatural stimuli, regardless of their professed beliefs. Just like believers, nonbelievers act more prosocially after being exposed subliminally to religious words (e.g., [63]; [68]) and demonstrate increased self-control (e.g., [45]; however, see [31]). And although Bering, McLeod and Shackelford [13] did not ascertain participants' explicit belief in the afterlife, individuals who were casually informed that a ghost had recently been spotted in their laboratory were significantly less likely than control participants to cheat on a competitive task when left alone in that room.

In a recent follow-up to Bering et al. [13], we examined whether the introduced presence of a "ghost" would influence people's physiological responding, and if so, whether these low-level bodily effects would be discernable even among those who self-identified as extinctivists [70]. Participants engaged in a mindfulness task in a laboratory room. In the experimental condition, participants were informed that a university employee had recently died in the room and as a casual aside, that the ghost of this person had recently been seen in the room. Those in the control condition did not hear anything about a death. In both conditions, participants were distressed (according to measures of skin conductance) when a remote-controlled light flickered off and on for several seconds, but those who had been told the ghost story were significantly more so. Critically, the difference between conditions did not depend on participants' self-reported belief in the afterlife: those who denied the possibility of postmortem existence were just as likely as those who accepted it to respond physiologically "as if" they believed the event was due to the ghost. Irrespective of their explicit afterlife beliefs, those in the ghost condition also reported being significantly more afraid than those in the control condition.

3. Disentangling the Many Strands of "Belief"

It is clear that those who explicitly reject the supernatural sometimes act and reason in a manner inconsistent with their stated beliefs. However, at the moment, precisely what such discrepancies reveal remains unclear. When people refuse to sell the soul they claim not to have, or fear the consequences of challenging a god they do not believe in, or tacitly endow the dead with mental abilities after denying they have any capacities at all, is this somehow revealing of their "real" beliefs? If so, are they unaware of their real beliefs? Are they aware but deceiving themselves, and, if they are, to what end? Do they momentarily believe?

To begin answering such challenging questions, we must first consider what it means to "believe" in the broader context of the cognitive sciences. Generally, cognitive scientists agree that beliefs are stable mental representations of the world, including those related to goals and personal identity (e.g., [18]). Something like this characterization is also apparent in the lay conception of belief. In a sample of around 1000 British people, Pechey and Halligan [57] found that 89% described it as a "strongly held conviction," 84% as a "framework for explaining how things are or should be," and 81% as "right and/or true." Furthermore, most respondents reasoned that beliefs were discrete states, separable from but capable of influencing other mental states (i.e., attitudes, thoughts, feelings) and causing behaviors.

Beyond this general consensus, however, the picture is much murkier. Operational definitions of belief are vague and inconsistent [51], but commonly involve associations between objects and attributes [22]; [41] and/or propositions (e.g., [25]). In the case of the latter, belief might be conceptualized as the acceptance of the existence or actuality of an object, as in the belief that "ghosts exist" [25], whereas in the former, belief captures any association between a concept and any property, as in the belief that "ghosts are scary" [22]; [41]. Perhaps most notable and contentious is investigators' frequent distinction between implicit (or intuitive) and explicit (or reflective) belief. Although these constructs are themselves often conflated and contested, and the relationship between them unclear, the general distinction is useful for unraveling the relationship between religious belief and behavior.

4. Explicit and Implicit Belief

Operational definitions of explicit religious belief tend to be vague and multifaceted [56]. Researchers have defined explicit religious belief in terms of religious identity (e.g., self-classification as "Christian" or "Muslim"), behavior (e.g., church attendance or frequency of prayer), and endorsement of religious or supernatural claims, even though these measures are empirically distinct (albeit usually correlated). For instance, someone with an extrinsic religious orientation (i.e., who uses religion for social and material benefits, such as social advancement) may not endorse supernatural claims (e.g., the idea that the dead go to Heaven). Indeed, it is not even clear whether supernatural claims are themselves distinct – how likely it is, for example, that a person will report a belief in God but deny an afterlife, or vice versa.

