

RELIGION AND INTELLIGENCE

An Evolutionary Analysis

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UI

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To my children, Martha and Henry.

'The fool says in his heart "There is no God." They are corrupt, their deeds are vile, there is no one who does good.' (Psalm 14:1).

'Doth someone say that there be gods above? There are not; no, there are not. Let no fool, led by the old false fable, thus deceive you.' (Euripides, Bellerophon).

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Edward Dutton
20th October 2013.
Oulu, Finland.

Chapter One

Introduction

1. *Introduction.*
2. *'What About the Archbishop of Canterbury, St Thomas Aquinas or Jacques Derrida?'*
3. *'It's Simplistic.'*
4. *Original Contribution.*
5. *Evolutionary Psychology and Consilience.*
6. *Outline.*
7. *Conclusion.*
8. *The Educated Reader.*

1. Introduction

St. Anselm of Canterbury (1033-1109) famously quoted Psalm 14:1 when he asserted, 'Truly there is a God, though the fool says in his heart there is no God' (St. Anselm, 1995). He wrote this in a thesis attempting to prove God's existence. St. Anselm was challenged by a monk called Gaunilo of Marmoutiers who entitled his reply *On Behalf of the Fool* (see St. Anselm, 1995). Gaunilo argued that St. Anselm's 'proof' of God's existence lacked logic. This study will go further and show that St. Anselm's assertion, that not believing in God is associated with foolishness and so, implicitly, with low intelligence, is incorrect. The opposite is broadly true.

Intelligence is negatively associated with religiousness. In this study we will focus on the relationship between intelligence and religious belief, as this will be argued to be the essence of religion, and the studies we will draw upon will focus on World Religions and Christianity in particular. But, as we will see in

Chapters Seven, Ten and Twelve, this statement is also true if religiousness is broadened to include both belief and ritual observance or if it is broadened beyond Christianity. This obviously does not mean that all highly intelligent people are not religious or that all of those who are low in intelligence are religious. It certainly does not mean that all those who are wealthy or highly educated are inherently less religious than those who are uneducated or impoverished. It means that, broadly speaking, the more intelligent are less religious than the less intelligent and that intelligence is the reason for this. Low intelligence predicts religiousness whether we define 'religion' according to the dictionary (as 'belief in or reverence for supernatural powers') or in a broader way, such as to include ideologies which I will call 'replacement religions.'

Attempting to argue that intelligence negatively predicts religiousness seems to evoke two initial responses.

2. 'What about the Archbishop of Canterbury, St Thomas Aquinas or Jacques Derrida?'

The first response is to list all of the highly intelligent yet religious people alive today, or present the even longer list of religious historical figures, and ask how the hypothesis can possibly be true. With regard to replacement religion, examples of intelligent Marxists or Multiculturalists are presented.

There are, of course, many comparatively religious people who are relatively intelligent. However, we will see that they are the minority within their cultural contexts. We will show that their comparatively high religiousness is due to strong personality traits counter-acting their intelligence, environmental factors in adulthood (especially stress), and, to a lesser extent, the experience of having been raised in a religious family. We will

see that British university graduates, overall, are more 'religious' than non-graduates (see Meisenberg et al., 2012), something which may be explained, in part, by educational success relating not just to intelligence but to specific personality factors which also make one prone to religiousness. However, this does not undermine the overall trend that those who are of high intelligence are less likely to be religious and are more likely to be atheists, skeptics and agnostics than those of low intelligence. In addition, we will show that supporters of replacement religions are on average less intelligent than non-supporters and, as with the religious, highly intelligent ideologues can be substantially explained by a particular personality trait profile.

With regard to the Early Modern period, for example, where it might be argued that everybody was religious by modern standards, we will show that the more intelligent were more questioning and liberal in their religiousness than the less intelligent and thus less 'believing' and so less 'religious.' Even in modern times, it will be demonstrated that the liberal religious are on average more intelligent than the conservative religious (though less intelligent than the non-religious).

3. 'It's Simplistic'

The second response to the assertion that intelligence negatively predicts religiousness is to call it 'simplistic.' But, as we will discuss in Chapter Two, any attempt to understand the world involves simplifying a mass of information into a manageable system. Empirical assertions by their very nature play-down nuance and simplify, meaning that any theory, no matter how accurate, risks being accused of being 'simplistic.' The word 'simplistic' implies simplifying something, which may be correct when nuanced, to the point where it is inaccurate. For example, to

claim 'there is a negative correlation between intelligence and physical attractiveness' (see Kanazawa, 2011) may be empirically accurate, while to assert, 'Physically unattractive people have lower IQs than attractive people' would be simplistic because the statement's lack of nuance has led to it being empirically inaccurate. From a scientific perspective, the question is whether the assertion that intelligence negatively predicts religiousness is empirically accurate. This study will show that it *is* empirically accurate. There are, of course, exceptions to the rule. Nobody is claiming that intelligence is the only factor in explaining religious differences and that intelligence negatively correlates with religion perfectly. But, we will show that intelligence negatively predicts religiousness in general. One could only conclude that this was 'simplistic' by making a strawman of the argument.

Moreover, it is axiomatic in science that, all being equal, the simplest theory is the best, so it seems odd to criticize a theory as 'simplistic' unless the theory's predictions are not borne out in most cases. Perhaps researchers who do so think that intelligence is associated with complex thinking and so dismissing intuitively accurate or widely accepted theories as 'simplistic' makes themselves seem more intelligent. But a consequence of such an attitude is an impractical failure to better comprehend the world where it could have been better comprehended. As Charlton (2009) argues, some highly intelligent scholars will reject the simplest theory, even though it is usually the correct theory, and instead adopt unnecessarily complex ideas simply because their intelligence allows them to do so. This may show-off how intelligent they are (and there may be benefits to doing this), but it does not help us to better understand the world and so, scientifically, it is not especially helpful.

4. Original Contribution

As we will see, there is a very large amount of research into the relationship between intelligence and religion in terms of academic articles. For this reason many psychology of religion textbooks contain a chapter looking at some of the research on the relationship between religion and intelligence (e.g. Argyle, 1958; Beit-Hallahmi and Argyle, 1975; or Argyle and Beit-Hallahmi, 1997). It is also briefly discussed in a number of books on why people leave religion behind (e.g. Zuckerman, 2011), in studies of the relative lack of religiousness amongst scientists (e.g. Ecklund, 2010), in studies of intelligence and its correlates (e.g. Kanazawa, 2012 or Lynn and Vanhanen, 2012), and in discussions of belief in God in general (e.g. Dawkins, 2006).

However, there exists no study which comprehensively reviews the body of evidence looking at the relationship between religion and intelligence. In addition, there exists no detailed study of the relationship between intelligence and what in Religious Studies is variously called 'replacement religion,' 'implicit religion' or 'secular religion' (see Hamilton, 2001, p.13). As we will see, there is a case for broadening the definition of religion to include 'ideologies' and this study will review the evidence regarding the negative relationship between intelligence and replacement religiousness. Accordingly, this book aims to fill a gap by providing a comprehensive study of the relationship between religion, replacement religion and intelligence. As part of this, it will look in depth at pre-twentieth century perceptions of the relationship between religion and intelligence and at why highly intelligent people in the contemporary West should still, sometimes, be more religious than those who are less intelligent than they are. In addition, I hope this study demonstrates to Religious Studies and social science scholars and students the

utility of using evolutionary psychology as a means of understanding religion and religious differences.

5. Evolutionary Psychology and Consilience

Evolutionary psychology is the attempt to understand human behavior from an evolutionary perspective. Proponents argue that human behavior can be comprehended by examining evolved adaptations to the ancestral environment and that behaviors that are common to all cultures are likely to reflect psychological adaptations. Certain psychological adaptations provided an evolutionary advantage, the adaptations spread, and, accordingly, only those descended from people with the adaptations are alive today. Of course, some psychological adaptations were less advantageous than others or advantageous only in certain environments or only in certain periods, so there is some population variance in psychological adaptations. Evolutionary psychologists argue that humans are best understood as an advanced ape, that the human brain is a physical organ subject to evolution like any other, that human nature is innate and that human behavior is a product of this innate human nature reacting to a given environment. A large body of evidence has been presented in favor of this perspective (see Wilson, 1975). As we will see, evolutionary psychological explanations, when compared to purely environmental ones, explain the most, leave fewer questions unanswered and can be grounded in science and thus logic. The alternatives leave questions unanswered, explain less and involve significant assumptions.

This study argues in favor of Religious Studies' being 'consilient' (see Chapter Three). In essence, the physical sciences are relatively unified but the social sciences are much less so, each with their own vocabulary, theoretical constructs and (sometimes

dogmatic) assumptions (see Wilson, 1998). This is not only inefficient but it renders some research in social science irrelevant to those who do not share its assumptions, just as some forms of research in theology are irrelevant to non-believers (see Labanow, 2009, Ch. 1). The unifying ideas of physical science - logic and the empirical method - lead to us being able to make correct predictions about how the world works, and we cannot live if we cannot do this. This is not the case with many examples of social science, which are based on dogma rather than the scientific method. Many of the predictions with this basis have been proven incorrect (see Wilson, 1998 or Kuznar, 1997). The philosophical principle of pragmatism argues that theories are tools to better understand, and find our way through, the world. If a theory is sound then you should be able to live by it (e.g. Peirce, 1929). James (1907, p.28) therefore presented pragmatism as a 'method for settling metaphysical disputes that might otherwise be interminable.' Unless a 'practical difference' would follow from one or the other side's being correct, the dispute is idle. Thus, from a pragmatic perspective, the social sciences need to be reducible to - consilient with - the natural sciences. Rejecting this proposal rejects the ability to make correct predictions about how the world works, we cannot live if we do this, so it is not pragmatic.

This study will also develop Lynn and Vanhanen's (2012) argument that 'intelligence' can be the specific unifying force in the social sciences by showing just what significant predictive power it has in making sense of a particular social phenomenon: religion.

6. Outline

In Chapter Two, we will define 'science.' The fact that some research into our key subjects, such as intelligence, has been dismissed as 'unscientific' necessitates defining 'science.' We will also define 'religion' and discuss the distinction between 'fundamentalist' and 'liberal' religiousness. We will argue for the superiority of a definition of 'religion' which encompasses modern ideologies. It will be demonstrated that such a definition explains more, is more consistent, and is easier to reconcile with research in psychology and biology.

Chapter Three will draw upon research in evolutionary psychology to understand how religion evolved. In this chapter, we will also summarize research on the heritability of religion. We will argue that adult religiousness is around 0.44 heritable, 0.12 caused by childhood environment, with the remainder explicable in terms of post-childhood environment. We will also look at the heritability of ideology.

Arguing that the genetic dimension of religion reflects inherited intelligence and personality, we will define these terms in Chapters Four and Five. In Chapter Four, we will examine the concept of intelligence, defend the classical definition of it, and defend IQ tests as measurement instruments for intelligence. We will also look here at the heritability of intelligence and some of its correlates, such as low time preference and short reaction times.

In Chapter Five, we will examine 'personality' and we will argue for the veracity of the 'Big Five' personality factors (Extraversion, Conscientiousness, Neuroticism, Agreeableness and Openness-Intellect). However, we will suggest that there appears to be a sound case for merging intelligence with Openness-Intellect. In this chapter, we will also look at the

heritability of personality and the personality correlates of religiousness and educational success, as this helps us to understand why some highly intelligent people are more religious than some less intelligent people from the same culture.¹ Also, we will look at why some highly intelligent people might be attracted to religion and others to replacement religion in the same cultural context. We will argue that distinct personality trait profiles, which counter-act intelligence, explain the assent of the more intelligent to religion and replacement religion respectively. However, as we will see, assent to both is generally predicted by low intelligence.

Chapter Six will look at pre-twentieth century scholars who have remarked on the apparent inverse relationship between intelligence and religiousness and the positive relationship between intelligence and heresy, religious liberalism, religious skepticism and atheism. We will also look at remarks and theories that strongly implied an awareness of such a relationship.

Chapter Seven will survey the studies conducted since the 1920s which have looked at the relationship between religion and intelligence, finding that there is a negative correlation between religion and intelligence, with the liberal religious more intelligent than fundamentalists. It will also discuss evidence of a negative relationship between intelligence and support for replacement religion-type political parties. Chapter Seven will argue that the more intelligent are less religious because they are better able to see through fallacious arguments and have a more questioning attitude. Alternative theories will be discussed but found wanting.

Chapter Eight will examine religiousness amongst those with the highest intelligence and particularly the academic elite in the West. It will show that they are far less religious than

¹ 'Culture' is used here to refer to the way of life of people. See Jenks (1993) for further discussion of the concept.

members of the public and that the most elite scientists are the least religious of all. It will also show that, even amongst such scientists, intelligence differences are a predictor of religious differences and it will note that the most intelligent academics are the least drawn to replacement religiousness.

Chapter Nine will examine the relationship between religion and age. It will find that those at their cognitive peak are the least religious.

Chapter Ten will examine the Flynn Effect; the observation that IQ test scores have been increasing in Western countries since around 1900. It will be noted that growing irreligiousness throughout the twentieth century in Western countries parallels the secular rise in IQ scores noted in the Flynn Effect. However, it will be argued that this is not caused by rising intelligence. We will argue that modernization may, in part, create the effect and it also reduces stress and uncertainty, which, as we will see, is a major factor in religiousness.

Chapter Eleven will look at the evidence that men are more intelligent than women, demonstrate that this is persuasive (with certain nuances) and show that it is paralleled in higher female religiousness.

Chapter Twelve will survey the evidence for religious differences between nations and find that, in general, the more intelligent a nation is then the less religious it is.

Chapter Thirteen will examine racial differences in religiousness within the USA and show that they parallel the findings of studies looking into racial differences in intelligence.

Finally, Chapter Fourteen will summarize our key findings and predict that the Western world will become more religious over the next hundred years due, in part, to the more intelligent being outbred by the less intelligent.

7. Conclusion

This study will show that if the irreligious are 'fools' they are fools in the sense of the stock character in certain Shakespeare plays. It is generally agreed by literary critics that the Fool was a highly intelligent person who was quick-witted and adept at, albeit subtly, challenging his masters and exposing their inconsistencies. Shakespearian fools also tended to grapple with difficult philosophical questions, be highly creative and be eccentric in their interests and habits.² As we will see in this study, these are facets all associated with high intelligence, as is religious skepticism, religious questioning and religious disbelief.

