Re-examining ‘creationist’ monsters in the uncharted waters of social studies of science and religion

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The subject of a clash between scientific and religious world views is often repeated as a very real ‘fact’ in scholarly, policy and public discourse – with creationists being painted as the ultimate unenlightened monsters that threaten scientific, and by extension societal, progress. There is, so we are told, a real and inevitable clash between world views – one that within extreme iterations can only be negotiated by an outright rejection of either science or religion.

We have become so accustomed to this framing of the relationship between evolutionary science and religion that it is now a commonly accepted norm within media or scholarly representation of evolutionary theory. Routinely, these accounts of anti-evolutionary stances tend to be reductionist and rarely look beyond polarised epistemic extremes. As Toumey notes:

It is common for enemies of creationism to dismiss it as a simple exercise in Biblical inerrancy. Human evolution faces opposition supposedly because it contradicts Genesis 1:27, and evolutionary chronology is thought to attract enmity because it cannot be reconciled with a period of six literal 24-hour days. (Toumey, 1993: 296–297)

The frequently repeated account in public-space discourse is then that Darwin’s publication of *On the Origin of Species* caused significant public and theological backlash, and there has been an ongoing battle between rational scientific champions and creationist dragons ever since. The New Atheists are portrayed as only the latest incarnation of those who are brave enough to take up the champion’s banner.

However, there is currently a significant gap in research, either historically or contemporarily, into *publics'* perceptions of the relationship between science and religion. It is important to note here I am purposely using the term 'publics', *not* the public. This is in recognition of the fact that there are multiple ways in which we can think about the 'public' or indeed that members of such 'publics' may identify themselves within different contexts. There is also an increasing recognition that the boundaries between expert, scientist or public can be, and have historically been, fuzzy. Indeed, an expert in one subfield of scientific research is a 'public' to another distinct subfield of research, even in some cases within the same discipline. We are all – however ensconced we may be in an ivory tower, media organisation or system of governance – in differing contexts, at one time or another, a member of the public.

This broader conceptualisation of publics is often missing from research in this field, which tends to focus more narrowly on certain communities. What little systematic social scientific work that has been done has tended to focus on the US debates concerning 'creationism'. Often, the more sophisticated research that has been undertaken has focused on distinct faith communities or those working within elite scientific institutions. Therefore, beyond the polar extremes of these debates we have no real idea of how the supposed clash between world views plays out in the day-to-day lived experience of wider publics, or the role of wider identity politics, or indeed geopolitics, in relation to the role of religion and science in society. Moreover, we have no real understanding of whether this is an issue that has any salience or meaningful consequences for publics at all.

In the interests of reflexivity and as it is integral to the argument within this chapter, I want to stress that I am myself a lifelong atheist, from an atheist and scientific family, and have for a number of years worked within science communication – specifically communicating evolutionary biology. Indeed, in 2009 I directed the Darwin Now project for the British Council, a multi-million-pound project that ran educational, public-engagement and academic activities related to the Darwin anniversaries in up to fifty countries worldwide. It is this experience of working to engage publics with evolutionary science across a range of cultural contexts that led me to examine in more detail what the social and cultural drivers

behind the idea of a necessary clash between science and religion might be.

There are a number of key assumptions at the core of this clash narrative, the primary one being that science and religion are in some form of intractable conflict, especially when it comes to evolutionary science. This implicit assumption pervades the way in which much of the debate or research surrounding creationism and evolution is conducted. These implicit assumptions, and in some cases outright prejudices, in the way that data are collected or research is framed, indicate that epistemic assumptions within scholarly research may contribute to an inflation of scale and threat in the public, policy and media gaze of the phenomena we might refer to as creationism, both in broader international context and in the USA (Elsdon-Baker, 2009, 2015; Hill, 2014a). This in turn means that by using reductionist categories and making inflated assumptions about their salience to individuals, we are in effect creating creationists in the way we collect data (Elsdon-Baker, 2015). As Jonathan Hill observes with regard to his 2013 National Study of Religion and Human Origins, a nationally representative survey of 3,034 US adults:¹

When we carefully define the various possible positions, and measure the certainty with which they are held, both anti-evolution creationists and atheistic evolutionists turn out to be very small proportions of the total population. (Hill, 2014b, no pagination)