To make matters more complicated, explicit measures of belief generally depend on individuals' introspection and self-reports, but there are many reasons why individuals might not accurately or honestly report their religious beliefs and behaviors to inquiring experimenters. One theoretically trivial reason is that they may be reluctant to share beliefs that they think are nonnormative, or that the experimenter (a scientist after all) will judge harshly. More interestingly, beliefs and attitudes may not be consistent over time, and answers to questionnaire items may represent less a readout of a participant's internal representation than a product of what thoughts were salient at the time the questions were asked.

In a study by Salancik and Conway ([66], Study 1), for example, participants were subtly led to assert that they had performed pro- or anti-religious behaviors, and consequently reported attitudes toward being religious that were consistent with the newly salient information. Participants were asked, for example, whether they prayed "frequently" or (in a different experimental

condition) "on occasion," questions they tended to deny or confirm, respectively, independent of the objective frequency of their behavior, and which led them to under or overestimate their religiosity, respectively. These and other demonstrations of the malleability of beliefs (e.g., the phenomenon of "choice blindness," in which participants fail to notice that the experimenter has sneakily swapped the chosen option for an unchosen one [35], [36], [52]), suggest that some beliefs, perhaps even confidently held ones, are tenuous, if not entirely illusory.

Perhaps most interesting, people may fail to report explicit beliefs because they don't know, or may be incorrect about, what they believe. The still-controversial idea that experimental participants "tell more than they know" [54] is at least consistent with the general understanding of "implicit beliefs," sometimes defined as those that are "introspectively unidentified (or inaccurately identified)" [32, p. 5]. That is, like explicit beliefs, they are, in principle, stable and measurable[2] associations between objects and characteristics, but unlike explicit beliefs, they are not directly accessible to consciousness and must be inferred indirectly (e.g., through behavior).

According to contemporary models in the cognitive science of religion, *theory of mind* (i.e., the tendency to attribute psychological states to others), *essentialism* (i.e., the idea that objects and events have an immutable essence or purpose), and *hyperactive agency detection* (i.e., ascribing intentional agency to inanimate objects) are some of the underlying mechanisms that promote implicit religious beliefs about the afterlife, existential meaning, and supernatural agents [3], [6], [9], [11], [28], [33], [38], [40]. Although these religious intuitions can be consciously overridden, they are powerful and ancient features of the human brain. Thus, rejecting implicit beliefs is cognitively effortful work, which may explain why religion is so ubiquitous and persistent in our species: the beliefs subserving religious practices and institutions are inaccessible and cognitively difficult to reject.

5. Dual Process and Continuum Theories

The distinction between explicit and implicit cognitions is not fully understood, though they are often integrated into so-called dual process or continuum theories (e.g., [4], [17], [20], [55], [72]). Such approaches can be seen as an attempt to reconcile implicit and explicit beliefs. Generally speaking, dual process models propose two qualitatively distinct types of reasoning processes: "Type 1," associated with intuitive, spontaneous, automatic, unconscious, and implicit mechanisms; and "Type 2," associated with analytic, reflective, controlled, reasoned, and explicit mechanisms. Though there is not complete consensus on the relation between the levels (e.g., which is "better"; which is more fundamental), a number of theories conceptualize them hierarchically, with Type 1 processes providing quick, consciously unfiltered responses to stimuli, which can then be adjusted and corrected, via Type 2 processing, if time and cognitive resources permit. For example, in Devine's [19] influential model of prejudice, individuals are assumed to activate stereotypes of minority groups automatically, upon encountering a member or symbol of the group, regardless of any conscious desire to remain unbiased. The initial reactions are then consciously overridden if and when the individual becomes aware of them, assuming he or she has the inclination and cognitive resources to do so. Similarly, dual process models might characterize religious beliefs to be spontaneous, affective, nonreflective responses to the world that have failed to be overridden by more effortful cognitive reflection.