8. The Educated Reader

This study is aimed at the educated reader with an interest in religion. Accordingly, it is aimed at those with training in the Humanities, such as Theology and Religious Studies, but also at those with a social scientific or scientific background. There are perspectives that we will defend in this study that may be taken for granted amongst natural scientists. However, they are not necessarily taken for granted amongst those from social science or humanities backgrounds. Accordingly, this study will present defenses of them. Readers trained in science may wish to skip the sections in Chapter Two which defend the scientific method, defend a relatively narrow definition of science, and which refute postmodernism and cultural relativism. They may also wish to skip the defense of the concept of intelligence and of IQ tests presented in Chapter Four. This study will include introductions to issues to which scientists will require no introduction (such as

² E.g. Dunkling (2012), 'Fool, you,' Neuvo (2005, Ch. 1), Cahn (2001, pp.89-97), or Calvo (1991, p.162).

genetics) because other scholars may require some introduction to them. Readers with training in the natural sciences may wish to skip some of these sections too. However, I hope they are useful to those with a social science or humanities background. Finally, this study will demonstrate, in Chapter Seven, that it is reasonable to term the arguments presented in favor of God's existence fallacious. This may be taken for granted by many non-religious people (who may wish to skip this section) but they have been examined with the religious reader, perhaps with a background in Religious Studies or Theology, in mind.

Chapter Two

Defining Science and Religion

- 1. Introduction.*
- 2. Stereotypes and Categories.*
- 3. What is 'Science'?*
- 4. On Speculation.*
- 5. Problems with the Lexical Definition of Religion.*
- 6. Operational Definitions of Religion.*
- 7. Religious Experience and Replacement Religion.*
- 8. Responding to the Postmodern Critique.*
- 9. Conclusion.*

1. Introduction

In this chapter, we will define 'science' such that we can be clear regarding what kinds of research are scientific and what kinds are not. In addition, we will define religion, arguing in favor of broadening the definition. However, before defining these terms we must be clear, philosophically, on how we can define words and categories and what defines a scientific category. This is because the scientific nature of some of the categories employed in the studies upon which we will draw has been questioned.

2. Stereotypes and Categories

As we will see, the scientific validity of a number of categories significant to this study - including 'religion' and 'intelligence' - has been questioned, in general by philosophers and social scientists. Their criticisms of these specific categories, however, could be leveled against any category.

In attempting to make sense of the world, scientists are faced with a mass information. The only way they can understand it, or make successful predictions about it, is by dividing it up into a system of categories, in other words a taxonomy. In essence, they must engage in what is commonly known as 'stereotyping.' The word 'stereotype' itself may have become a way of attempting to dismiss perspectives with which one does not agree (see Levin, 2005, pp.32-34), but difficulties with the word aside, stereotypes can be useful as long as they are used with caution. This caution is necessary because all attempts at taxonomy suffer from the same inherent problems: they simplify, they play down differences within the category and they neglect that which borders the category. But, even so, creating a taxonomy is both useful and necessary.

Some, however, effectively argue that categories should be perfectly defined before they can be employed. According to Popper (1966a, p.39), *essentialists* – following the Platonic view – argue that every concept is an imperfect reflection of the ideal of that concept (which, according to Plato, can be found in the World of Forms which is accessible through the intellect).¹ These forms are unchanging and it is the task of science to describe the true nature of things and thus focus on the definitions of terms. Dennett (1995, p.95) counters that scientists should 'of course' define their terms but 'only up to a point.' He provides a modern version of the so called *nominalist* critique.

Nominalists are more interested in understanding how something behaves in different circumstances, and they make use of a concept if it is helpful (see Oderberg, 2007). There will always be different ways of defining a term and different definitions will be useful in different situations. But to insist that a concept and its borders must always be perfectly defined before

¹ See Watt (1997) for a more detailed discussion of Plato's Theory of Forms.

being employed leads us to a situation where we can do very little. As Dennett (1995, p.39) observes, there are manifold difficulties defining a word such as 'island,' but, aware of these difficulties, we can still use the concept as a tool to further our understanding.

In creating a category, we tend to present an example of the 'type' that embodies all the characteristics that are seen to distinguish that type. The type is not randomly constructed. Rather, lots of different characteristics seem to correlate in a way that they do not in a type which would be regarded as separate, and this correlation of characteristics is useful to distinguish because it permits correct predictions to be made. Accordingly, the category is an extreme or ideal version of that which it conceptualizes. However, breaking up reality into these categories is useful to the extent that it helps us to better comprehend reality, and make predictions, often permitting us to better control our environment.

It is not philosophically justifiable to reject the division of reality into categories. Moreover, dismissing some categories in particular, as stereotypes, should simply make us question the impartiality of the critic because all categories are stereotypes and, unsurprisingly, an analysis of racial stereotypes, for example, found that 25% were completely accurate and a further 50% had at least a factual basis (Helmreich, 1982). Any given category, such as 'intelligent,' is imperfect, based around an extreme example of the category in question, plays-down internal differences, and neglects the borderline. But this is true of all categories, even those used to write the previous sentence. If we cannot employ these categories in this manner then we cannot begin to comprehend the world, let alone control it to any degree. We cannot even talk, because naming things will involve categories and these same inherent problems. We could not cope in everyday life if we could not simplify the mass of information

by which we are surrounded into a comprehensible system of stereotypes through which we could make predictions. From a pragmatic perspective, we must be able to cautiously categorize.

3. What is 'Science'?

'Science' must involve certain agreed characteristics. Listing the characteristics that a word connotes is widely regarded by logicians as a crucial aspect of any definition (e.g. Hurley, 2007). There are different types of definition. A 'lexical' definition refers to how a word is understood in the dictionary and is thus most useful for everyday life because, to avoid confusion, we all need to understand what we mean by different words. However, if we want to understand how something works, how it functions in a particular context, then an operational definition is often more useful. It provides experimental procedures that permit us to discern whether or not something should, on balance, be placed in that category. This is especially useful if there is any kind of dispute over the matter or if we are dealing with abstract concepts, the precise definition of which needs to be pinned down.

Kuznar (1997, p.22) argues that the central operational characteristics of 'science' are the following:

- (1) It must be solely empirical. If a discipline is based on unprovable or inconsistent dogmas it is not scientific.
- (2) It must be systematic and exploratory.
- (3) It must be logical. This means, in particular, that fallacious arguments, such as appeal *ad hominem* or any other form of rhetoric must be avoided. It also means that the research and arguments must be consistent.
- (4) It must be theoretical. It must attempt to explain, to answer questions and, where possible, to predict.

- (5) It must be self-critical with regard its assertions, prepared to abandon long-held models as new information arises.
- (6) Its propositions must be open to testing and falsification.
- (7) Science should be a public activity.
- (8) It should assume that reality is actually real and can be understood. It should be epistemologically optimistic.

This is an extreme type and so, of course, individual examples of 'non-science' and 'science' will come under the purview of one or other with varying degrees of firmness.² However, there are three areas where I would disagree with Kuznar.

Firstly, he seems to imply that a discipline is not 'scientific' if it takes as a starting assumption a view that is controversial amongst scientists (Kuznar 1997, p.103). But I do not think that this is unscientific if the scholar first argues that the view should not be controversial and demonstrates that the view is in fact scientific or, at least, it is inconsistent to argue that it is not scientific because something else, very similar to it, is accepted as scientific.

Secondly, Kuznar implies that if a scholar states a specific motivation that is not purely the pursuit of truth (such as

² For example, the 'liberal religious' might be regarded as 'religious' but closer to science than 'fundamentalists' (we will discuss these distinctions below). Some scientists and scientifically trained theologians believe that science and religion are compatible, because they explain 'different domains' (Stannard, 2004), due to acceptance of some form of intelligent design (e.g. Polkingthorne, 2009 or Peacocke, 2004) or because their religiousness is extremely liberal, even defining God in metaphorical terms (e.g. Freeman, 1994). Critics counter that their arguments are illogical and rely on rhetoric (e.g. Grayling, 2009). Most obviously, many religions make truth claims and thus enter into the scientific domain. See Chapter Seven for a discussion of the other arguments.

improving humanity in some way) this renders his research unscientific. There are many theories regarding how we should define the word 'truth' (see Dowden and Schwartz, 2004). In common usage, however, something is 'true' if it is 'in accordance with the facts or actuality.' This is known as 'correspondence theory' (see Fumerton, 2002). It implies that there is an actuality to be known and, as we need, as much as possible, to have shared definitions of terms to engage in discussion (see Hurley, 2007), it is how I will define 'truth' in this discussion. It might be argued that a motivation other than just the pursuit of truth is ultimately scientific because it reflects a desire to create a more scientific world in which, for example, people are more innately intelligent (e.g. Lynn, 2001) or the more intelligent have a better opportunity to become scientists. I think these kinds of motivations are only problematic if they are placed in the way of the pursuit of truth. Otherwise, and Kuznar (1997, p.217) accepts this, scientists are likely to have emotional reasons for studying the fields that they study. Their own motives (as long as they do not interfere with science) are irrelevant.

Thirdly, regarding being 'self-critical,' it might be argued that a sense of humility is an important part of science. In order to be 'self-critical' there is a degree to which you must avoid being too sure of yourself and this sits well with a community of scientific practice in which new research is only deemed acceptable if deemed so by accepted scientific authorities.³ But, at the same time, there is a confident dimension to science. If science involves challenging received knowledge, then there comes a point where humility must be abandoned and there is sound evidence that great scientists lack humility (see Feist, 1998 or

³ Jenkins (2009) has looked at 'the implicit religion of science' in contemporary Britain. For a discussion of 'scientism,' a term often pejoratively employed, see Sorell (1994).

Simonton, 1988). Accordingly, a balance must be struck between humility and 'iconoclasm' (see Andreski, 1974, p.249).

There are those who have argued for far broader definitions of 'science.' Rees (2010, p.900), for example, defines science very broadly as 'thoughtful, sincere research.' It is legitimate to define a word in terms of that which it commonly connotes and denotes, because the ultimate point of words is to communicate and, accordingly, they must have, to a certain extent, an agreed meaning in order to facilitate communication. Hurley (2007, p.90) observes that if we define the word 'tiger' we can partly define it by examining it in terms of increasing extension as in: 'tiger, feline, mammal, animal.' A tiger is a member of each of these classes, it is denoted by these classes, but to define 'tiger' simply as 'feline' ignores much which 'tiger' connotes, and fails to distinguish it from things which are not denoted by 'tiger,' and which we intuitively accept are not 'tiger,' such as 'domestic cat.' Accordingly, 'tiger' becomes meaningless as a separate category and the predictive and analytical benefits of rendering 'tiger' a separate category are lost. Rees defines 'science' as 'thoughtful, sincere research' and earlier as 'knowledge producing' practice. Research conducted prior to writing a novel, even if not especially systematic, may be 'thoughtful' and 'sincere' and produce 'knowledge.' But does this render the product of the research 'science'? If it does, then the definition of 'science' is so broad that we may as well jettison the word and just say 'research.' To be a separate category, 'science' requires borders that distinguish it from 'art,' 'religion,' or other concepts that we intuitively accept are not 'science.'

Likewise, it might be argued that the definition of 'science' should be much narrower because, in everyday conversation, 'science' generally refers to the natural sciences only and so to define it differently will cause confusion. The obvious solution is

to distinguish between 'science' and 'social science' and emphasize that some forms of social science follow the same principles as science and as such can be regarded as science. There is no reason why 'science' cannot be defined in different ways in different circumstances as long as the interlocutors are clear on how 'science' is being defined. Defining science in an unusual way, within these parameters, however, is only reasonable if such a redefinition can be shown to be useful.

4. On Speculation

Often disputes, once our definition of science is accepted, over whether or not something is science, relate to a specific debate within science. Segerstråle (2000, p.255) argues that for those in the 'experimental tradition' of science, 'good science' is science which is, to a great extent, proven, beyond doubt (Segerstråle, p.256).⁴ Scientific naturalists, by contrast, are in an older tradition of science where you wish to understand nature and theorize, based on the available evidence, in an attempt to understand the natural world as a whole. Darwin's theory of evolution (Darwin, 1859) was in this tradition. Darwin was a naturalist and, based on his observations, he suggested his theory of evolution. It was not absolutely proven when he suggested it but there was certainly a body of evidence for it. It rendered the animal world congruous with the materialist underpinnings of science and made sense of various disparate empirical observations. Accordingly, there was a

⁴ For further discussion of this divide within science, see also Chalmers (1999). Kurzban (2010) has argued that, in fact, 'good science' is, in reality, science that does not challenge Political Correctness. He uses this term to refer to the ideology that seeks to avoid giving offense to cultural minorities and to promote the status of these minorities in Western nations. For further discussion of Political Correctness, see Ellis (2004).

degree to which it was 'speculative' but it was also a contribution to science because it attempted to understand the nature of the world based on empirical evidence.

Experimentalism is to be praised for its exactness but it is problematic because it demands such exacting standards of evidence before an assertion can be made. This leaves too little room for intelligent discussion, based on the evidence, and the public, collegial dimension to science whereby ideas are freely discussed. Moreover, we may never be able to make any assertions if the level of proof required is so absolute that, for example, Richard Dawkins' attempts to understand, historically, why certain animals have evolved the features they have is 'bad science' as Richard Lewontin suggests it is (Seegerstråle, 2000, p.257).⁵ In that scientific discovery is ongoing, it is always possible, as Eysenck (1991, p.41) observed, to claim that there is not sufficient evidence to reach a conclusion or that the evidence is open to dispute, as it always is. Scientists can merely reach conclusions based on what best fits the evidence.⁶

Naturalism can be problematic if it becomes too speculative. 'Speculation' is generally defined as 'reasoning based on inconclusive evidence, conjecture or supposition.' As such, the exact border of 'speculation' is intuitive. This leads to an impasse that can be solved through philosophical pragmatism. So, in everyday situations, how much evidence, we might ask experimentalists, is enough for you to act differently in accordance with it? Would you, in everyday life, follow the

⁵ For examples, however, of such analysis see Dawkins (2010).

⁶ Lewontin (1978) has suggested that, for moral reasons, the burden of proof should be higher when developing evolutionary theories about humans. This renders humans somehow separate from animals when, from an evolutionary psychological perspective, humans are a form of ape. Moreover, it introduces the danger that biased scholars will tendentiously argue that there is never sufficient proof for hypotheses that they dislike.

method, used in this study, of making inferences from indirect or not wholly conclusive but nevertheless noteworthy evidence? Do you ever, for example, judge a person's intellectual ability based on their educational credentials? Does this lead to successful results? Based on such a method, whom would you call upon to solve a particular and specifically intellectual problem: the person with the PhD or the person with just a school leaving certificate who had dropped out of university? I suspect, all things being equal, it's the person with the doctorate rather than the university dropout, even if there are some highly intelligent university dropouts, such as Bill Gates or Mark Zuckerberg. This is because, on average, those with PhDs are more intelligent than university dropouts (see Herrnstein and Murray, 1994, p.143). Likewise, naturalism permits successful predictions to be made, which have real life consequences, even if the perspective does not offer absolute proof.