Unfortunately, some of the larger scale polling work that has been undertaken concerning public perceptions of evolutionary science and religion is as a result of the implicit assumptions implied by binary measures potentially skewed. This is in part due to the nature of the methodologies employed in large-scale polling or data collection. But it is also in part due to a lack of reflexivity or critical engagement with the individual researchers' own, or traditional disciplinary, assumptions; namely, that evolutionary science and religion are inevitably in conflict. It is evident from the issues framing in some of this research that there is a set of interlinked value judgements or implicit biases that may be at play within facets of the research data

1 For further details of this survey see the publicly available report at: <https://biologos.org/uploads/projects/nsrho-report.pdf>.

collection in this area of study. These assumptions and biases can be characterised by the following statements:

- Anti-evolutionism is always creationism and creationism is always anti-evolutionism.
- Creationism is a product of religious world views or theological concerns and is inevitable within societies that are religious.
 - Therefore, anti-evolutionary stances are always driven by strict adherence to religious world views, not by other social or cultural factors.
- Creationism as a mainstream world view is a real-world phenomenon that is on the rise and must be tackled.
- Creationism is a threat to evolutionary science or science more broadly.
 - Therefore, evolutionary science is increasingly under threat from creationism, which is driven by religious world views, ergo (evolutionary) science is inevitably under threat from religious world views or societies where they are predominant.
 - Ultimately, by extension, therefore, adherence to religious world views will inevitably lead to a necessary rejection of some or all facets of scientific world views, perspectives or research.

Some or all of the above statements might seem to some to be clear common sense or common knowledge. However, whilst we might see some or all of these statements as given ‘facts’ and obvious parts of the contemporary narrative surrounding the communication of evolutionary science, it is important to note that these statements are not based to any great degree on empirical data. Nor are they based on any form of multilayered analysis that allows us to build a systematic understanding of what might be happening at a public-space-discourse, group or individual level. Furthermore, by ignoring these different levels of analysis we are also ultimately making an implicit assumption that for an individual to self-identify as a creationist is always to self-identify as an anti-evolutionist. This might seem like a very counter-intuitive statement. However, both in a categorical sense – that is, in the way we collect survey or polling data – and also in the way that people may themselves use the label ‘creationist’ as an identity marker, there are indeed times when a creationist is not a ‘creationist’

in the anti-evolutionist sense. A good example of this ambiguity over language and identity is the Church of England's website. In an essay entitled 'Good Religion Needs Good Science' by the Rev. Dr Malcolm Brown, he states that:

There is no reason to doubt that Christ still draws people towards truth through the work of scientists as well as others, and many scientists are motivated in their work by a perception of the deep beauty of the created world. (Brown, n.d., no pagination)

The term 'created world' is here used in the context of accepting Darwinian evolution as the process 'by which humanity came to be'. It is philosophically entirely plausible to accept evolution as a mechanism by which a meta-causal deity 'created' humans and all other life forms. Indeed, it is not unheard of, in my experience, for those who accept all facets of evolutionary theory and a 'God of first cause' to refer to themselves as creationists.

However, this ambiguity or complexity is not often reflected in the more binary examples of research data collection. Nor is it considered in the ways in which researchers or science communicators, who are often working within more 'secular' social-science settings or intellectual traditions, approach the entire issue.

Such implicit biases or value judgements concern me when thinking about how we might collect data that provides us with a clearer account of what the social and cultural drivers are for rejecting evolutionary theory. I will expand on this point by focusing, firstly, on the implications of the geographical focus and gaps in research data and methodological concerns in this field of study, and, secondly, on the philosophical issues relating to the researchers' own cultural, disciplinary and institutional context within the field of study itself.