Religious individuals will naturally be skeptical of an account that treats their beliefs as relatively unsophisticated reactions awaiting reasoned disconfirmation, but there is some (controversial) evidence that religious thought is, at least, associated with Type 1 processing. Believers, for example, form more liberal automatic associations (e.g., [65]), prefer intuition to analytic thought ([1], [69]), and trust their intuitions more [48] than nonbelievers. Conversely, nonbelievers show an increased reliance on analytical thinking [29], [58], [59], [60], [69]. Gervais and Norenzayan [29], for example, reported a correlation between participants' religious belief and their tendency to provide the intuitive (but incorrect) answers to riddles (e.g., If a bat and ball cost $1.10 together, and the bat costs $1 more than the ball, what does the ball cost?). The researchers

also found that "thinking" primes, such as exposure to Rodin's sculpture, *The Thinker*, reduced religious belief relative to control primes, although subsequent research has failed to replicate these effects ([29], [68]). More recently, Farias and colleagues [21] further questioned the simple mapping of cognitive processing and religious belief, failing to find a relationship between intuitive thinking style and religious identification or behavior, or any effect of intuition when experimentally manipulated (by overloading working memory, or suppressing inhibition via brain stimulation).

6. What Kind of "Belief" is Behavior?

It is against this uncertain theoretical backdrop that we now consider what "behaving as if" one believes might mean. What, for example, does a person's reluctance to sell their soul tell us about their belief in the soul, whether explicit or implicit? Psychological research points to three possible answers.

6.1. Behavior is Independent of Belief

One possible answer is that behavior tells us nothing at all about belief. Gendler [27] treats behavior that conflicts with belief as an independent construct, coining the term *alief* to refer to the automatic or habitual response to stimuli that conflicts with one's explicit beliefs. For example, a person may respond as if she is at risk of falling when standing on the glass "Skywalk" that spans the Grand Canyon (e.g., she may feel anxiety, grip the handrails, tremble, etc.), but these reactions do not necessarily reflect her *belief* that she in danger. She may express complete confidence in the engineers and safety inspectors who built and certified the bridge, and even (more controversially) unconsciously associate the bridge with safety, but her body may disagree. Similarly, people can feel genuine emotions while watching a movie they know to be fictional or they may knock on wood with no expectation of positive results. Such phenomena, Gendler suggests, show only that sensory stimuli can activate concept association patterns, including behaviors, beliefs, attitudes, and emotions. These processing mechanisms are insensitive to whether the stimuli are real, imagined, believed, or not believed.

According to this model of alief, people need not believe in the soul to be reluctant to sell theirs; they need only have associated the soul with value. They do not need to believe in ghosts to feel fear when told a ghost is present; they need only have associated the emotion of fear with the concept of ghosts (or any other fear-valenced target, for that matter, such as the Devil or werewolves). In general, "true" or "hidden" belief should not necessarily be inferred from one's behavior or bodily reactions to such emotionally laden primes. Rather, such responses are automatically generated from existing innate or learned associations, having no prima facie epistemological value.

6.2. Behavior is Indicative of Belief

A second answer is to assume that while behavior is not the *same* as belief, it tends to be associated with belief. Although the association is intuitively causal – we are afraid of ghosts because we believe they are real – it need not be. Indeed, attitude researchers have historically assumed that beliefs, emotions, and behaviors are three components of a single construct (e.g., [64], [2], [15].) We are not fearful of ghosts because we believe them to be real; our belief in ghosts, our negative emotions, and our behavioral response, collectively make up our "attitude" toward ghosts.