5. Problems with the Lexical Definition of Religion

The dictionary definition of religion limits 'religion' to organizations that are focused around explicit belief in a non-material existence and especially in gods. This kind of definition has been defended (e.g. Griffin, 1991, p.29) because when the meanings of words are broadened, a process is sometimes begun whereby they are broadened so far as to become meaningless. The problem with limiting 'religion' to this definition is that it leaves important questions unanswered and, moreover, it is inconsistent, because it excludes that which we would intuitively understand as 'religion,' such as Buddhism.

Firstly, the lexical definition of religion implicitly divides between the 'religious' and the secular. However, in pre-modern, Christian Europe there was no such divide. 'Religion' was simply

the means through which the world was understood. As such, the lexical definition of religion draws a clear divide, in effect, between pre-modern times, when politics was difficult to distinguish from religion, and 'modern times' when it supposedly can be distinguished. This draws a clear line, in a strongly essentialist fashion, under the past and suggests that the present is somehow radically different. Popper (1957) observes that drawing such radical lines is not in the spirit of science, which progresses in incremental steps and draws lines cautiously, but rather in the spirit of revolutionary, historicist ideologies, which, as we will see, can be usefully understood as replacement religions. Also, as we will see, drawing such stark lines is not empirically justifiable, and it means that social phenomena that might be best understood through the prism of 'religion' cannot be understood through this and – therefore – are potentially left not understood in as much depth as they could be.

Secondly, the lexical definition of religion leads us to radically separate the 'sacred' and the 'profane.' The only reason not to merge 'religion' and 'ideology' is if religious beliefs are somehow fundamentally different from ideological ones. This can only really be the case if religious beliefs - unlike ideological ones - are a reaction to something different; if there is something that we can call the 'sacred' to which ideology is not reacting but to which religion is. We will see below that this cannot be 'religious experience' (in the sense of scientifically explicable hallucinations or profound feelings) as this can also be found in replacement religions. So, if religion involves reacting to something different, and this is what Religious Studies pioneer Mircea Eliade (1957) argued, then the sacred is some separate, incomprehensible mystery that cannot be reduced to scientific explanation. Thus, to a degree, one must believe in unsolvable mysteries - something

which is not scientific - in order to accept this way of thinking.⁷ The operational definition of religion is superior because it does not require this 'religious' way of thinking.

Thirdly, though the lexical definition is useful to distinguish a pre-modern view from a modern one, this is of limited use. Such a distinction is less clear in non-European and especially polytheistic societies such as India and Japan (see Fitzgerald, 2000) so the definition may limit us to Europe or monotheistic societies. It has been argued that in polytheistic societies belief in gods is less significant and actual religious belief is effectively in a kind of fate, rendering it relatively similar, as we will see, to replacement religion (see below).

Fourthly, an operational definition of religion, for example, allows us to understand why some secular ideologies are so powerful in people's lives, which a lexical one does not. The lexical definition might be seen to imply that ideologies such as Marxism and nationalism are somehow rational, leaving us wondering about the fervor and violence they involve (see Boyer, 2001, Ch. 8). For the American anthropologist Clifford Geertz, who offered an operational definition, this is explained as they perform the same function in people's lives as Christianity.

6. Operational Definitions of Religion

Geertz (1966, p.4) contended that:

'Religion is a system of symbols which act to establish powerful, pervasive and long-lasting moods and motivations in people by forming conceptions of a general account of existence and clothing these conceptions in such an aura of

⁷ Fitzgerald (2000) has observed that such a definition renders Religious Studies effectively a kind of liberal theology.

factuality that the moods and motivations seem uniquely realistic.'

Geertz's definition can be applied across all cultures and eras and is, therefore, of greater use. 'Religion,' for Geertz, refers to the aspects of culture which are, at a given point, regarded by a group as essential and beyond question - those to which they cannot have a critical attitude. Wilson (1975, p.560) notes that belief in gods and abhorrence of incest tend to be the firmest of these followed by 'ideology.' We would expect aspects of this primal 'religion' to be partially preserved in any 'secular' replacement. But to avoid turning 'incest' into 'religion' our distinction could be slightly more specific. In addition, Geertz's definition is problematic because it ignores the group dimension to religion (Asad, 1993), and could conceivably stretch 'religion' very far, such that it is the same as 'culture' (Fitzgerald, 2000).

Geertz's definition, then, is too broad. I would argue that the most useful definition has been presented by Pascal Boyer (2001) in his book *Religion Explained*. Boyer makes the point that religion refers to a series of phenomena in human-thought generally involving logical or category contradictions that are made possible by evolutionary hard-wiring. One of the consequences of this hard-wiring is perceiving agency behind the world. This perception of agency behind the world unites everything from ancestor cults to a historicist perspective such as Marxism or Herderian nationalism. In addition, this agency is fervently believed to be a reality.⁸

⁸ It might be argued that such a definition is problematic because it implies that religious people are inherently irrational. If so, how do we explain 'rational' religious people such as former Archbishop of Canterbury Rowan Williams? There are two obvious answers. Firstly, such people, by the standards of their culture, are relatively liberal in their religiousness and thus moving away from

Such a definition of religion creates an archetype of religion and a spectrum ranging all the way to the archetype of science. It means that there will be groups on the spectrum that involve religious dimensions - such as fervor - without other aspects. The latter we might call 'implicitly religious' while the former we might call 'implicit' or 'replacement religions.'⁹ This definition would also encompass some conspiracy theories as modern forms of religiousness. Such theories tend to be fervently adhered to. Like Christianity, they provide the believer with a kind of Gnostic truth about how the world works which others do not realize (see Dutton, 2008b). Conspiracy theories make sense of the world and, most importantly, involve agents working behind the scenes. This belief in agency behind the universe combined with a firm belief that the perception of agency is accurate and strong group borders, is how we might distinguish 'religion.'

It might be argued that 'religion' and 'science' have a great deal in common and that focusing on the ways in which they differ neglects, for example, that both religion and science are interested in ethics, developing a comprehensive world view, understanding the nature of life and in gaining emotional satisfaction. We have already discussed how we can only understand the world through distinguishing between categories.

the 'religion' archetype. Secondly, though they may be unable to look at religious questions rationally, perhaps due to personality factors which cause them to need fundamental certainty, this does not mean that they cannot look at other academic questions rationally as Williams' historical research attests (see Williams, 2002).

⁹ The term 'implicit religion' has become popular in social science as a means of referring to godless ideologies that are regarded as *de facto* religions. For a detailed discussion, see Bailey (1997). Other terms include 'secular religion' and 'invisible religion' (see Hamilton, 2001, p.13). Some have even looked at football as a religion, because it provides group identity and evokes strong emotions (see Edge, 2012 or Hervieu-Leger, 2000).

We could take any two concepts which might be set as opposites, such as 'black' and 'white,' and find points of commonality between them. There are, of course, points of commonality between 'religion' and 'science.' But the question is whether it is useful to establish a spectrum with 'religion' at one end and 'science' at the other. It is useful to do this if being 'religious' or being 'scientific' would generally predict thinking and behaving in different ways. The 'religious' and 'scientific' do indeed think and behave differently. As we will see, scientists are much less religious than the general population, they are much less likely to be religiously observant and they are much less likely to believe in God. Also, the very nature of science involves questioning assumptions whereas to remain 'religious' one must, at some point, cease to question certain ideas and simply accept them, because if one rejects, for example, the belief that there is a God, it is questionable, following the lexical definition of the 'religious,' whether one is still religious at all. As such, it is useful to set science and religion as opposites (while, of course, not forgetting that they have points in common). Failure to do so involves missing the opportunity to better comprehend an aspect of reality, and those who wish to miss this opportunity should ask themselves why they wish to do so.

Returning to Boyer's definition, every ideology in the Romantic tradition would be congruous with 'religion' following such a definition. They each involve an (implicit) controlling agent, dogmas and fervor and can thus be termed 'replacement religions.' In distinguishing between 'religion' and 'replacement religion' it should be emphasized that this is a cautious division which is not necessarily so clear-cut in reality. A given Westerner's worldview is likely to combine aspects of 'religion' and 'replacement religion,' just as a given English Medieval peasant's worldview combined aspects of Christianity and the

paganism, or folklore, which Christianity superseded.¹⁰ But just as some Medieval peasants were thus closer to the 'Christian' archetype than others, equally some contemporary Westerners are closer to 'replacement religion' than others, making this a useful, predictive division.

With this caveat, many philosophers - such as Scruton (2000), Gottfried (2004) or Benoist (2004) - have observed the way in which the Enlightenment led to the questioning of Christian assumptions. This in turn led to the Romantic Movement, which fostered a series of replacement religions in the mould of European Christianity. Each replacement religion is a group phenomenon based around dogmas, the prizing of the marginalized in some form, and the belief in some kind of controlling agency, such as fate, behind the world.¹¹ One example, which Scruton argues is a descendent of Marxism, is Multiculturalism. Levin (2005, p.192) observes that a coherent definition of Multiculturalism is difficult to pin down. On the one hand, supporters of this ideology argue that all cultures are of equal value and that cultures cannot therefore be compared. But on the other hand, they argue that marginalized cultures should be protected and empowered, and that cultural diversity (at least in Western nations) is to be promoted. This would seem to imply that non-Western cultures are somehow superior to Western ones.

But, definitions aside, Multiculturalists certainly accept cultural determinism, the belief that cultural differences are purely products of culture (defined as the way of life of a people). However, if cultural differences are simply the products of 'culture' then culture causes cultural differences. This is circular, it

¹⁰ See Chidester (2001). For examinations of religious syncretism, see Geertz (1971) or Dutton (2009, Ch. 8).

¹¹ I appreciate that some Enlightenment scholars can themselves be accused of creating replacement religions (see Becker, 2003).

reifies culture, and it implies that there is something, behind the universe, which controls and distributes cultures. In essence, therefore, the cultural determinist assumptions of Multiculturalism and Marxism are underpinned by a kind of fate; a force behind the universe.

The religious fervor of Marxists and nationalists is well documented.¹² Proponents of Multiculturalism also reflect religious fervor and this can be noted in the reactions to scholars who have challenged Multiculturalism by highlighting racial differences and thus challenging cultural determinism and the more general Multicultural idols. For example, American psychologist Arthur Jensen (1923-2012), who researched intelligence and race, received so many death threats in 1969, when he published research arguing that poor black school attainment was due to genetic lower IQ (Jensen, 1969), that the police advised him to move house. The words 'Kill Jensen' were scrawled across his office door. Even a geneticist who disagreed with Jensen (and was preparing to publicly rebut his arguments) was assaulted, accused of implicitly giving Jensen's arguments respectability. In addition, an unsuccessful campaign was waged by 'Students for a Democratic Society' to have Jensen fired from the University of California at Berkeley (see Pearson, 1991, Ch. 4).¹³

¹² See Cavanaugh (2009) for a discussion of this dimension of Marxism and Smith (1998, p.114) for nationalism. For Nazism, see Krinsky (1995).

¹³ See Dutton (2012a, p.136) for summaries of similar plights suffered by academic critics of Multiculturalism in the UK since the mid-1990s and see Pearson (1991) for the same up until 1991.

7. Religious Experience and Replacement Religion

A final criticism of including ideologies under 'religion' is the absence of anything akin to religious experiences in ideology. In lexical terms, religious experience tends to involve experiencing the presence of a god or spirit. But, in operational terms, it might be defined more broadly as some kind of sense of presence or a sense of supreme understanding. This could encompass both traditional 'religions' and replacement religions such as Marxism or Romantic nationalism. In the latter case, the experience would be similar to the former in terms of what is felt, but would not necessarily involve a vision or hallucination. Likewise, many testimonies regarding Christian religious experience describe a sense of presence but no actual hallucinations (see Rambo, 1993). Accordingly, we can conceive of a spectrum of religious experience ranging from a sense of an agent behind events, no matter how vague (Rambo gives an example of being certain that life ultimately makes sense and has meaning) to hallucinations involving such agents.

But even here there is at least anecdotal evidence that adherents to ideologies can experience something quite close to religious experience. In a Finnish study, Jokikokko (2009) interviewed 10 Finnish trainee teachers who were adherents to Multiculturalism. They could highlight a specific moment of 'realization' where they suddenly understood that they should accept Multiculturalism. This moment of realization is very similar to religious experiences in non-theistic religions such as Buddhism, which we accept to be a religion. So, Multiculturalism allows for something that, in a Buddhist context, would be understood as a religious experience. Bullivant (2008) has also examined 'irreligious experiences,' which appears to compliment Jokikokko's findings.