Geography and anti-evolutionism

Beyond pockets of research undertaken in the USA there is a very significant lacuna in research of any kind that explores public perceptions or attitudes towards evolutionary science, let alone scholarly research that examines how broader publics perceive the relationship between their personal belief (or non-belief) and their attitudes towards

evolution (Elsdon-Baker, 2015). The problem with this US focus in terms of both data and researchers is twofold. Firstly, there is a tendency to assume this subject has been fully researched by US-based researchers, which leads in places to rather naive extrapolations or generalisations from US research into public perceptions onto other culturally distinct publics. This is perhaps most notably problematic in parts of Europe where religion plays a very different role in public-space discourse. Here, non-religious, atheistic or indeed anti-religious narratives are far more prevalent and more likely to be the dominant narratives in these debates, which will, in turn, impact on the social or cultural factors at play. It also assumes that creationism is a US export that is uncritically consumed and rebroadcast by creationists from different belief systems worldwide. This entirely ignores the possibility that there may be a distinct set of localised social and cultural drivers relating to the rejection of facets of evolutionary science, so that what we may be observing are multiple types of creationism and ways of being a creationist.

Additionally, in some of the scholarly discussion to date there is an almost alarmist agenda or tone. This is becoming increasingly evident in discussions of creationism outside the USA, where there is a very significant lack of comprehensive data. This, in part, is an understandable response of those within broad science, technology, engineering and mathematics studies fields to a perception of an increase in creationist discourses outside US contexts (see Blancke et al. (2013) for a good example and comprehensive overview of this concern in Europe). While I am not denying that creationist or intelligent-design narratives and groups do exist in Europe and internationally, we need to be very wary – especially when we have little empirical data – of inflating the levels of acceptance, salience or influence of such positions. As Blancke et al. (2013) show, there have been some quite vocal incursions of advocates of creationism (or its fellow traveller, intelligent design) into policy discussions within European contexts. As is often the way in public debate or online forums, it is often those who shout the loudest who gain the most attention, but it would be folly for the academy to assume that being vocal or having access to a privileged platform means that such individuals are acting in a way that is representative of broader publics' actual perspectives.

Such a significant lack of information about what publics really think with regard to evolution, faith and belief carries the risk that both of the counter-oppositional sides of the polarised narratives within these debates – 'creationists' and 'hard-line atheistic evolutionists' – can make claims that cannot be countered or refuted in any way. This kind of abstract debate might seem to be of limited importance outside US educational-policy arenas. But into this research vacuum steps speculation, implicit bias and, in some cases, outright prejudice.

Within a broader geopolitical context, the notion of the 'threat of creationism' is being tied to more pernicious clash-of-civilisation narratives. In the UK, for example, there are some recent cases whereby this kind of implicit bias might be implemented within UK educational policy.² This is particularly evident in relation to concepts of British values and the purported, yet to date empirically unfounded, threat of Islamic versions of creationism (Elsdon-Baker, 2015; Hameed, 2014).

Data, methods and rejection of evolution

All too often, given the gap in data, scholars are reliant on the few quantitative surveys that have been undertaken (e.g. Blanke et al., 2013; Gallup, n.d.; Hameed, 2008; Miller et al., 2006; Newport, 2014; Pew Research Center, 2013). Given the nature of the commissioning processes involved and the way in which this kind of polling is conducted, this kind of research builds in from the outset a framing of research questions that may contribute to an inflation of the numbers of people we might classify as creationist, which further serves to exacerbate the public and scholarly discourse on the inevitability of the clash between evolution on the one hand and creationism on the other (see Elsdon-Baker (2015) for a more thorough analysis of issues framing in quantitative research in this field). A core component of such surveys or studies tends to be the development of measures that

2 For an interesting example of this in relation to Nicky Morgan, then Education Secretary, see the article by Matthew Holehouse in the *Telegraph*, 7 August 2014: 'Toddlers at Risk of Extremism, Warns Education Secretary' (www.telegraph.co.uk/news/politics/11020356/Toddlers-at-risk-of-extremism-warns-Education-Secretary.html), where the teaching of creationism in nurseries is linked to 'extremism' as part of a counter-terrorist response to the Trojan horse affair.

seek to ascertain levels of rejection of evolution or acceptance of creationism. These are very much based on models that have been in use in the USA for the past few decades, and are evident in the Gallup polls that have been conducted since 1982, which ask:

Which of the following statements comes closest to your views on the origin and development of human beings:

1. 'Human beings have developed over millions of years from less advanced forms of life, but God guided this process.'
2. 'Human beings have developed over millions of years from less advanced forms of life, but God had no part in this process.'
3. 'God created human beings pretty much in their present form at one time within the last 10,000 years or so.' (Gallup, n.d.)