Even if the components do not directly influence one another, however, they may exert indirect influence via individuals' motivation for consistency (as in cognitive dissonance theory; [23]) or via their logical inferences about the meaning of their behavior (as in Self Perception Theory; [8]). In the former case, behavior that is inconsistent with belief is assumed to create measurable physiological discomfort, which people are motivated to assuage by alternating one or

both of the contradictory components. In the latter case, behavior is simply used as evidence from which belief can be logically inferred. Thus, on the first account, a fearful response to a ghostly apparition motivates the skeptic to believe that ghosts exist, in order to obviate the uncomfortable contradiction between their fear of ghosts and their skepticism about their existence. On the second account there is no discomfort to assuage; the skeptic merely infers (as any observer might) that he believes in ghosts more than he thought (else why would he be fearful of one?). In either case, behavior in this case is functionally inseparable from belief, not an orthogonal construct that may or may not constitute evidence of it.

6.3. Behavior is *Belief*

A third answer goes even farther in terms of the primacy of behavior, proposing that behavior is not just a component of a holistic construct, of which beliefs and emotions are also parts, but rather constitutes the very means by which beliefs and emotions are represented. According to "embodiment" theories, our beliefs concerning ghosts, for example, are not stored as abstract, amodal mental representations, but rather in the pattern of bodily changes and movements characteristic of our interactions with ghosts (whether real or imagined). Thus, the question of whether belief causes or is caused by behavior, is meaningless; belief *is* behavior. To believe that ghosts are real is to behave as though they are, and the awareness that one believes in ghosts follows rather than precedes that behavior.

Although various forms of embodied representation have been espoused by philosophers for centuries, the idea that knowledge is not necessarily stored as abstract symbols is a relatively recent approach in cognitive science (see [7], for an historical review). Its re-emergence has gained momentum from recent empirical findings that demonstrate the bi-directional relationship between thoughts (and emotions) and behavior. In most embodiment frameworks, perception of an object activates behavior that is associated with that object and, conversely, the associated behavior can facilitate or prime its perception. The presentation of a mug, for example, prompts motor movements required for grasping it [74], and objects are more easily recognized when preceded by other objects that required similar (versus incongruent) motor skills [37]. Behavioral simulations in social contexts show similar effects. For instance, participants asked to hold a pen between their teeth, without it touching their lips (i.e., a simulation of a smile), report more positive emotions [74] than participants who hold a pen in their lips (a simulation of a frown); participants instructed to slump report more negative emotions than those who sit upright [73]; and participants who nod their head, simulating agreement, report more agreement with an editorial than participants who turn their head side to side [76]. Recent developments in virtual reality have made it possible to embody physical states – and other people – in more literal ways, with intriguing results [50].

In its strongest form, the embodied cognition view renders moot the question of whether "behaving as if one believes" shows that one "really" believes, because those two claims amount to the same thing: religious belief involves simply the behaviors and bodily states associated with religious practice. Even a weaker form in which belief is directly influenced by behavior (but not synonymous with or wholly represented by it) would call into question the practical value of distinguishing behavior and belief. It might be, in a behavioral extension of self-perception theory, that skeptics who fear ghosts subsequently come to believe in them, while those who practice their religion without believing it discover they are more religious than they thought.

7. Conclusion

Religious belief and nonbelief, and the actions associated with believing, present a complicated yet seldom articulated puzzle to cognitive scientists working in this area. In many respects, the conversation among scholars seems to have outpaced the published findings, with many of the relevant concepts remaining too ambiguous for any conclusions to be drawn about their role in causality. This is especially so, as we have argued throughout, with the relationships between

implicit and explicit supernatural thinking, and also behaviors (or physiological responses) that conflict with the individual's overt beliefs. Some researchers have more or less asserted that subtle, unconscious responses captured in clever laboratory experiments reflect participants' "true supernatural beliefs." Yet our position is that the directionality is in fact unclear: these measurable responses could be products, causes, or simple correlates (i.e., epiphenomena) of belief. Future research in this area should therefore aim to systematically pit these hypotheses against each other. Only then can a clear, integrated model of religious belief (and nonbelief) and behavior begin to emerge.