So, Boyer's definition is justified in bringing ideology under the purview of 'religion.' Boyer's definition also ensures that pagan or polytheistic religions are within the purview of religion. Benoist (2004) suggests making a binary division between two archetypes: monotheism (Christianity, Islam and Judaism for example) and polytheism (or paganism). He notes that monotheistic religions tend, overall, to be held together by shared belief in perceived factual assertions (dogmas) whereas such shared belief is less central to polytheistic religions. Polytheistic religions tend to be held together by shared rituals, norms of behavior and even a belief in kinship, though, within this discourse, there is often a belief in agency (such as an eternal spirit force), so both of Boyer's dimensions can be observed. Nevertheless, the kind of definition which we have suggested is broad enough to encompass both perceived kinds of religion. And as we have already touched upon, a definition which focuses on gods and spirits would dismiss Buddhism - based around a kind of fate called *Karma* but not around gods or spirits - as not being a religion. As Buddhism is intuitively a religion, we must broaden the lexical definition and, if we do so, then it is legitimate to take in 'ideologies' that involve a belief in fate.¹⁴

This kind of definition also overcomes the problem that 'everyone is religious,' which would render 'being religious' meaningless. The 'religious' are relatively fervent in their beliefs and practices about an agent. The less religious, even in a

¹⁴ Hindus believe that there is a supreme, eternal spirit - *brahmin* - which underpins all existence. Gods are manifestations of this universal spirit (see Flood, 1996). Buddha, by contrast, emphasized that questions regarding the causes of existence are meaningless. Buddha focused on *Karma* (the cycle of life and reincarnation) and supposed methods to escape from it (see Harvey, 2001). However, this has not stopped Buddhists - despite Buddha's apparent instructions to the contrary - worshipping him, in some ways, as though he were a god or combining Buddhism with folk beliefs (see Lamb, 2001).

traditional society, would be less adherent to this way of thinking and possibly less likely to, in some way, have religious experiences. Of course, this also implies a scale of religiousness with those moving away from the archetype being 'liberal religious.' We will observe in the following discussion that high IQ correlates both with agnosticism and atheism but, to a lesser extent, with 'liberal religiousness.' The liberal religious tend to have higher intelligence than the conservative religious (or 'fundamentalists'). We have already observed that, to some extent, religion can be regarded as the opposite of science, and that we can conceive of a spectrum with religiousness at one end and science at the other. Liberal religiousness, in terms of our definition of religion, is a form of religiousness that moves further away from the religious archetype than conservative religiousness. Liberalism is generally understood to involve not being dogmatic, having an open mind, and being prepared to discard traditional values, possibly including, amongst liberal Christian theologians, literal belief in the traditional dogmas of Christianity.¹⁵

In consequence, conservative Christians (or 'fundamentalists' as they are often termed in the psychological research) have tended to reclaim the word 'Christian,' arguing that they, in contrast to liberal Christians, are genuine 'Christians' because they hold to the traditional theological and ethical dogmas of Christianity, supposedly revealed in the Bible, which is itself regarded as the inerrant word of God.¹⁶ Bebbington (1989) notes that what is commonly called 'Christian fundamentalism'¹⁷ has

¹⁵ For a discussion of liberal religiousness, see Miller (1983). For examples of such theologians, see Tillich (1948), Robinson (1963), Freeman (1994) or Cupitt (1997).

¹⁶ See Dutton (2008c) for a detailed discussion of conservative evangelical students on British and American university campuses.

¹⁷ Packer (1958, p.30) argued that 'fundamentalist' has 'long been a term of ecclesiastical abuse' and has become a 'theological swearword.' I can only

manifested itself as a reaction against increasingly liberal trends amongst those who claim to be Christians and against their Modernist theology. Armstrong (2001), Barr (1977), Bruce (2002) and other scholars of fundamentalism have emphasized that the concept of 'fundamentalism' can be broadened beyond Christianity as a kind of radical conservative reaction against modernity, which involves creating a tightly bounded counter-culture in contrast to a supposedly decadent or godless world.¹⁸

8. Responding to the Postmodern Critique

It should also be noted that the very concept of 'religion' has been subjected to a 'deconstructive' critique at the hands of postmodernists.¹⁹ Postmodernism can be summarized as a movement that argues that there is no such thing as objective truth. 'Truth' is merely the ideology of the powerful. Accordingly, postmodernists look to 'deconstruct' contemporary ideas to reveal the power structure beneath. In so-doing, they can undermine the powerful and promote the marginal. They assume cultural relativism, cultural determinism and generally support Multiculturalism. In this regard, Fitzgerald (2000, p.4) argues that

respond that I have stated what I mean by it and its use is so common in the current psychological literature that it is simplest, for comparative purposes, to continue using it. Whatever it is replaced by will probably also become an insult. As Packer adds, 'as its derogatory flavor grows stronger it is used more and more widely as a general term of abuse, till it has lost all its value as a meaningful description of anything.'

¹⁸ Smith (1991), however, notes that some liberal Christian churches can dogmatically hold to left wing perspectives about equality and so forth. This is best exemplified in Liberation theology, which involves strong Marxist influences.

¹⁹ For examples of postmodern scholars see Natoli and Hutcheon (1993). See Scruton (2000) for a critique.

'religion' involves imposing a specifically Judeo-Christian category on other cultures - such as the Japanese where there is no concept of 'religion' - and this leads to us misunderstanding Japanese culture because we assume that the Japanese understanding of 'gods' is the same as the Western one. He argues that 'religion' is suspect because by imposing a Western category, as it does, it is legitimating Western 'imperialism.'

Clearly, these criticisms could be leveled against any concepts. All concepts are part of a language and therefore a culture. If we discuss French culture using English words then we are inherently imposing English categories on French culture. If we cannot do this, we cannot discuss a non-Anglophone culture in English. If this is 'imperialist' then imperialism cannot be avoided in analysis. Moreover, 'imperialist' is an insulting and emotive term to level against intellectual opponents. To employ such abuse is also to commit the moralistic fallacy (see Davies, 1978), since the supposed morality of an opponent's position is irrelevant to its logical status.²⁰

However, the assumption of Fitzgerald's (2000) critique of 'imperialist' imposition is cultural relativism: There is no objective truth, simply competing and equal cultural perspectives that can only be understood through their own frames of reference. This is why 'religion,' for Fitzgerald, is imperialistic: it is one culture - equal to another - imposing itself on the other culture as if it is superior. However, there are clear problems with cultural relativism.

Firstly, the belief in cultural relativism is simply asserted as a dogma. Fitzgerald does not prove the presupposition that all cultures are equal. In this regard, we can see why some scholars

²⁰ I appreciate that morality becomes an issue when looking at the ethics of scientific experiments involving living organisms. For a summary of this debate regarding anthropological fieldwork, see Dutton (2013c).

have argued that cultural relativism and Multiculturalism are derived from Romanticism which, likewise, asserts (similar) dogmas (see Scruton, 2000).

Secondly, there is a degree to which the assertion of cultural relativism is self-contradictory. As Bloom (1987, p.39) has observed, cultural relativists argue that cultures are equal and condemn ethnocentrism and imperialism as intellectually unjustifiable and immoral. Yet, abundant research indicates that tribal cultures are highly ethnocentric (see Sandall, 2001).

Thirdly, even ignoring cultural relativism's failure to prove its founding basis and the contradictions to which it leads, Sandall (2001) demonstrates that different cultures lead to very different results in terms of basic culturally shared desires, such as survival, and this has been widely documented (see Wilson, 1975, p.550). This is why, Sandall (2001, pp.viii-ix) suggests, people come from Africa to Europe for heart operations and not the other way around. It appears, in practice, that you cannot live according to cultural relativism, assuming the shared values of not wishing to die and wishing to be able to make decisions in your interests.

9. Conclusion

In this chapter we have defined 'science' and 'religion.' We have argued that though there are philosophical problems with using categories, from a pragmatic perspective we have to employ them and should employ them with a degree of caution. We have examined the different definitions of 'religion' and noted that the most useful - in the sense of being the most consistent and permitting us to explain the most - is the definition of religion advocated by Boyer. We have also examined the postmodern critique of the 'religion' category and highlighted its inconsistencies and lack of pragmatism. In the next chapter, we

will find that the superiority of Boyer's definition can further be demonstrated by the fact that it is consilient, and we will examine the evolutionary dimensions of religion.

Chapter Three

The Evolution and Heritability of Religion

- 1. Introduction.*
- 2. Religion and Evolution.*
- 3. Is Religion Adaptive in Itself?*
- 4. Religion and Fertility.*
- 5. Genetics: A Brief Introduction.*
- 6. Twin Studies and Religious Heritability.*
- 7. Replacement Religion and Heritability.*
- 8. Conclusion.*

1. Introduction

In this chapter we will demonstrate that Boyer's definition of religion is superior to competing definitions because it is grounded to the greatest extent in scientific research conducted within the evolutionary paradigm. In this regard, we will outline how religion can be understood from an evolutionary perspective, examine the central disputes in this area, and also look at evidence for the heritability of religion and replacement religion.¹

2. Religion and Evolution

If 'religion' is a scientific category, we should be able to ground its development in evolutionary theory. In other words, it should be 'consilient;' reducible to science. As we have discussed, it is all very well to 'interpret' findings but unless one holds a shared set of presuppositions there is no reason to accept one interpretation

¹ Much of this chapter was originally presented as part of Dutton (26 April 2013).

over another. Thus, we need a shared presupposition. Lynn and Vanhanen (2012) have argued that the concept of intelligence ultimately underpins differential findings in the social sciences but, even if this is so, the social sciences require a shared presupposition with the natural sciences. This must be logic and the empirical method, because without an agreement on what is logical we cannot begin to comprehend anything and we cannot live in such circumstances.

Following logic and the empirical method, we can argue that from a pragmatic perspective the success of science in answering questions evidences the need for social science to be consilient with science. It is simply inconsistent for it not to be. As Richard Dawkins (2003, p.15) puts it, 'Show me a cultural relativist at 30,000 feet and I'll show you a hypocrite² . . . If you are flying to an international conference of anthropologists . . . the reason you will probably get there, the reason you won't plummet into the ploughed field – is that a lot of Western, scientifically trained engineers have got their sums right.' And it appears that religion can be reduced to science, in the sense of being inexplicable in scientific terms, if we follow Boyer's operational definition. If we follow the lexical definition, as we have seen, we are left positing 'religion' as a separate category, beyond scientific comprehension, and even assuming that religious assumptions are true.³ Having

² It might be argued that this term is an appeal *ad hominem*. Perhaps Dawkins should have substituted 'hypocrite' for 'highly inconsistent.' But it would be inconsistent for a person who rejects logic to criticise him on these grounds anyway.

³ The arguments levelled against this reductionism by Religious Studies scholars cannot be accepted. For example, Bellah (2011, p.115) asserts that 'Science is an extremely valuable avenue to truth. It is not the only one.' The 'truth' felt during a religious experience is eternally true and cannot be refuted by science, argues Bellah. He adds that if you don't agree with him on this then you are an advocate of 'scientism' and that this is an example of

established this, it must therefore be accepted that there is a large body of research (see Boyer, 2001 for review) examining religion in evolutionary terms which finds that religion can be reduced to a series of evolutionary adaptations. Humans have a certain kind of mind, selected for in prehistory, which inclines them towards religiousness.

Firstly, humans are strongly inclined to look for and perceive causation. This was most famously demonstrated in the 1940s by Michotte's experiments. He found that when people were shown randomly moving dots on a screen they could not help but perceive the dots as chasing each other (Michotte, 1962). In that religion offers a system of understanding the world, this experiment helps to demonstrate why it can be attractive. And we can understand that, in pre-history, a heightened ability to detect causation, an over-active detection system in this respect, would have been useful, and would have been selected-for, because it would have given people an advantage in comprehending and controlling their environment.

Secondly, humans do appear to be specifically evolved to over-detect agency. Guthrie (1993) found that we tend to find human characteristics with faint cues, such as by perceiving faces in clouds. He argues that we have evolved to look for complex explanations and humans are the most complex things we know so this explains over-detecting human agency. Barrett (2004) argues

'fundamentalism.' Bellah does not define 'truth' or 'science.' However, if we follow the correspondence theory definition of truth (the standard definition) and define science as we have above then science is indeed the only avenue to the truth. The only way that revelation can be an avenue to truth is if truth is subjective. Accordingly, Bellah is effectively assuming that there is no objective truth. As we have seen, this cannot be philosophically justified. Also, to dismiss academic opponents as 'fundamentalists' is a fallacious appeal to insult and connotation fallacy and we should accordingly be very suspicious of the degree to which Bellah is objective.

that humans do not so much see 'faces in clouds' as 'traces in grass.' The highly religious see their gods as being involved in many aspects of everyday life even if they cannot physically perceive them. Also, finds Barrett, people will tend to jump to the conclusion that an agent is involved in an unexplained incident even if there might be a more plausible naturalistic explanation. He calls this the 'Hyperactive Agency Detection Device.' Boyer (p.165), Barrett and many other evolutionary psychologists propose the evolutionary explanation that in prehistory the expense of a false positive (wrongly perceiving a distant rock as a wolf, for example) would be lower than the cost of a false negative (not detecting agents when they were actually there), whether these agents were predators or prey. Accordingly, humans evolved an agency over-detection system. This explains why we instinctively assume that an agent is behind an otherwise unexplained phenomenon.

But this still raises the question of why humans should be inclined to the view that an agent, or series of agents, should be behind natural phenomena. Baron-Cohen et al. (2008) have noted that humans are particularly empathetic. They have an acutely accurate 'theory of mind' (meaning an ability to understand how others might feel) and are very good, accordingly, at predicting the mental states of others. This adaptation would have been useful in pre-history in reducing group conflict and in helping us to co-operate better in pursuit of group goals. Drawing upon this kind of research, Mithen (1996, p.173) argues that the human mind is divided into three 'cognitive domains' – social, environmental and technical. The human mind is distinguished from the animal mind by an ability to apply one cognitive domain to another - noted in the tendency to anthropomorphize nature and thus apply social knowledge to the environment. This ability would have been useful in pre-history because it would, through

metaphor, even further improve our ability to understand and control our world. In particular, it would permit us to take our already very strong theory of mind and apply this to other animals and accordingly make predictions about their behavior, which would assist us in hunting or avoiding them. The by-product of this kind of mind would be the ability to comprehend the natural environment through the prism of pack knowledge. This, of course, permits us to understand why religious groups, in the broadest sense, are attractive. They appeal to our evolved intuition to comprehend the world in terms of agency, whether this is God, gods, or a shadowy conspiracy.⁴

Thirdly, human-beings very easily form very tightly structured groups. In a well-known study, Sherif (1966) randomly assigned young boys to two different groups and had them engage in a series of competitions. Despite the groups being randomly selected and novel, Sherif noticed that group membership quickly became very important to their sense of who they were. The two groups rapidly developed very strongly negative views about each other and seemed to change into what Sherif described as 'wicked, disturbed and vicious' (Sherif, p.85). Following this research, we can understand why the group dimension of religion might be attractive.

Fourthly, it is widely accepted that human-beings are not only evolved to form tightly structured groups, fearing ostracism (e.g. Tajfel, 1970 or Ridley, 1996) but to obey group authority. Under laboratory conditions, it was demonstrated in Milgram's (1974) experiment that the majority of people (more than 50%) would be prepared to knowingly administer a lethal electric shock to an innocent person in another room simply in order to comply

⁴ See Lewis-Williams (2010) for a discussion of the archaeological evidence for the development of religion. He suggests that there is evidence that there were sacred spaces in the Stone Age era.

with the instructions of an authority, in the form of a white-coated scientist. Subjects were told that they were taking part in an experiment to see whether electric shocks increased learning ability. They watched as their 'student' (really an actor) was strapped into the electric device. Then, in another room, they had to ask the student questions over a speaker system, watched over by a scientist, with teachers increasing the electric shock level each time the student gave a wrong answer. Eventually, students were audibly screaming in pain and teachers questioning whether they should continue. Told that 'the experiment must go on,' over half continued past the point where the machine said 'Danger: Severe Shock' and even after the students had fallen silent, presumably fainted or worse, simply because they were instructed to do so by an authority. Religions tend to involve obeying the religious authorities, so we can see why they are attractive in this respect.