The respondents who chose option 3, the 'creationist' option, have stayed relatively consistently at 40%–47% between 1982 and 2014 (Newport, 2014). However, as Hill (2014a) has shown, a systematic and conscious affiliation with creationism is more limited. When asked, only 8% of survey respondents agreed with all aspects of the conventional young-earth-creationist world view, involving the creation of earth in seven twenty-four-hour days and a historical Adam and Eve. A large proportion (37%) of those classified as creationists in Gallup's terms also do not see correct belief about evolution as 'very' or 'extremely' important.

While this kind of polling is indicative of broader trends, it cannot on its own give us an understanding of how salient these matters are to individuals in their day-to-day lives, or how other complex factors, including cultural identity, might play a role in how people respond to these questions. However, this kind of large-scale public-attitudes measure is relatively commonplace within research to date into public perceptions of science. Given the history, agendas and development of science communication or public understanding of science as an academic field of research (Bauer et al., 2007), and also significantly as a practice, in recent decades it is unsurprising that there has been little engagement with the growing body of work in the sociology of religion that seeks to understand groups' lived experience of beliefs, or approaches that might seek to understand belief systems as a form of cultural identity or a form of belief and belonging.

Public understanding and anti-evolutionism

So, while there has been an emphasis in scholarly approaches on the perceived rise in creationism and creationist discourses, or in bluntly measuring numbers of creationists, contextual research has been lacking. Such research would need to explore the salience of creationism across populations or cultural contexts, the real lived experience of such a phenomenon, and general levels of understanding of what key terms in polling or surveying research (e.g. evolution, ancestor, creator or god) might mean to the respondents. Furthermore, negligible research has been done outside the USA to examine creationist discourses themselves, or the impact and level of influence these creationist groups or discourses might have on the general population. Additionally, alongside such studies there is a need for more analysis of what 'creationist' public-space discourses might be responding to, for example, in terms of secular humanist discourses or the perceived (and real) atheistic framing of evolution and broader cultural-identity issues (Hameed, 2014; Toumey, 1993). These approaches would give us a much clearer idea of what is being rejected when individuals reject evolution in large-scale surveys or quantitative research. In order to do this effectively, we need to move away from simplistic models that assume that the only reasons one might reject evolution are due to a literalist religious stance, or that the debate is purely about a clash between epistemic world views (Elsdon-Baker, 2016; Evans and Evans, 2008; Toumey, 1993).

New approaches and their limits

Therefore, in order to really understand public perceptions of the relationship between religious or spiritual belief and science, or indeed perceptions of evolution per se, we should try to remove any form of value judgment when evaluating the relationship between creationist and evolution. As Wylie and Nelson similarly observe in their review of the impact of gendered contextual and epistemic values on scientific research: 'Typically, these effects arise and persist because scientists are unaware of the values informing the research traditions in which they are educated and in which they work' (Wylie and Nelson, 2007: 78).

However, drawing on the positive impact of feminist approaches in a range of fields including anthropology, biological sciences, archaeology and the history of science, it is clear that we do not have to retreat into relativism if we accept and recognise the epistemic contexts within which we work. As Wylie and Nelson (2007) further highlight, the enterprise of science itself has a shifting and changing agenda. This is both an opportunity and a concern, in terms of the highly politicised social-scientific study of religion, the critical reappraisal of the secularisation thesis, and the increasingly geopolitical or trans-national understanding of science and religion debates within society. Particularly in light of feminist, or indeed postcolonial, approaches to science studies, which have not only sought to avoid disappearing gender or race, but have also provided a new lens through which to increase our understanding of certain fields.

And yet the problems for the social-scientific study of religion and science are manifold. Firstly, there is the real potential for a strong conflation between the perceived need for science communication, science education or scientific-practice-based research to draw a distinct demarcation between 'science' and 'non-science', and the way that researchers in these or related fields may tackle the boundaries between public perceptions of 'science' and 'religion'. Such concerns might lead to an obfuscation of the more fluid and complex ways that we define, practice or engage with that nebulous entity we call science. Furthermore, it also fundamentally disregards the possibility that 'science' can act as a cultural identity as well as a methodological framework for understanding the world around us.