References

1. Aarnio, K., Lindeman, M. Religious people and paranormal believers: Alike or different? *Journal of Individual Differences* 28 (1), 2007, pp. 1-9.
2. Bagozzi, R. P., Tybout, A. M., Craig, C. S., & Sternthal, B. The construct validity of the tripartite classification of attitudes, *Journal of Marketing Research* 16 (1), 1979, pp. 88-95.
3. Banerjee, K., Bloom, P. "Everything happens for a reason": Children's beliefs about purpose in life events, *Child Development* 86 (2), 2015, pp. 503-518.
4. Bargh, J. A., Chartrand, T. L. The unbearable automaticity of being, *American Psychologist* 54 (7), 1999, pp. 462-479.
5. Barrett, J. L., Keil, F. C. Conceptualizing a nonnatural entity: Anthropomorphism in God concepts, *Cognitive Psychology* 31 (3), 1996, pp. 219-247.
6. Barrett, J. L., Lanman, J. A. The science of religious beliefs, *Religion* 38 (2), pp. 109-124.
7. Barsalou, L. W. Grounded cognition, *Annual Review of Psychology* 59, 2008, pp. 617-645.
8. Bem, D. J. Self-perception: An alternative interpretation of cognitive dissonance phenomena, *Psychological review* 74 (3), 1967, pp. 183–200.
9. Bering, J. *The belief instinct: The psychology of souls, destiny, and the meaning of life*, WW Norton & Company, 2011.
10. Bering, J. M. Intuitive conceptions of dead agents' minds: The natural foundations of afterlife beliefs as phenomenological boundary. *Journal of Cognition and Culture* 2 (4), 2002, pp. 263-308.
11. Bering, J. M. The folk psychology of souls, *Behavioral and Brain Sciences* 29 (5), 2006, pp. 453-498.
12. Bering, J. M., Bjorklund, D. F. The natural emergence of reasoning about the afterlife as a developmental regularity, *Developmental Psychology* 40 (2), 2004, pp. 217-233.
13. Bering, J. M., McLeod, K., & Shackelford, T. K. Reasoning about dead agents reveals possible adaptive trends, *Human Nature* 16 (4), 2005, pp. 360-381.
14. Bloom, P. Religion is natural, *Developmental Science* 10 (1), 2007, pp. 147-151.
15. Breckler, S. J. Empirical validation of affect, behavior, and cognition as distinct components of attitude, *Journal of Personality and Social Psychology* 47 (6), 1984, pp. 1191-1205.
16. Chatterjee, S. Hindu pilgrimages, pp. 269–279, In A. Wilder-Smith, E. Schwartz, & M. Shaw (eds.), *Travel medicine: Tales behind the science*, Oxford, UK: Elsevier, 2007.
17. Chen, S., Chaiken, S. The heuristic-systematic model in its broader context, *Dual-process theories in social psychology* 15, 1999, pp. 73-96.
18. Connors, M. H., Halligan, P. W. A cognitive account of belief: a tentative road map, *Frontiers in Psychology* 5, 2015, p. 1588.
19. Devine, P. G. Stereotypes and prejudice: Their automatic and controlled components, *Journal of Personality and Social Psychology* 56 (1), 1989, pp. 5-18.
20. Dijksterhuis, A., Nordgren, L. F. A theory of unconscious thought, *Perspectives on Psychological Science* 1 (2), 2006, pp. 95-109.
21. Farias, M. et al. Supernatural belief is not modulated by intuitive thinking style or cognitive inhibition, *Scientific Reports* 7 (1), 2017, p. 15100.
22. Fazio, R. H. Attitudes as object–evaluation associations of varying strength, *Social Cognition* 25 (5), 2007, pp. 603-637.