Fifthly, humans have evolved relatively high intelligence, self-awareness, and consequent awareness of their own mortality and the degree to which the world is unpredictable. This leads to stress, and religion, and religious experience, can reduce this stress. There is a body of evidence indicating that too much stress has a negative impact on humans, just as it does on all animals. Mild risk is exciting but extreme risk leads to anxiety. Even with dogs, an entirely unpredictable environment for a sustained period will tend to lead to a nervous break-down (Hogan, 2007, p.6) and certain kinds of depression (with the physical symptoms which they entail) are often caused by dramatic change with which the sufferer finds it difficult to cope. Often, depression develops when people feel that they have lost control of their environment and cannot conceive of how to gain control of it again and, as such, relationship break-down and other sudden losses can often trigger the symptoms (see Beck and Alford, 2009, p.319). Religion

reduces stress because it provides us with a system of understanding the world, and even a system that gives our lives some kind of eternal significance. As we will see below, people do indeed become more religious at times of stress.

In addition, it has been found that certain kinds of religious experience occur amongst those who are stressed (e.g. Rambo, 1993). In *The Varieties of Religious Experience*, William James (1902) distinguished between the religion of 'healthy-mindedness' and the religion of the 'sick soul,' emphasizing that, in the latter case in particular, religious experiences tended to occur at times of stress. In making this point, James highlights an important distinction between 'religious' and 'mystical' experience. Newberg et al. (2002, pp.38-43) argue that the mind has two systems - arousal and quiescence (calming) - and that when these systems are pushed to their extremes alternative states of consciousness develop, something congruous with the suggestion that religious experiences occur when we are at our most instinctive. According to Newberg et al., in evolutionary terms, it is dangerous to be too aroused and so when this state is reached the body's quiescence system will be activated. Conversely, meditation will lead to the activation of the arousal system. In both circumstances a profound emotional experience will occur and, as these circumstances push us to our most instinctive, we may experience this in terms of a sense agency. However, it might be suggested that in that meditation is over a religious object this still demonstrates that religion reduces stress.

Many other scholars have observed the way in which different kinds of experiences are understood to be religious by those who have undergone them but stress is often the key factor. Rambo observes that these range from a profound sense of knowing to actual hallucinations in which they see and hear God. The latter, especially when they happen to a person who is not

overtly religious, can be life-changing, and are categorized as conversion experiences in the Christian tradition. But they generally appear to be associated with times of stress. Conn (1986) has observed that the experiences tend to occur at times of existential change such as adolescence and old age. Persinger (1983) observes that religious experiences occur due to the stimulation of the temporal lobe area of the brain. Specifically, they are caused by 'electrical microseizures within deep structures of the temporal lobe.' These microseizures are precipitated by stimulation of the amygdala area of the temporal lobe, which relates to strong emotions. Persinger found that life crises were 'optimal' at stimulating the amygdala and in turn producing these microseizures. Persinger (1984) produced a detailed analysis of these results, noting: 'People who reported greater numbers of different types of paranormal experiences also reported greater numbers of temporal lobe signs.' Dawkins (2006, p.116) suggests that the origins of religious experience lie in our over-detection of agency. When particularly aroused we are particularly in tune with our instincts and we are especially likely to perceive a voice, a face, or whatever it may be and this would, as we have discussed, ultimately be useful in terms of survival.⁵

Sixthly, humans are subject to a series of other inclinations which make them more prone to being religious. These include *consensus effect* (adjusting your beliefs to fit in with the group), *cognitive dissonance* (readjusting memories in the light of new experience) and *confirmation bias* (superiority at detecting confirmation of ones belief over detecting refutation of it).⁶ The

⁵ Other psychologists of religion have argued the same point. See, for example, Teehan (2011).

⁶ For confirmation bias, see Wason (1960), for cognitive dissonance, see Festinger (1957), and for consensus effect see Ross (1977). The latter also focuses on the false-consensus effect - people believe that others believe what

latter two would make us prone to 'believe' and hold to a worldview with certainty, while the former would reduce the likelihood of ostracism. In addition, confirmation bias might be useful in a relatively unchanging environment. But all of these characteristics would incline us towards religiousness.

3. Is Religion Adaptive in Itself?

Vaas (2009) has looked at the problems with the view that religion is an adaptation in itself. He notes that religion is effectively a 'bundle of properties' of changing significance, there is wide variability in religiousness, no specific gene or set of genes has been convincingly highlighted which would specifically explain religiousness,⁷ and, as we will see, the heritability of religiousness appears to reflect the heritability of intelligence and certain personality traits. Vaas compares religion to the knee-jerk reaction, arguing that it is a byproduct but it may, nevertheless, be adaptive in itself. This would lead to the characteristics which underpin religion being selected for so in, this sense, it is, indirectly, an adaptation.

Voland (2009) sets out this case, arguing that religion is adaptive because:

(1) Religion provides us with a means of comprehending the world, thus reducing stress. Also transcendent experience

they believe. They suggest that this boosts self-esteem and reduces stress. It might also make us less likely to abandon our beliefs.

⁷ In his study *The God Gene*, Hamer (2004) suggests that the gene VMAT2, which seems to influence the way in which the nervous system responds to psychedelic drugs, may well be one of many additive genes (see Ch.3:5 for definition) that heightens the likelihood of religiousness. This is obviously not the same issue as locating specific genes that control religiousness.

promotes health, by reducing stress, and provides time for contemplation.

(2) As they are paranoid, those who are religious will be better at detecting risk and so they will be further selected for.

(3) Religion forces you to work together as part of a group.

(4) It provides a means – through ingroup dress or costly ritual participation, for example – of expressing your loyalty to the group, so it selects in favor of co-operation: it is an 'honesty signal.' Conversely, it permits you to assess the degree to which someone else is prepared to commit to the group.

(5) It provides a moral framework, also selecting in favor of co-operation and obeying authority.

Vaas cautiously agrees, arguing that religion has a higher probability of being adaptive if it is universal, evidently confers reproductive success, involves heredity, has a physical foundation and involves selective advantage.

Lewis and Bates (2013) argue that the above list might be reduced to two essential factors: (1) Community Integration and (2) Existential Certainty.

(1) *Community Integration*: Religion is understood to strongly promote community bonding (e.g. Norozayen and Shariff, 2008). This is congruous with Durkheim (1915, p.422) who argued that 'society' was at the heart of religion. Research has shown a significant association between higher levels of religious belief and community integration (e.g. Cavendish et al., 1998). Hartman (1976, p.40) asked former Methodist church members why they decided to leave their church and found that the most frequent answer related to 'their failure to feel . . . accepted, loved, or wanted' by others in the congregation. Experimental work furthers this case. 'Priming' is a process whereby subjects are exposed to

stimuli (primes) which may unconsciously affect their subsequent reactions. Birgegard and Granqvist (2004) found that subliminal primes reflecting a threat of separation, such as 'mother is gone,' significantly increased people's subsequent desire to believe in God. Researchers have found (Gebauer and Maio, 2012) that when people were exposed to 'science vignettes' supposedly proving God's existence they only reported significantly higher belief in God than controls if the God in question was portrayed as accepting and loving. This reaction was strengthened if they had been previously primed with a brief visualization of a significant other (rather than a stranger). This would imply that the religious are likely to be more pro-social and that social exclusion increases religiousness.

(2) *Existential Certainty*. It is argued that religion reduces existential uncertainty and thus reduces feelings of anxiety (e.g. Inzlicht et al., 2009; Kay et al., 2010 or Peterson, 1999). This view is supported by evidence that religiousness increases when perceived control is threatened. It has been found that just before a national election, when government stability is low, people are more likely to believe in a controlling God, compared with immediately after an election (when governmental stability is higher). Presenting subjects with vignettes on high or low levels of governmental control also raised or lowered belief in a controlling God (Kay et al., 2010). Rutjens et al. (2010) found that belief in God increases when subjects recall an unpleasant life event in which they feel that they lacked control. Interestingly, with regard to replacement religion, people primed in Darwinism, rather than religion, showed enhanced belief in a strongly certain form of Darwinism in the same circumstances. Norenzayan and Hansen (2006) found that manipulating 'mortality salience' (by emphasizing to subjects that they are going to die) led people to

report higher levels of religiousness and a stronger belief in God. Jonas and Fischer (2006) reported that affirming intrinsic religiousness reduced the extent to which subjects thought about death. (Intrinsic religiousness refers to genuine religious belief while extrinsic religiousness involves seeming religious for primary purposes, such as improving social relations, while not having genuine religious belief.) Clearly, factors 1 and 2 could provide a selective advantage that would be selected for in higher fertility.

4. Religion and Fertility

There is evidence that the more religious have higher fertility, further implying that religion provides a selective advantage. Voland notes, for example, that in Spain the more religious you are, the more likely you are to have more children independent of other variables, such as social class. Likewise, Rowthorn (2010) has noted that, 'The more devout people are, the more children they are likely to have. The World Values Survey for 82 nations over the period 1981-2004 reveals that adults attending divine service more than once a week averaged 2.5 children, those attending once per month averaged 2.01 and those never attending averaged 1.67.'

Blume (2009, p.118) sets out in more depth the evident benefits of religiousness in terms of fertility. His research in Switzerland, drawing upon the Swiss census in the year 2000, indicates that religious people - when controlling for education and other factors likely to influence fertility - are more likely to marry and less likely to divorce. They will have more children than the secular, have stronger family values, are more co-

operative and have more reproductive success.⁸ Kaufmann (2010) has also found that the most religious tend to have the most children, something that partly explains both the growth of Islam and the growth of fundamentalist Islam.

Blume argues that this kind of research further demonstrates the degree to which religiousness is adaptive and, indeed, his Swiss study finds clear evidence of the sexual selection of the religious. Swiss women prefer religiously committed men. Swiss women dominate all major denominations in the country, but they prefer those where there is a strong pressure to marry (such as the more conservative denominations), have children, and not divorce. By contrast, men dominate the secular category. In this group there is the lowest percentage of marriage, the highest percentage of divorce, the lowest percentage of pairs with children and the highest percentage of children being raised by single mothers. For example, the 'non-affiliated category' has 1.1 births per woman with 26.7% of its members being in the highest socio-economic strata. Members of 'independent Christian' (conservative Protestant) churches have 1.82 children per woman and 31.8% of them are in the highest socioeconomic strata. This strongly implies that the fertility difference is related to religious practice and not simply the widely known research that fertility tends to decrease in developed countries the higher the socioeconomic position is which a female holds (see Chapter Fourteen). In addition, while 45% of members of the 'non-affiliated' category were female, 57.4% of Jehovah's Witnesses (the most conservative church in the sample) were female and the more liberal the church was the lower was its female membership. 99.3% of Jehovah's Witness 'pairs' were married compared to 81%

⁸ Meisenberg (2012) finds that, in developed societies, fertility correlates more strongly with religiousness than in developing societies. In developed societies, the correlation between level of religiousness and fertility is 0.37.

of the non-affiliated, and 53.3% lived with (minor) children (40% amongst the non-affiliated). Though the pattern is not exactly linear - Jehovah's Witnesses have the highest female participation but are only 4th (out of 10 churches, Judaism and the non-affiliated) in terms of pairs living with children (Blume, p.124) - the general pattern is that the church with highest levels of marriage, lowest divorce and fewest single mothers has the most women.

This is congruous with evolutionary psychology. The female, who must invest the most in any child-bearing relationship, desires a male whom she can trust to invest in her and look after their family. Blume accordingly, argues that she selects in favor of religious men because religiousness acts as a kind of honesty signal. Being part of a religious group indicates greater co-cooperativeness, greater obedience to authority, and a greater likelihood of obeying the traditional moral values (including family values) that are part of most religions. This would imply that many women are sexually selecting in favor of religious men. From a male perspective, it would also make sense to sexually select in favor of religious women, at least if the male was prepared to commit to that woman. If the woman is religious it is far more likely that the child in which he is investing is actually his. At the same time, evolutionary psychology would predict that males would be less interested in committing to one particular female because they have less to lose, in terms of being incapacitated for example, through the breeding process. Consequently, larger numbers of men, compared to women, would be inclined towards promiscuity, as this would result in higher fertility for the men in question. Blume's research reflects this. Men are less interested in being part of religions (which promote family values to varying degrees) and are more likely to

be in the 'secularist' category. This is low in marriage, low in commitment and high in divorce.

So, there is a sound case for arguing that religiousness is at least indirectly heritable. It would appear to be a product of assorted prehistorically useful adaptations, which would of course be heritable. However, to the extent that religiousness (as a byproduct) boosts fertility, it would also select in favor of a more pronounced version of these adaptations.

But, of course, the usefulness of these adaptations would vary from ecology to ecology. We will see in Chapter Five the strong evidence for population genetic differences in the personality characteristics that would underpin these adaptations. As such, religion is not heritable in the sense in that eyes are heritable. Religiousness should vary in its heritability. We can take this further by looking at the twin studies on religiousness, as this directly indicates the degree to which religiousness is heritable.

5. Genetics: A Brief Summary

Before moving onto the twin studies themselves, it may be useful to provide a brief discussion of the nature of heredity and genes (see also Hyde, 2009). The most fundamental units of any organism are cells, each of which contribute to a particular function in the organism. These cells perform their function for a period of time, divide (creating replacements) and then die. The cells are rather like a factory. There are two kinds of worker in the factory: genes and proteins. Genes (which reside in the cell nucleus) produce specific proteins. These proteins are composed of 20 amino acids and the gene dictates the order in which they should be joined together, thus causing different proteins to carry out different instructions (such as to repair the cell).

Every cell in an organism contains, in its nucleus, a particular organism's entire DNA code (the complete blueprint for how the organism works). However, individual cells only use the parts of the DNA code (the genes) that are relevant to that cell's function. The blueprint tells the cells which parts of the code to use and thus what their function is. In a particular cell, the relevant part of the DNA code is transcribed by RNA (which is present in the cell) and it is this which produces the protein which causes the needed effect. Genes, as with any category, come in slightly different forms within the overall categorization of a particular gene and these different forms have slightly different effects. For example, a particular gene might have a 'long form' and a 'short form.'

Genes are copied each time a cell divides but the process of copying is not perfect. This can lead to degeneration and, when genes are copied to produce offspring, mutation; one of the factors leading to genetic variance within populations. A poor copy of a particular gene might cause a particular function in an organism not to work properly or become faulty more quickly than in another organism. In rare cases, it will cause the function to work better.