Secondly, not only is there a case to be made that there is a disappearing of the epistemic facets of religious belief from the study of religion, but also there is an added issue relating to the development of the social-scientific study of religion as a 'secular' discourse or approach (Evans and Evans, 2008). This is largely due to the values-based contexts which in places, both historically and within the academy today, have at least defined social- or natural-scientific research in contradistinction to 'religious' world views, or at worst have framed science as openly anti-religious. In the latter polarising binary narrative, to be a scientist (in this case a social scientist) you must be non-religious. This is then further compounded by subtle and nuanced differences in

terms of the context, disciplinary history, practice and methodologies between different cultural contexts in how religion (and science and religion) is studied academically, which is in evidence even between purportedly similar anglophone contexts, e.g. researchers based in the UK and the USA.

By identifying the ways in which an open-minded and reflexive examination of scholarly research in the social and cultural study of science and religion, as both a subject for empirical enquiry and a methodological commitment, we can potentially open up new innovative lines of enquiry. To achieve this the submerged biases within existing research need to be examined. If we expand Wylie and Nelson's argument beyond the gender biases, which have become increasingly more evident in the academy, to the possibility that there are secular or Western epistemic biases too, we will have to confront the agendas of science as a programme, a cultural identity and a geopolitical world view in order to create space for new, more fruitful avenues of empirical research which enable us to better understand the role of religious (or spiritual) belief in society and public perceptions of its relationship with science.

Furthermore, if we were to take a step back from some of the value judgements I outlined at the beginning of this chapter, we might be able to revisit the entire discussion of what public perceptions of evolutionary science are, and what might actually be acting as the cultural or social drivers that lead individuals or groups to adopt anti-evolutionary stances or to voice concerns or doubts over evolutionary science *per se*. Thus, if we move from simply focusing on 'anti-evolutionism' as a 'religious' reaction to evolutionary theory and start to unpick what might be wider moral and ethical, historical, cultural, or societal concerns, we will start to develop a more nuanced picture of what exactly is driving anti-evolutionary, and by extension broader, anti-science stances within certain groups or communities. This is especially pertinent for understanding public responses across international contexts where differences in colonial experience and legacy, or the current geopolitical framing of world views or cultural, religious or ethnic identities will undoubtedly influence the ways in which people form attitudes or perceptions of evolutionary science or indeed 'Western science' itself.

Moral values and anti-evolutionism

We therefore need to more carefully examine what exactly the moral concerns might be that lead to a rejection of, or lack of trust in, evolutionary science. Both historically and contemporarily there have, to say the least, been some highly socially objectionable misappropriations of evolutionary science, the most obvious being the ‘scientific racism’ and eugenics movement, which saw enforced sterilisations in a number of countries worldwide. This may seem like a mere historical concern that relates only to the interwar period and the atrocities of Nazi Germany. However, eugenical programmes were adopted by a number of countries across North and Latin America, Europe, and Asia (Broberg and Rolls-Hansen, 2005; Stepan, 1991; Stone, 2001). It should also not be forgotten that the last of these laws in the USA was not repealed until as late as 1979, and in Alberta, Canada, they were not repealed until 1972.

This is within living memory for many publics, individuals or communities. These programmes were not always aimed at those who were seen as ‘mentally unfit’, but there were also within a number of contexts (including in the US) programmes of enforced sterilisation that targeted indigenous, migrant or ethnic-minority populations. This can still leave a lasting legacy today, either in the current discourses, or perceptions, concerning ethnicity and genetic screening (for a good example of this in California, see Stern (2005)). More worryingly, forced sterilisation is still a contemporary issue for some ethnic groups, leading the World Health Organization (WHO) in 2014 to release an interagency statement seeking to tackle: ‘forced, coercive or otherwise involuntary sterilisation’, and noting that:

in some countries, people belonging to certain population groups, including people living with HIV, persons with disabilities, indigenous peoples and ethnic minorities, and transgender and intersex persons, continue to be sterilized without their full, free and informed consent. (WHO, 2014: 1)