23. Festinger, L. *A theory of cognitive dissonance*, vol. 2, Palo Alto, CA, US: Stanford University Press, 1962.
24. Fuller, C. J. *Camphor flame: Popular Hinduism and society in India*, Princeton, NJ: Princeton University Press, 2004.
25. Gawronski, B., Bodenhausen, G. V. Associative and propositional processes in evaluation: an integrative review of implicit and explicit attitude change, *Psychological Bulletin* 132 (5), 2006, pp. 692-731.
26. Gawronski, B., De Houwer, J. Implicit measures in social and personality psychology, pp. 283-310, In H. T. Reis, C. M. Judd (eds.), *Handbook of research methods in social and personality psychology* (2nd ed.), New York, NY: Cambridge University Press, 2014.
27. Gendler, T. S. Alief and belief, *The Journal of Philosophy* 105 (10), 2008, pp. 634-663.
28. Gervais, W. M. Religious cognition, pp. 81-105, In V. Saroglou (ed.), *Religion, personality, and social behavior*, Psychology Press, 2013.
29. Gervais, W. M., Norenzayan, A. Analytic thinking promotes religious disbelief, *Science* 336 (6080), 2012, pp. 493-496.
30. Gervais, W. M., et al. Analytic atheism: A cross-culturally weak and fickle phenomenon? *Judgment and Decision Making* 13 (3), 2018, pp. 268-274.
31. Gomes, C. M., McCullough, M. E. The effects of implicit religious primes on dictator game allocations: A preregistered replication experiment, *Journal of Experimental Psychology: General* 144 (6), 2015, e94-e104.
32. Greenwald, A. G., Banaji, M. R. Implicit social cognition: Attitudes, self-esteem, and stereotypes, *Psychological Review* 102 (1), 1995, pp. 4-27.
33. Guthrie, S. E. *Faces in the clouds: A new theory of religion*, New York: Oxford University Press, 1993.
34. Haidt, J., Bjorklund, F., & Murphy, S. Moral dumbfounding: When intuition finds no reason, unpublished manuscript, 2000.
35. Hall, L., Johansson, P., & Strandberg, T. Lifting the veil of morality: Choice blindness and attitude reversals on a self-transforming survey, *PLOS ONE* 7 (9), 2012, e45457.
36. Hall, L., Johansson, P., Tärning, B., Sikström, S., & Deutgen, T. Magic at the marketplace: Choice blindness for the taste of jam and the smell of tea, *Cognition* 117 (1), 2010, pp. 54-61.
37. Helbig, H. B., Graf, M., & Kiefer, M. The role of action representations in visual object recognition, *Experimental Brain Research* 174 (2), 2006, pp. 221-228.
38. Heywood, B. T., Bering, J. M. "Meant to be": How religious beliefs and cultural religiosity affect the implicit bias to think teleologically, *Religion, Brain & Behavior* 4 (3), 2014, pp. 183-201.
39. Järnefelt, E., Canfield, C. F., & Kelemen, D. The divided mind of a disbeliever: Intuitive beliefs about nature as purposefully created among different groups of non-religious adults, *Cognition* 140, 2015, pp. 72-88.
40. Jong, J. Explaining Religion (Away?), *Sophia* 52 (3), 2013, pp. 521-533.
41. Jong, J. Beliefs are Object-Attribute Associations of Varying Strength, *Contemporary Pragmatism* 15 (3), 2018, pp. 284-301.
42. Kelemen, D., Rosset, E. The human function compunction: Teleological explanation in adults, *Cognition* 111 (1), 2009, pp. 138-143.
43. Kelemen, D., Rottman, J., & Seston, R. Professional physical scientists display tenacious teleological tendencies: Purpose-based reasoning as a cognitive default, *Journal of Experimental Psychology: General* 142 (4), 2013, pp. 1074-1083.
44. Keysar, A., Navarro-Rivera, J. A world of atheism: Global demographics, pp. 553–586, In S. Bullivant, M. Ruse (eds.), *The Oxford handbook of atheism*, Oxford, UK: Oxford University Press, 2013.
45. Laurin, K., Kay, A. C., & Fitzsimons, G. M. Divergent effects of activating thoughts of God on self-regulation, *Journal of Personality and Social Psychology* 102 (1), 2012, pp. 4-21.
46. Lebreton, L. C., Van der Zwet, J., Damsteeg, J. W., Slat, B., Andrady, A., & Reisser, J. River plastic emissions to the world's oceans, *Nature Communications* 8, 2017, p. 15611.