Each parent will contribute genes for a genotypic trait to the child. These genes will be expressed differently - they will involve variations in the phenotypic range - depending on environmental factors. Often there are a number of different genes behind a particular trait. When people discuss 'genes,' this is often shorthand for 'alleles.' Genes usually come in pairs and the individual genes are referred to as 'alleles' - with one allele contributed from each parent. For example, a person might have one allele for brown eyes and another for blue eyes; one from each parent. There are four kinds of allele: additive, dominant, recessive and X-linked. Additive alleles both contribute equally to

the genetic characteristic with they affect, which will be underpinned by many different genes. Dominant alleles dominate the recessive alleles with which they are paired, meaning that the recessive alleles have no effect or just a small effect. Recessive alleles are dominated if they are paired with dominant ones. X-linked alleles are the exception. They do not come in pairs. They are on the X chromosome and are passed from parent to child. A chromosome is an aggregate of genes all of which, together, control a series of functions. For example, the gender of an organism is dictated by having either two X chromosomes or an X and a Y chromosome. Regarding dominant and recessive, people can have two recessives, two dominants or one of each.

When parents mate they contribute one allele each to the child. So, if there are two alleles (A and B) for a particular characteristic in the population you can end up with the following variations: AA, AB, BB, BA. This, of course, means that a couple's children can differ with regard to a genetic trait. If both parents have A and B and they have three children then one may be AA, the other BB and the third BA. The fourth may be AB but this is the same as BA so there are three variations. This sometimes means that children do not resemble their parents. This is especially noteworthy when both parents pass on the same recessive gene.

6. Twin Studies and Religious Heritability

Dizygotic (non-identical) twins share, on average, 50% of their genetic makeup, as do any siblings, while monozygotic (identical) twins share 100% of their genetic makeup. There are a number of nuances in this regard. Sibling genetic variance can range from between 45% and 55% (see below), monozygotic twins can acquire some genetic differences during fetal development due to

mutations, and there is the rare phenomenon of semi-identical twins. These are monozygotic twins that are 75% alike due to having the same maternal genes but half the same paternal genes (see Gilbert, 2006, Ch. 8). But, in general, it can be stated that dizygotic twins share half of their genetic makeup and monozygotic twins share all of it.

This being the case, all twin studies permit us to control for age and to compare siblings who are between 50% and 100% genetically alike. However, the most useful twin studies are of monozygotic twins reared apart. These studies allow us to separate the influence of childhood environment and genes. Another method is to compare identical and non-identical twins reared together. These identical twins have all their genes and their childhood environment in common while non-identical twins have childhood environment and 50% of their genes in common. Heritability can be discerned by doubling the difference between the correlations of the identical and non-identical twins, a method known as Falconer's formula (Falconer, 1960).⁹

It has been suggested that similarities in measures when comparing identical twins may be partly explained by identical twins being treated more similarly, such as by being dressed the same (e.g. Plomin et al., 2009). However, it has been demonstrated that this does not influence, for example, twin similarities in religion or politics (Martin et al., 1986). As we will see in Chapter Five, childhood environment also has no influence on personality. In addition, advances in molecular genetic technologies (the ability to measure DNA markers across the

⁹ Flynn (2012, p.168) argues that the similar IQs of identical twins reared apart will in part be explained by twins benefiting from environments for intelligence which their intelligence genes will incline them to access. But this would also be true of non-identical twins or just siblings and, anyway, heritability is only discerned through comparison.

genome) have led to breakthroughs in methods of estimating heritability which avoid the assumptions of the twin design. For example, it has been discovered, as already noted, that siblings, though roughly 50% alike on their variable genetic matter, vary around this average and can be 45% or 55% alike. This allows researchers to directly assess whether sharing more DNA leads to greater similarity. In the case of height, this method has found the same heritability as has been found by classical twin studies, implying that the assumptions underpinning these studies are reasonable (Visscher et al., 2006). Also, a study examining shared genes in unrelated individuals has confirmed that genetic factors are of substantial importance with regard to intelligence and that IQ at age 11 genetically correlates with it in old age at 0.62 (Deary et al., 2012). This is congruous with the substantial heritability of intelligence among adults (0.83) discerned from twin studies, as the heritability of intelligence aged 11 is around 0.5 with 0.3 explained by family environment (see Bouchard and McGue, 2003, p.15) while it is 0.83 in adulthood with nil family environment influence (see Chapter Four).

Twin and adoption studies have been conducted to discern the heritability of religiousness. They have all found statistically significant genetic effects on several dimensions of religiousness, including church service attendance, conservative and exclusivist beliefs, spirituality and religious experience, among others. The results of twin studies with regard to the heritability of religiousness can be seen in Table 3.1. MZA and DZA refer to twins reared 'Apart.' MZT and DZT refer to twins reared 'Together.' We will expand on some of these studies below. Heritability of religiousness (as opposed to specific sub-categories) ranges from 0.17 (Eaves et al., 1999) to 0.62 (Winter et al., 1999).

Table 3.1 - Heritability of Religiousness Based on Twin Studies

Scale	Sample	Heritability	Shared Environment	Source
Bible Truth	MZT, DZT	0.25	-	Martin et al., 1986
Religious Attitudes	MZA, DZA, MZT, DZT	0.49	-	Waller et al., 1990
Personal Devotion	Adoption, MZT, DZT	0.28	0.2	Kendler et al., 1997
Personal Conservatism	Female MZT, DZT	0	0.24	Kendler et al., 1997
Religious Fundamentalism	Adoption Data	0.41	0.26	Beer et al., 1998
Religiousness	MZT, DZT (aged 16)	0.17	-	Winter et al., 1999
Religiousness	MZT, DZT	0.62	-	Eaves et al., 1999
Intrinsic Religiousness	MZA, DZA	0.43	-	Bouchard et al., 1999
Extrinsic Religiousness	MZA, DZA	0.39	-	Bouchard et al., 1999
Self-Transcendence	Older MZA, DZA	0.39	-	Kirk et al., 1999
Religious Fundamentalism	MZA, DZA, MZT, DZT	0.54	0	Bouchard et al., 2004
Religious Occupation Interests	MZA, DZA, MZT, DZT	0.44	0	Bouchard et al., 2004

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Religious Leisure Time Interests	MZA, DZA, MZT, DZT	0.57	0	Bouchard et al., 2004
Religious Activities	MZA, DZA	0.43	-	Bouchard et al., 2004
Religious Values	MZA, DZA	0.46	-	Bouchard et al., 2004
Religiousness	Female MZT, DZT	0.44	0.12	Koenig et al., 2005
Religiousness	MZT, DZT (aged 14 to 18)	0.27	-	Koenig et al., 2008
Religious guidance and coping	MZT, DZT	0.44	-	Bradshaw and Ellison, 2008
Biblical Literalism	MZT, DZT	0.41	-	Bradshaw and Ellison, 2008
Religiousness	MZT, DZT	0.4	-	Steffes, 2009
Religiousness	Male MZT, DZT	0.36	0.18	Vance et al., 2010
Religious Interests	MZA, DZA	0.59	-	Segal, 2012
Religious Leisure Time	MZA, DZA	0.55	-	Segal, 2012
Religiousness	MZA, DZA	0.5	-	Segal, 2012

There are four important points to make about the above studies. Firstly, a number of the studies use pre-adult samples where, as

we will see, the environmental influence on religion is higher. If we focus only on studies which have examined either 'religiousness' or 'fundamentalism' among adults, then, taking the average of those 11 studies, religiousness is 0.45 heritable. This is almost identical to the 0.44 estimate suggested by studies which have included estimates of shared environmental influence. Accordingly, this study will use the estimate of 0.44 for religious heritability, 0.12 for shared environment and 0.44 for non-shared environment.

Secondly, the heritability of religiousness changes over the life-span. Koenig et al. (2005) observe a striking change in the heritability of religiousness as children turn into adults. Drawing upon 169 MZ and 104 DZ twins, with a mean age of 33, they found that while adult religiousness is 0.44 heritable (with 0.12 explained by shared environment), childhood religiousness is 0.18 heritable, with 0.56 explained by shared environment. The remaining difference is accounted for by non-shared environmental factors. This finding makes sense because a child's environment will heavily reflect the intelligence and character of his parents. As an adult, it will reflect a person's own intelligence and character to a greater extent. Koenig and Bouchard (2006, p.51) concede that it is difficult to know 'what to make of' the 'personal conservatism' result (Kendler et al., 1997) because it is so out of line with the rest of these data. But we can see that the general trend is that aspects of religiousness are significantly heritable. We will see in Chapters Four and Five that the childhood environment influence on adult intelligence and personality is nil. But we can understand why this factor would have a small influence on adult religiousness, reflecting the greater ease with which children and teenagers can be inculcated (see Alacorta, 2012).

Thirdly, different aspects of religiousness are differentially heritable. Bradshaw and Ellison (2008) draw upon the Survey of Midlife Development in the United States to show that religiousness, depending on the dimension involved, is between 19% and 65% heritable. The findings that Bradshaw and Ellison draw upon are based on 196-316 monozygotic twins and 176-278 same sex dizygotic twins. Three aspects of religiousness were assessed: Personal religiousness and spirituality (e.g. 'How important is religion in your life?'), conservative ideology (e.g. strength of agreement with the statement that 'the Bible is the actual word of God and is to be taken literally, word for word') and Transformations (e.g. Have you ever been born again?). Bradshaw and Ellison calculated that organizational involvement is the least genetic aspect of religiousness, followed by personal religiousness and spirituality, conservatism and religious experience. In this sense, their results parallel Bouchard et al. who suggested that traditionalism is the key factor underpinning religiousness. Bradshaw and Ellison found that religious service attendance was about 0.32 genetic. Childhood religiousness was 0.19, religious salience was 0.27, spirituality was 0.29, and religion as daily guidance and coping was 0.42. It is noteworthy that the heritability in this more general category is close to the 0.4 which other studies have found for 'religiousness.' Moving onto conservatism, Biblical literalism was 0.44 and exclusivist beliefs 0.41 heritable. Finally, having a religious experience or being 'born again' was 0.65 heritable.

Likewise, Vance et al. (2010) used a sample of 408 female DZ and 612 female MZ twins. They found that general adult religiousness correlated at 0.68 for the MZ twins and 0.32 for the DZ twins. They also argued that religious differences could be reduced to a combination of one common additive gene, three common environmental factors, as well as unique environmental

effects. This implies a religious heritability of about 0.36. Strongly feeling 'love' is found to be 0.17 heritable, believing in God as a judge is also 0.17 heritable, belief in an 'involved God' is 0.39 heritable, and 'social religiousness' is 0.3 heritable, with Bradshaw and Ellison putting it at 0.32.

7. Replacement Religion and Heritability

In terms of replacement religion, a number of studies have looked at the heritability of political persuasion. Eaves and Eysenck (1974) found that political perspective, whether 'conservative' or 'radical,' was 65% heritable. More recently, Alford et al. (2005) found that 43% of the variability in political perspective was determined by genes with 22% determined by shared environment (amongst adults).¹⁰ It is noteworthy that the latter study is very similar to those on the heritability of religion amongst adults.

This would be congruous with Bouchard's (2009) suggestion that 'religion' can be substantially reduced to 'traditionalism' which he defines as a combination of docility ('obedience to authority or inclination to authoritarianism) and conservatism (resistance to change and rule following). He argues that differences in political orientation can also be understood with reference to this factor. Traditionalism correlates with 'religiousness' at 0.69 and with 'conservatism' at 0.76, for example. Unfortunately, he does not test the relationship with authoritarian left-wing groups. So the superiority of an operational definition of religion, if not Boyer's specifically, is further illustrated by the possibility that a single factor underpins ideology and religion. A potential criticism is that it does not explain Marxism but I would argue that it does to

¹⁰ A series of studies have noted the heritability of political perspective. For a review of the studies, see Hannagan (2011). See also Hatemi et al. (2009) or Fowler et al. (2008).

the extent that adhering to it involves 'docility' (inherent in adherence to the authoritarian dimensions of Marxism) and ingroup rule-following. So, it would appear that all religions and replacement religions are underpinned by an inclination to obey authority. More research is needed to see if religion and ideology can be factor analyzed down to the three factors suggested by Boyer. Currently, this can only be argued linguistically by examining the nature of key ideas in religion and ideology.

8. Conclusion

This chapter has found that part of the superiority of Boyer's definition of religion is that it is consilient with research in psychology and biology, the disciplines which ultimately underpin the study of religion. It has then demonstrated that religion has arisen as a byproduct of evolutionary adaptations in prehistory and particularly the human propensities to obey authority, be pro-social, perceive causal explanations, over-detect agency, and the facility to have stress reducing religious experiences. We have observed the difficulties with the argument that religion is an adaptation in itself, but have noted that religion may be indirectly adaptive by promoting health, fertility, and group co-operation. Accordingly, we have suggested that the evolutionary understanding of religion implies that it would vary within and between populations, with differing pressures for these adaptations, and in this sense might be regarded as heritable. In the second half of the chapter we looked at the twin and adoption studies in relation to religion. We found that they all indicate that all aspects of religiousness are at least partly heritable and that conservative and exclusivist beliefs and propensity to religious experience are the most heritable, with the later being more genetically grounded than environmentally grounded.

Religiousness, for adults, is in the region of 0.44 heritable. The question this raises is, 'What is underpinning the differential heritability of religiousness?' This study will argue that the differences can be best explained by differences in intelligence and differences in personality factors. So we must define these two concepts.

Chapter Four

Defining Intelligence

1. *Introduction.*
2. *What is Intelligence?*
3. *The History of the Intelligence Construct.*
4. *Criticisms of IQ Tests.*
5. *Criticisms of the Concept of Intelligence.*
6. *The Heritability of Intelligence.*
7. *Parent-Child Intelligence Variation.*
8. *Intelligence and Evolution.*
9. *Conclusion.*

1. Introduction

We will begin this chapter by defining 'intelligence.' We will examine the history of intelligence and the hierarchical model of intelligence and we will look at IQ tests, how they have developed and potential problems with them. We will then refute the arguments against the concept of intelligence and show that intelligence can be measured by IQ tests. Most importantly, we will show that intelligence is a useful predictive category because it permits us to make accurate predictions about people's lives. We will then show that intelligence is around 0.83 heritable, while also examining nuances in this regard such as Regression to the Mean. Finally, we will look at why intelligence might be selected for.