The linking of Darwinism, eugenics and creationism does indeed form a part of creationist anti-evolutionary literature. This is perhaps unsurprising given the fact that it was Charles Darwin’s cousin Francis Galton who first coined the term eugenics, even though he did not

do so until a year after Darwin's death in 1882 (it is, however, worth noting that Darwin and Galton strongly disagreed on mechanisms of inheritance). There are even attempts on websites such as creation.com to link Richard Dawkins and New Atheist discourses with earlier eugenically inspired approaches.³ However, while there is evidence of concerns over eugenics in creationism literature and discourse, insufficient historical research has been undertaken to examine the possible links between the development of anti-sterilisation discourses and creationist discourses in North America or elsewhere. As Dack (2011) notes in his analysis of the Alberta eugenics movement and Sexual Sterilization Act:

[A] number of pamphlets and books were published in Canada during the mid-1930s, mostly by religious organizations in Ontario and Quebec, which were widely circulated in Alberta and spoke out against the province's sterilization law. (Dack, 2011: 102)

If we take the case of enforced sterilisation in 1930s Alberta, Canada, as an example, we can begin to see how the impact of these laws and subsequent programmes could possibly be linked to the development of creationist anti-evolution discourses. There is, of course, a need here for further and systematic historical study.

Even within well-studied contexts such as North America, then, not enough research has been done that allows historical insights into the impact of social factors such as sterilisation laws and 'scientific racism' on consolidating public anti-evolutionary stances. What research has been done has tended (for sound methodological reasons) to focus solely on explicitly creationist discourses and does not tend to explore those on the periphery of those debates or who do not explicitly endorse a strong creationist stance. However, concerns over sterilisation and eugenics are cited in creationist literature as part of a whole package of moral issues that are linked to evolutionary theory (Numbers, 1993; Toumey, 1993). Within broader international contexts, there has been a long legacy of evolutionary theory being perceived as being entwined with racial stereotyping and reductionist anthropological approaches. This is, again, not just a historically situated concern, but has been

3 See <http://creation.com/dawkins-and-eugenics>.

prevalent in more recent highly problematic articulations of alleged 'racial' differences.

A classic example of this is the publication of *The Bell Curve: Intelligence and Class Structure in American Life* by Richard Herrnstein and Charles Murray in 1994, which controversially discussed racial differences in intelligence due to both genetic and environmental factors, with people of African descent being seen as inherently less intelligent than those of Caucasian or Asian descent. This is a view that was heavily echoed in the public scandal caused by the Nobel-Prize-winning geneticist James Watson in 2007.⁴

These more recent examples can only add to longer-term concerns within some groups or communities that facets of 'evolutionary science' or 'genetics' are inherently racist or sexist. More recently we have also seen this in the linking by Richard Dawkins in his rhetoric over 'Islamic creationism' with broader Islamophobic narratives (Hameed, 2014). Taking into account the issue of race and ethnicity alongside the broader issues of perceived links between 'evolution' and 'secularisation' will no doubt play an important role in any research that seeks to unpick increasingly complex and geopoliticised debates on Muslim perceptions of evolution. As Hameed (2014) states:

The rejection of evolution may be becoming another contested marker for Muslim minorities [in Europe] in schools. In fact, one can see why evolution may be the target: for many, evolution is one of the prime reasons for the secularization of Europe. Furthermore, it is often pitted against religion in popular press and many conflate evolutionary biology with racism associated with Eugenics and social Darwinism. (Hameed, 2014: 393)

There is no causal relationship between adopting an evolutionary-science paradigm for research and some of the atrocities conducted under the banner of eugenics, social Darwinism or public policies of enforced sterilisation that have affected potentially hundreds of thousands of people due to their race, ethnicity, gender or mental health status. However, in public perceptions of evolutionary science these societal issues clearly do (rightly) count, and will most likely

4 See www.independent.co.uk/news/science/fury-at-dna-pioneers-theory-africans-are-less-intelligent-than-westerners-394898.html.

for some individuals, groups or communities play a role in the way in which people might perceive evolutionary science today.