47. Lindeman, M., Heywood, B., Riekki, T., & Makkonen, T. Atheists become emotionally aroused when daring God to do terrible things, *International Journal for the Psychology of Religion* 24 (2), 2014, pp. 124-132.
48. Lindeman, M., Svedholm-Häkkinen, A. M., & Lipsanen, J. Ontological confusions but not mentalizing abilities predict religious belief, paranormal belief, and belief in supernatural purpose, *Cognition* 134, 2015, pp. 63-76.
49. Maclean, K. *Pilgrimage and power: The Kumbh Mela in Allahabad, 1765–1954,* Oxford, UK: Oxford University Press, 2008.
50. Maister, L., Slater, M., Sanchez-Vives, M. V., & Tsakiris, M. Changing bodies changes minds: owning another body affects social cognition, *Trends in Cognitive Sciences* 19 (1), 2015, pp. 6-12.
51. McKay, R. T., Dennett, D. C. Our evolving beliefs about evolved misbelief, *Behavioral and Brain Sciences* 32 (6), 2009, pp. 541-561.
52. McLaughlin, O., Somerville, J. Choice blindness in financial decision making, *Judgment and Decision Making* 8 (5), 2013, pp. 561-572.
53. Moors, A., Spruyt, A., & De Houwer, J. In search of a measure that qualifies as implicit: Recommendations based on a decompositional view of automaticity, pp. 19-35, In B. Gawronski, B. K. Payne (eds.), *Handbook of implicit social cognition: Measurement, theory, and applications*, New York, NY: Guilford, 2010.
54. Nisbett, R. E., Wilson, T. D. Telling more than we can know: Verbal reports on mental processes, *Psychological Review* 84, 1977, pp. 231–259.
55. Nosek, B. A. Implicit–explicit relations. *Current Directions in Psychological Science* 16 (2), 2007, pp. 65-69.
56. Oman, D. Defining religion and spirituality, pp. 23-47, In R. F. Paloutzian, C. L. Park (eds.), *Handbook of the psychology of religion and spirituality* (2nd ed.), New York: Guilford, 2013.
57. Pechey, R., Halligan, P. W. Exploring the folk understanding of belief: Identifying key dimensions endorsed in the general population, *Journal of Cognition and Culture* 12 (1-2), 2012, pp. 81-99.
58. Pennycook, G., Cheyne J. A., Barr, N., Koehler, D. J., & Fugelsang, J. A. On the reception and detection of pseudo-profound bullshit, *Judgment and Decision Making* 10 (6), 2015, pp. 549-563.
59. Pennycook, G., Cheyne, J. A., Seli, P., Koehler, D. J., & Fugelsang, J. A. Analytic cognitive style predicts religious and paranormal belief, *Cognition* 123 (3), 2012, pp. 335-346.
60. Pennycook, G., Ross, R. M., Koehler, D. J., & Fugelsang, J. A. Atheists and agnostics are more reflective than religious believers: Four empirical studies and a meta-analysis, *PLOS ONE* 11 (4), 2016, e0153039.
61. Pew Center on Religion and Public Life. *The Global Religious Landscape*, Washington D.C.: Pew Forum on Religion and Public Life, 2012.
62. Preston, J. L., Ritter, R. S., & Hepler, J. Neuroscience and the soul: Competing explanations for the human experience, *Cognition* 127 (1), 2013, pp. 31-37.
63. Randolph-Seng, B., Nielsen, M. E. Honesty: One effect of primed religious representations, *The International Journal for the Psychology of Religion* 17 (4), 2007, pp. 303-315.
64. Rosenberg, M. J., Hovland, C. I., McGuire, W. J., Abelson, R. P., & Brehm, J. W. Attitude organization and change: An analysis of consistency among attitude components (Yales studies in attitude and communication), Oxford, England: Yale University Press, 1960.
65. Rozin, P., Nemeroff, C. Sympathetic magical thinking: The contagion and similarity "heuristics", pp. 201-216, In T. Gilovich, D. Griffin, & D. Kahneman (eds.), *Heuristics and biases: The psychology of intuitive judgment*, New York, NY, US: Cambridge University Press. 2002.
66. Salancik, G. R., Conway, M. Attitude inferences from salient and relevant cognitive content about behavior, *Journal of Personality and Social Psychology* 32 (5), 1975, pp. 829-840.
67. Sanchez, C., Sundermeier, B., Gray, K., & Calin-Jageman, R. J. Direct replication of Gervais & Norenzayan (2012): No evidence that analytic thinking decreases religious belief, *PLOS ONE* 12 (2), 2017, e0172636.