2. What is Intelligence?

When we say that a person is 'more intelligent' than somebody else, we instinctively know what we mean. 'Intelligence' is a construct that refers to a person's efficiency in solving problems, learning, and understanding, both correctly and in-depth. As with all constructs, there are difficulties with drawing the border: where do you draw the line between stating that one person is 'intelligent' and another person is not? But the concept of intelligence is useful because, as we will see, it is predictive. Intelligence is an important positive predictor of education and wealth and a negative predictor of criminality and religiousness, amongst many other correlates.

However, let us focus on a more in-depth definition of intelligence, as a number of definitions have been offered, each with nuanced differences. The American Psychological Association propounded a particular definition of intelligence in 1995. Their 'taskforce,' whose task was to define what was regarded as a difficult to define concept, defined intelligence as the ability to 'to understand complex ideas, to adapt effectively to the environment, to learn from experience, to engage in various forms of reasoning, to overcome obstacles by taking thought' (Neisser, 1996, p.1). As Lynn (2006, p.4) has pointed out, this definition is broadly reasonable; however there is one apparent problem with it, and this relates to adaptation to the environment. Certain species of ant may be regarded as adapted to their environment, because they would not survive if they were not so adapted, but we do not instinctively regard ants as particularly intelligent. Equally, Herrnstein and Murray (1994, p.353) have documented how in economically highly developed countries, single mothers who live off government welfare have the highest fertility. In this sense, they, of all females in such societies, are the

best adapted to their environment. However, as Herrnstein and Murray (p.378) also document, they are the least intelligent of their society's women in relation to all other aspects of the above definition.

A more nuanced definition, and the one upon which we will draw in this study, was proposed by Gottfredson and 52 other leading intelligence experts in the *Wall Street Journal* in 1994. They defined intelligence as follows:

Intelligence is a very general mental capacity which, among other things, involves the ability to reason, plan, solve problems, think abstractly, comprehend complex ideas, learn quickly and learn from experience. It is not merely book learning, a narrow academic skill, or test taking smarts. Rather, it reflects a broader and deeper capability for comprehending our surroundings - 'catching on,' 'making sense' of things, or 'figuring out' what to do (Gottfredson, 1997, p.13).

This definition is superior because it summarizes what we mean by intelligence but specifically divorces it from personality characteristics or social conditioning - which might make, for example, a less intelligent person perform better academically than a more intelligent one - and it avoids the pitfall of environmental adaptation noted in the previous definition.

Psychologists divide between different intelligence abilities all of which correlate with each other. 'Fluid intelligence' is defined as the ability to think logically and solve novel problems while 'crystallized intelligence' is the ability to solve problems by drawing upon experience and knowledge. Both kinds of intelligence are important in problem solving. Generally, we understand that there are three central kinds of intelligence: spatial

(often regarded as the closest to 'fluid'), mathematical, and linguistic (closer to 'crystallized').

This definition, or definitions like it, has been subject to heavy criticism, but before responding to these criticisms, we will look in more detail at the history of this particular understanding of intelligence and its relationship with IQ and intelligence tests.

3. The History of the Intelligence Construct

Intelligence has been conceptualized as a single entity that can be measured by IQ (intelligence quotient) tests. The theory of a single construct called intelligence can be traced back to Charles Spearman (1863-1945). Spearman (1904) showed that ability on different kinds of cognitive tasks are positively correlated such that people who do well on some kinds of tasks requiring intelligence will tend to do well on all of them, even if they will do better on some than others.

As discussed, the standard division is between mathematical, linguistic and spatial intelligence. Some people score very highly in linguistic intelligence and mathematical intelligence but much lower in spatial intelligence. A famous example is A. J. Ayer (1910-1989). The pioneering Oxford University analytic philosopher was clearly exceptionally intelligent in terms of language but had poorer spatial abilities, something he blamed on never learning to drive a car (Ayer, 1984, p.32). Conversely, Albert Einstein - so brilliant at mathematics that he found an original proof of Pythagoras's theorem aged twelve - had less pronounced linguistic intelligence, meaning that he failed the entrance exam to the Federal Institute of Technology in Zurich (Miller, 1999, p.644). However, these are exceptions and in general different kinds of intelligence are strongly positively correlated. Spearman used factor analysis to prove that

performance in all cognitive tasks is underpinned by a single factor. He called this factor 'g' or 'general intelligence,' and he argued that for g to exist there must be a general mental ability which determines performances on all kinds of cognitive tasks.

Spearman also argued there were a large number - as many as seventy - specific abilities which determined performance on specific kinds of task, all of them ultimately underpinned by g. Thurstone (1938) developed this to argue that there were seven primary abilities (underpinned ultimately by g), these being: reasoning, verbal comprehension, numerical ability, spatial ability, fluency (how quickly a person can produce a series of synonyms), memory, and perceptual speed. By around the 1960s it was broadly accepted that intelligence should be conceptualized as a hierarchical structure. This was often conceived of as a pyramid in which there were seventy narrow abilities at the base (drawing upon Spearman), rising to about ten second order abilities at the next level (drawing upon Thurstone) with Spearman's g at the apex of the pyramid. This model is widely accepted by experts in the field such as Lynn (2006), Jensen (1998), and Mackintosh (1998). However, Thurstone's seven have often been factored down to three fundamental forms of intelligence: mathematical reasoning, verbal reasoning and spatial reasoning, with these three understood to be underpinned by g. Jensen (1998, p.88) emphasizes that g is a hypothetical construct which cannot be measured in itself but which underlies the narrower abilities which sit beneath it in the pyramid of intelligence.

Accordingly, the best way to measure g is through the IQ test. The test was first developed by Alfred Binet (1857-1911) in France in 1905 and translated into English by Lewis Terman (1877-1956) in 1916 (Lynn, 2006, p.3). An IQ test is essentially a test of learning ability, assessing mathematical ability, verbal

reasoning, and spatial ability and, to a limited extent, acquired knowledge. All of the questions require the subject to solve some kind of problem: to work out which shape goes next in the sequence, which number goes next in the sequence, or which concept is associated with which other concept. This test is performed against the clock so it also tests how quick-witted the subject is, a dimension of intelligence as we have defined it. The subject's IQ is the ratio of the average number of questions he answers correctly set against the average number of questions answered correctly by a reference group, generally a large sample who have previously been asked the same or similar questions. The ratio is multiplied by 100 and this gives us a number. If the subject receives the same test score as the reference group then his intelligence is average and his IQ is 100. If his score is better than the reference group's then he is above-averagely intelligent and if it is worse then he is below-averagely intelligent. Scores distribute with a Standard Deviation (SD) from the mean of 15. This creates the well-known bell-curve (see Herrnstein and Murray, 1994), with the majority of the reference group being at the mean and the percentage with a given IQ becoming increasingly smaller the more that their IQ deviates from the mean. There are a number of objections to IQ tests which require rebuttal.

4. Criticisms of IQ Tests

1. *A few dozen questions are insufficient to test mental ability.* It is quite true that, in a minority of cases, an IQ test score may be skewed by illness, stress or even developing slightly later than ones peers, but, as we will see, there is a significant correlation between adolescent IQ score and later achievement in various fields. Of course, it is not an absolute correlation, which may demonstrate both the significance of factors other than IQ in

attainment and the failure of the IQ test as a predictor in some cases (possibly due to the factors suggested). But the important point is that the evidence indicates that the IQ test is an important predictor. Moreover, there are many other instances where we would accept that a one-off test is a reasonably good indicator of ability. As Levin (2005, p.41) has noted, asking a person to go for a two mile run and timing how long it takes them is a reasonably good indicator of physical fitness. Of course, there will be those who, on the day of the run, have a foot injury or diarrhea or anything else that may slow them down, but the test is likely to be predictive in most cases, and will produce valid results if the sample is large enough.

2. *IQ tests are unable to measure intelligence.* To argue that intelligence is real yet IQ tests do not measure it is like claiming that weight is real, and some people are heavier than others, but bathroom scales do not accurately measure it. A scales is reliable if its estimation of the heaviness of different people positively correlates with our own estimation when trying to lift the same people. Likewise, an IQ test is reliable if its estimation of the intelligence of different people positively correlates with differences in their intelligence as measured by more intuitive measures of intelligence, such as academic performance. The instrument, in both cases, is imperfect but it is the best instrument we have. In that IQ scores correlate, as we will see, with evidence of intelligence, they are the best (if imperfect) means we have of measuring intelligence, just as a bathroom scales is the best (if imperfect) means we have of measuring weight. Different scales will give people slightly different weights just as different IQ tests will give different people slightly different IQs.

3. *Intelligence and IQ are not the same thing.* We have defined intelligence as ability in cognitive tasks. Academic exams involve cognitive tasks and, as we will see, successful performance in school exams is predicted by IQ at about 0.7 (Jensen, 1979, p.319). In addition, ability in different cognitive tasks seems to be underpinned by a *g* factor, just as the three IQ subtests are. As far back as 1904, Spearman (1904) demonstrated that performance in very different cognitive tasks is (usually strongly) positively correlated, just as performance in the different parts of the IQ test is positively correlated. This implies that intelligence and IQ are very much the same thing.

Table 4.1 - Spearman's (1904) Rank Order Correlation Matrix

Classics	1					
French	0.83	1				
English	0.78	0.67	1			
Math	0.7	0.67	0.64	1		
Pitch	0.66	0.65	0.54	0.45	1	
Music	0.63	0.57	0.51	0.51	0.4	1

4. *IQ tests are unreliable.* No test instrument is perfectly reliable. A sphygmomanometer (which measures blood pressure) has a reliability of 0.5. Modern IQ tests, in particular the Raven Progressive Matrices (first developed in 1938), have been argued to have a reliability of at least 0.9 (Jensen, 1998, pp.49-50). So, it is simply inaccurate to brand them unreliable.¹

¹ Raven's Progressive Matrices are a widely accepted as very reliable tests which substantially eliminate cultural bias and are heavily *g*-loaded. Nevertheless, it has been emphasized that some peoples will be exposed to the objects depicted more than others, so developers must always strive to make the tests ever fairer (Eaton et al., 2009, p.173).

5. *Intelligence tests are political*: It is argued that intelligence tests are inherently political because they imply that we value intelligence (e.g. Jencks, 1992, p.104). This is a cultural matter and so the tests are biased. But intelligence is valued in all cultures (e.g. Buss, 1994), whether implicitly or explicitly, and the fact that the people who produce the tests value intelligence does not in any way undermine the accuracy of the results. To argue that it does is akin to saying that the accuracy of an academic book should be questioned because it has been published by people who value academic books.

6. *The tests are not predictive of life outcomes because some successful people, such as Einstein, are brilliant at mathematics but less good at linguistic tasks*. This criticism fails to appreciate that this kind of contrast is relatively rare. In general, those who perform above average on linguistic tasks also perform well on spatial and mathematical tasks and this implies the presence of *g*. The correlation at age 16 between verbal and mathematical intelligence on the NCDS (the UK-based National Child Development Study, N. 17,000) is 0.65 (Kanazawa, 2012, p.42). The subjects will likely perform better on one kind of task than on another but the crucial point is that there is a strong positive correlation. Spearman's (1904) own research found a correlation of 0.64 between performance in English (mainly linguistic intelligence) and performance in Math. This demonstrates that many of the subjects were better at English than Math or *vice versa*. But it also evidences our ability to posit *g* and shows a strong positive correlation. With this in mind, IQ tests can be 'g-loaded' such that they more accurately test *g*, steadily eliminating aspects of the test which have been shown not to relate to *g*. This has led some IQ tests to have *g*-loadings of around 0.9, which

means that the argument that they are unfair is very difficult to sustain.

7. *There is no such thing as g so IQ tests cannot be loaded to test it.* Gould (1981) argued that the factor analysis used to reach *g* is indeterminate and that discussion of mental ability is meaningless if there is no *g*. The latter point clearly cannot be accepted. Even if *g* is abandoned, IQ tests illustrate that people are differing in mathematical, verbal and spatial abilities. Moreover, if we must reject factor analysis in relation to IQ we must presumably reject it in all circumstances. This brings us back to our discussion of categories and philosophy. On a pragmatic level, as we will see, *g* permits us to make correct predictions and that is why it is useful. If we followed Gould's argument, it would be unacceptable to reduce a large number of issues down to a few more manageable ones which are, nevertheless, the essence of the narrower ones, and this is obviously not a philosophy by which we can live.²

8. *IQ Tests are culturally biased:* The tests are argued to be culturally biased and unfair on certain races and classes (e.g. Ryle, 1974, p.54). A hundred years ago, this criticism may have had some validity, with cases of working class children being expected to know the meaning of the word 'regatta,' but they have been substantially developed since then. To criticize them in this way is a strawman argument. Moreover, the Japanese score better on IQ tests, on average, than whites which means that the 'cultural bias' argument clearly does not work, as white America and Japan are very different cultures. Indeed, Japanese Americans score better on IQ tests than white Americans (e.g. Jensen, 1981). So, it really cannot be argued that the tests are culturally biased and

² For a detailed discussion of the bias, falsehoods and fallacies in Gould's (1981) work, see Levin (2005) or Lewis et al. (2011).

there are further reasons for this conclusion. American blacks actually perform slightly better on traditional IQ tests than they do on the more recent 'culture free,' strongly *g*-loaded tests (Herrnstein and Murray, p.303). Blacks perform better on verbal than non-verbal tests. They score below groups that are even more disadvantaged than them, such as Native Americans (Jensen, 1981, p.217). Again, this is a strong argument against the tests being culturally biased.

But the most important argument against cultural bias is that IQ scores are significantly positively correlated with 'nerve function velocity' - how quickly a person reacts to external stimuli and thus their overall nervous system functioning. Reed and Jensen (1992) found a correlation of 0.37. Vernon et al. (2000, p.257) have collated the studies on this subject and they have described the evidence as 'weak and mixed.' But they collate data on a variety of reaction time measures, not all of which relate to anything akin to cognitive processing, such as swiftness of the pathway from the wrist to the elbow. They also collate studies with very small samples such as '38 undergraduates.' Jensen (2006, p.155) argues that there have been severe problems with some tests that have found a negative correlation between IQ and reaction times, including using undergraduate samples (limiting the intelligence range), estimating intelligence from academic achievement (an imperfect method) and failing to account for reliability problems on the RT test.