This broader linking of moral or societal concerns and a mishmash of identity issues relating to secularism with evolutionary science is stressed in the work of Evans and Evans (2008) and builds on the work of Toumey (1993), who, when discussing the linking of evolutionary theory to secular humanism within US creationist discourses, argued that:

The key to understanding the intellectual structure of creationist thought is to see that it is part of a larger body of thought, that is, fundamentalist moral theory. This latter body of theory addresses a broad range of issues and worries about modern American culture and social change. As a result, creationist commentaries on both creation and evolution often refer, directly or indirectly, to the moral meanings that make those issues and worries so urgent to creationists and other fundamentalists. Much of the existential content of creationist thought is a broad cultural discontent, featuring fear of anarchy, revulsion for abortion, disdain for promiscuity, and endless other issues, to which evolution is then appended. (Toumey, 1993: 297)

As Evans and Evans suggest, there may be factors beyond epistemological concerns at play, stating that 'public debates between religion and science are no longer about truth, but rather about values' (Evans and Evans, 2008: 100).

The influence of these kinds of social and cultural narratives upon the views held by broader populations globally about evolution or the relationship between science and religion has been understudied, as has the wider link between being anti-evolution and anti-science, or the levels of trust in science among individuals or groups who reject Darwinian evolution.

Unfortunately, due to the primary, and in some cases sole, focus of social scientists on a kind of literalist or religious fundamentalist creationism as the only show in town when it comes to reasons for rejecting evolution, these wider, more nuanced and, on occasion, entirely credible social concerns over the perceived application of evolutionary science in society or public policy are often lost. Added to this is the compounding factor that the individuals, groups or communities most likely to be impacted on by such discourses are

often the least likely to have a voice in public science or education policy. Moreover, they are seldom seen as an important or primary audience for science communication initiatives. Lumping together these important – yet often complex and nuanced – moral, social, political and geopolitical concerns with what are caricatured as extreme fundamentalist religious positions inhibits us from building a better understanding of what might be at play when people say they reject evolution. Little or no data have been systematically collected across publics to discern how these factors may or may not impact on the ways in which people negotiate, accept or reject evolutionary science.

Future research directions

What is needed, then, is a more internationally focused programme of research into these kinds of social and cultural narratives that moves us away from a less reflexive or reductionist approach towards a contextual whole-systems approach which incorporates both quantitative and qualitative data collection. Indeed, I am currently directing one such programme of research with sociologists, social scientists, historians, social psychologists and myself as the token philosopher. We expect that this type of research will go some way towards allowing a multilayered analysis of the different social and cultural drivers for the rejection of evolutionary science across a spectrum of publics at the level of individuals, groups, communities and societies. Far from arguing that quantitative research plays no role in this more systematic approach, I am arguing that we need to recognise that the kind of survey work discussed above should not be used solely to give us one-off snapshots. Instead, it is important to examine in more depth the issues framing within question design, together with the cross-correlation between survey items, and to resist using simple measures to draw comparative conclusions across cultural contexts. This kind of survey research, when used in conjunction with more in-depth historical, social psychological and qualitative data, can provide us with an opportunity to understand trends within the broader societal narratives. Given the contextual and translation issues inherent in international research, we should be careful to view this as part of a package of cultural- or country-specific case studies, as opposed to some kind of pseudo-comparative league table, as has been in evidence in some of the literature in this field.

As Bauer (2008: 124) notes in his review of survey research and the public understanding of science, 'The abuse of survey data is clearly possible and documented ... But the misuse of an instrument does not exhaust its potential.'

There is therefore a clear need to develop a more systematic field of humanities and social-science research (incorporating expertise from the currently predominately distinct study of both 'science' and 'religion') that seeks to explore these questions and to ask: 'Is public-space religion always public-space science's ultimate "other"?' This is not only important in terms of our own research practice, but could enable a more nuanced understanding of the relationship between science and religion that provides space for a productive dialogue and avenues for public engagement across a range of issues relating to the role of science in society both nationally and internationally.

To return to the theme of this book: if we go looking for monsters real or imagined, we will often find them, as is the case with creationists. However, sometimes we should be aware that these are monsters only because we choose to see them that way. Furthermore, in terms of truly critically engaging with our own disciplinary norms, hegemonies and implicit biases (or indeed prejudices), it may well be that the monster we fear the most is the one we will find if we look too closely in the mirror.

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