68. Shariff, A. F., & Norenzayan, A. God is watching you: Priming God concepts increases prosocial behavior in an anonymous economic game. *Psychological Science* 18(9), 2007, pp. 803-809.
69. Shenhav, A., Rand, D. G., & Greene, J. D. Divine intuition: Cognitive style influences belief in God, *Journal of Experimental Psychology: General* 141 (3), 2012, pp. 423-428.
70. Smith, S., Alogna, V. K., Balkcom, E. R., Halberstadt, J. B., & Bering, J. M. *Challenges of religious skepticism: Do extinctivists fear a visit from the dead?* Poster presented at the annual meeting of the Society for Personality and Social Psychology, Portland, OR, USA.
71. Sosis, R., Alcorta, C. Signaling, solidarity, and the sacred: The evolution of religious behavior, *Evolutionary Anthropology: Issues, News, and Reviews: Issues, News, and Reviews* 12 (6), 2003, pp. 264-274.
72. Sperber, D. Intuitive and reflective beliefs, *Mind & Language* 12 (1), 1997, pp. 67-83.
73. Stepper, S., Strack, F. Proprioceptive determinants of emotional and nonemotional feelings, *Journal of Personality and Social Psychology* 64 (2), 1993, pp. 211-220.
74. Strack, F., Martin, L. L., & Stepper, S. Inhibiting and facilitating conditions of the human smile: A nonobtrusive test of the facial feedback hypothesis, *Journal of Personality and Social Psychology* 54 (5), 1988, pp. 768-777.
75. Tucker, M., Ellis, R. On the relations between seen objects and components of potential actions, *Journal of Experimental Psychology: Human Perception and Performance* 24 (3), 1998, pp. 830-846.
76. Wells, G. L., Petty, R. E. The effects of over head movements on persuasion: Compatibility and incompatibility of responses, *Basic and Applied Social Psychology* 1 (3), 1980, pp. 219-230.
77. Willard, A. K., Norenzayan, A. Cognitive biases explain religious belief, paranormal belief, and belief in life's purpose, *Cognition* 129 (2), 2013, pp. 379-391.
78. Zuckerman, P. Atheism: Contemporary numbers and patterns, pp. 47–66, In M. Martin (ed.), *The Cambridge companion to atheism*, Cambridge, UK: Cambridge University Press, 2007.

Notes

1. Personal communication (2017) confirmed that participants were asked "do you believe you have a soul."
2. Implicit belief should not be confused with implicit measures. A measure is implicit to the extent that responses to it are difficult to control, are nonconscious, are not cognitively effortful, and unintentional [26], [53].