Most psychologists appear convinced by the narrower evidence - focusing on perceptual reaction times - arguing, for example, that *specific examples* of nerve function velocity - such as perceptual speed - do significantly correlate with IQ (e.g. Reed et al., 2004). For example, Jensen (2006) developed the 'odd man out test' in which people were seated in front of a bank of lights. They observed which light went on, lifted their finger from a

'home' button and pressed the button closest to the illuminated light. Studies have found a correlation of between 0.3 and 0.4 (Hunt, 2010, p.151) between how quickly they pressed the right button and IQ. Jensen (2006) provides the most detailed meta-analysis of the correlation between response time and IQ. Surveying the studies he concludes (p.199) that, 'We can no longer regard seriously the earlier criticisms of attempts to explain the basis for this remarkable correlation by questioning its existence or validity. The RT-IQ correlation *per se* is an empirical fact as thoroughly proved as any phenomenon in the behavioral sciences.'

Different kinds of tests of perceptual RT provide different correlations, as noted. 'Choice' RT generally involves a higher correlation than 'Simple' RT. Jensen (p.37) observed that the FAST test's results, in which two left-right LEDs flash over a sequence and the subject must decide which side flashed most at the end of a sequence by pressing a button, correlated with IQ at between 0.5 and 0.74. RT experiments can also be used to measure swiftness of recall for both short and long-term memory and they show a similar correlation with IQ (Jensen, p.218). Jensen (p.158) even notes one case in which RT was correlated at between 0.9 and 1 with IQ scores. This seems to follow as it is axiomatic that, all things being equal, the more quickly a person produces the correct response, the greater is his intelligence. In general, it is concluded that choice RT and intelligence correlate at around 0.5, while with simple RT it is around 0.3 (e.g. Deary et al., 2001; Hunt, 2010, p.151; or Pandey, 2005, p.182).

When a racially mixed sample of American children aged 9 to 12 took the 'odd man out test' the results paralleled race differences in IQ results, which will be discussed in Chapter Ten. East Asian (Chinese, Korean and Japanese) children were the fastest, then whites and then blacks (Jensen, 1998). This is despite

evidence that blacks develop physically the fastest while East Asians develop the slowest (e.g. Noble, 1978). This, therefore, demonstrates that IQ tests are not biased in this way. We commit the moralistic fallacy if we argue that all human populations are equal and therefore if the IQ tests reveal intelligence differences between such populations they simply have to be flawed and biased. Also, such a criticism is inconsistent and unjustifiably equates intelligence with human worth, as implied by the fact that evidence for race differences in average blood pressure, height, or personality raises no suggestion that the instruments used to measure blood pressure, height or personality are culturally biased or 'racist'.³ Equating human worth with intelligence is odd as the highly intelligent can often be seen to lack common sense, as discussed in Chapter One.

9. *IQ tests are meaningless*: There is strong evidence that IQ tests relatively accurately predict performance in school and in the job market and there are many studies which have demonstrated this. For example, Jensen (1979, p.341) notes that IQ correlates with occupational status at between 0.5 and 0.7. The average IQ of an occupation correlates with its prestige rating at 0.9 (p.343). In particular, IQ correlates with what people ordinarily mean when talking about certain social types in terms of intelligence. For example, those commonly regarded as intellectually gifted have very high IQs while those who are regarded as mentally retarded have very low IQs (Sternberg et al., 1992 or Jensen, 1985). Also,

³ The exception in this regard would be certain postmodern anthropologists who have argued that it is imperialist - and thus presumably 'racist' - to use Western measurement when dealing with non-Western peoples. Hymes (1974) criticizes anthropologists for imposing 'Western categories' - such as Western measurement - on those they study, arguing that this is a form of domination. So, in a sense, to assert the empirical fact that Hutus are taller than Inuit would be an immoral act.

the more prestigious a profession is the more strongly IQ correlates with success in it - up to 0.19 for sales positions but up to 0.47 for professional positions (Jensen, 1979, p.348). Neisser et al. (1996, p.83) find that 29% of variance in job performance is a matter of IQ.

In addition, there is a significant positive correlation between IQ and socioeconomic status. Herrnstein and Murray (p.134) found, drawing on a 12,686 person sample, that the correlation between low IQ and being below the poverty line is 0.32, the correlation between low IQ and being a single mother on welfare a year after the birth of your child is 0.56, and the overall correlation between IQ and socioeconomic status is 0.4. Academic achievement correlates with IQ at 0.5 overall (e.g. Jensen, 1979, p.316) and at about 0.7 at primary and secondary school where a wider academic range is still present (Jensen, 1979, p.319). This falls to 0.5 for undergraduates and 0.4 for postgraduates. This is understandable because all postgraduates are likely to have relatively high IQs and, as such, IQ will make less of a difference to their relative achievements and other factors, such as personality differences, will likely become more significant. Equally, there is a positive correlation between low IQ and welfare dependency, criminality (e.g. Gordon, 1975), immorality (e.g. Kohlberg, 1981 or Herrnstein and Murray, Ch. 11) and simply being low in Agreeableness or altruism (see Chapter Five). The average IQ of a criminal in a Western society is 92, compared to an average IQ of 100 (Herrnstein and Wilson, 1985, p.154). Within criminality, the IQ of white collar criminals is much higher than that of muggers, rapists and murderers (e.g. Herrnstein and Wilson, 1985). IQ is also weakly but significantly correlated with relative head size which, clearly, cannot be explained by purely social explanations. It implies that the brain is a muscle and some are simply more muscular than others. Van Valen (1974) found a

correlation of 0.3 between IQ and brain weight, while for Andreason et al. (1993) it was between 0.26 and 0.56. Of course, intelligence is not the only factor in gaining or losing socioeconomic status. Conscientiousness, as we will see later, is also a factor, but it appears that IQ is a particularly important factor.

10. IQ Tests Results are Influenced by Motivation: There is some evidence that 'motivation' can interfere with the predictive validity of IQ tests. Drawing upon a meta-analysis (with 2008 participants overall) it was found that material incentives in relation to IQ test performance increased IQ score, on average, by 0.64 SD with a higher increase for those with a lower baseline IQ. In another test, 'Trained observers rated test motivation among 251 adolescent boys completing intelligence tests using a 15-min 'thin-slice' video sample. IQ score predicted life outcomes, including academic performance in adolescence and criminal convictions, employment, and years of education in early adulthood. After adjusting for the influence of test motivation, however, the predictive validity of intelligence for life outcomes was significantly diminished, particularly for nonacademic outcomes' (Duckworth et al., 2011, abstract). However, even this research concedes that even low stakes tests are significantly predictive of life outcomes.

Moreover, Duckworth et al.'s (2011) meta-analytic sample is small for a meta-analysis as is their other sample and, most importantly, the same issue of 'motivation' could be raised with regard to most tests. For example, we can imagine a test which inquires into the relationship between academic success and cross-country running ability amongst 12 year old boys for which there is no reward and no observer other than the test administrator. This test may skew results against academic achievement

correlating with this ability, because doing well in sport may be less important to the self-esteem of the more academic children, meaning that they will be less motivated. Any individual test could involve not just motivational but many other variables that might affect the outcome for individuals or groups. The problem of skewed results due to such variables can be obviated by drawing upon large, random samples which would be a cross-section of society both in terms of intelligence, personality and environmental variables. This would reduce the extent to which any particular variable would skew the results and it would permit us to have more confidence in the results. And this is what much of the research looking at IQ and life history has done, further evidencing the 'meaningfulness' of IQ tests. For example, Herrnstein and Murray draw upon the US National Longitudinal Survey, a sample of 12,686 people. And these problems can be further obviated by replication, and the associations discussed have indeed been replicated as the citations indicate.

11. Doing Poorly on IQ Tests Upsets People. The final argument I will deal with at this stage is really a moral argument which, strictly-speaking, should be dismissed out of hand as fallacious when looking at the validity or otherwise of IQ tests. Until the 1970s, most children in England - and some to this day - sat an exam called the Eleven-Plus.⁴ Passing it meant that you went to a Grammar School which directed you towards university. Failing it meant that you went to a 'secondary modern' (unless your parents could afford to pay for you to go to a private school with a less rigorous entrance exam than the Eleven Plus). This directed you towards less well-paid and less respected professions. Many of those who failed the Eleven Plus felt that they were branded as

⁴ For a history of the Eleven Plus see Murdoch (2007, Ch. 10).

failures at a young age and they found this detrimental.⁵ It may be that 11 was too young to have children sit such an exam and it may be that some who failed it at 11 may have passed such an exam amongst their cohort at 15, due to delayed cognitive maturation. There is a high correlation between childhood and adult IQ. The correlation between IQ aged 4 and IQ 12 years later has been estimated at about 0.77 (Hodapp and Dykens, 2002, p.493). Winner and Von Karolyi (1998, p.396) have estimated that childhood and adult IQs correlate in the range of 0.7-0.85. Both estimates allow the possibility, indeed the probability, that *some* people's IQs will rise or fall over the course of childhood, albeit only comparatively rarely. This may be an argument against a particular educational policy, but it is not an argument against the validity of IQ tests.

The criticisms of IQ tests do not stand up to scrutiny.

5. Criticisms of the Concept of Intelligence

There is an ongoing debate about how 'intelligence' should be defined. For example, in contrast to the model of intelligence I have defended above stands Gardner's (1983) theory of 'Multiple Intelligences' which includes not just mathematical, spatial and linguistic, but musical intelligence, bodily-kinesthetic intelligence, interpersonal intelligence (i.e. emotional intelligence) and intrapersonal intelligence. Gardner even guardedly argues for the recognition of 'existential intelligence,' best understood as a kind of intuition towards spiritual awareness. Gardner is also rather dismissive of IQ tests, claiming that they fail to predict ability to learn or solve new problems. There are many scholars who have developed aspects of Gardner's theory, but it is not necessary to

⁵ In most areas of Britain, the Eleven Plus has been abandoned and replaced with mixed-ability 'Comprehensive' schools (see Robins, 1999).

examine them in order to refute the broad perspective from which their views derive. To give a further example, however, Sternberg (1985) has proposed the Triarchic Model of intelligence in which he divides between analytic, creative and practical intelligence. But, we will now highlight the difficulties with the main criticisms of the definition of intelligence advocated by Gottfredson (1997).

1. *Intelligence is difficult to define:* (e.g. Block and Dworkin, 1976, p.412). This point could be made about any concept to varying degrees. It could be argued that 'tall' is difficult to define, but that does not mean we cannot talk about 'tall people.' At an intuitive level, 'intelligence' essentially means 'learning ability.' We say that John is more intelligent than James if John catches on to something quicker and shows evidence that he comprehends something more thoroughly. Accordingly, John can learn more quickly and more thoroughly from experience and act, if he so wishes, accordingly.

2. *There are different kinds of intelligence:* 'Intelligence' means many different things such that we can talk about 'emotional intelligence' (e.g. Gardner, 1983) or 'creative intelligence' and 'practical intelligence' (Sternberg, 1985).

It might, of course, be argued that the concept should be broadened, but this raises two problems. Broadening the concept, to some extent, might be accepted if it can be justified. It would be justified if it could be shown that abilities that sit outside of 'intelligence' and 'intelligence' can be reduced to the same things. But it cannot be.

Gardner's and Sternberg's extra 'intelligences' can be specifically explained by personality factors (which would be experienced as intuitions rather than analytical abilities) that are substantially independent of IQ or only very weakly correlate with

it,⁶ combined with classical 'intelligence.'⁷ For example, Sternberg's 'creative intelligence' would appear to be, to a great extent, Openness-Intellect plus relatively high IQ. His 'practical intelligence' would seem to be relatively high IQ plus high Agreeableness (see Chapter Five). As such, there is no need to broaden the concept of intelligence, and it is analytically unhelpful to do so because intelligence and personality operate substantially separately.

Secondly, broadening the concept, when we know that personality and intelligence are substantially separate, conflates intelligence and intuition. This renders intelligence meaningless because analytical ability is the opposite of acting on instinct. It effectively means that everybody is intelligent, so the concept of intelligence ceases to be analytically useful.

As such, it is not defensible to broaden the use of 'intelligence' and those who do so, and use the term differently from how most people intuitively understand it, are doing nothing more than causing confusion, which might lead us to wonder why. As Kanazawa (2012, p.2) has noted, discussing 'emotional intelligence' is rather like discussing 'inner beauty.' Both are metaphors and it is just as confusing, in everyday speech, to term an unintelligent but altruistic and empathetic person 'intelligent' as it is to call a kind yet ugly person 'beautiful.'⁸

⁶ Factor analyses have consistently found that at least three of the 'Big Five' personality factors are substantially independent of intelligence (see DeYoung et al., 2012).

⁷ See DeYoung (2011). Openness-Intellect positively correlates with intelligence at 0.3. The other traits involve weaker correlations.

⁸ Interestingly, Kanazawa (2011) finds that physical attractiveness positively correlates with IQ in the UK at 0.38 and in the USA at 0.12. The association was stronger among men than among women.

3. *Intelligence means different things in different cultures:* To argue that intelligence means different things in different cultures (e.g. Jencks, 1992, p.194) is irrelevant. We have stated what we mean by intelligence. If a different culture talks about something different then they're not talking about intelligence.

4. *Intelligence is scientifically contingent:* It is argued, inline with Popper (1963), that there is a lot we don't know about 'intelligence' and in the future we may abandon the concept just as we abandoned 'witches' and so on (e.g. Block and Dworkin, 1976, p.420). But this does not follow. 'Witch' means 'woman with supernatural powers.' The fact that most people accept that there are no real witches is no reason to abandon the 'witch' concept. Likewise, 'intelligence' will mean what it has always meant no matter what changes in how we understand the world. The belief in witches is rejected because it is based on a false hypothesis. There is no reason to reject 'intelligence' until it is proven that people do not learn from experience to different degrees and cannot reason to different degrees.

5. *Intelligence is simply what IQ tests test* (Block and Dworkin, 1976): As we have discussed, there is a clear, positive relationship between IQ test results and evidence of what we intuitively define as intelligence.

6. *We do not fully understand intelligence, so intelligence research is speculative:* It is true that we do not yet understand the precise brain architecture of intelligence, but this does not mean that we cannot talk about intelligence. We could talk about stars before we understood their architecture. 'Stars' were defined in terms of what they denoted to us. They were lights in the sky. Likewise, we can define intelligence as summarizing its

manifestations - what it denotes - without fully understanding the science behind it. If we cannot do this, then it can be countered that, as science by its nature progresses, we do not fully understand anything and, accordingly, cannot talk about anything. This is not a method we can live by. This critique likewise fails to appreciate that we can reasonably hypothesize a mechanism without knowing what that mechanism is. Darwin did not understand the gene. Was presenting evolutionary theory unreasonable and pointless discussing until the discovery of the gene?

7. Other factors are more important in understanding achievement than intelligence: In some cases, such as socioeconomic status, this is true; though as intelligence predicts socioeconomic status at 0.4 it may be the largest single factor. As we have seen, intelligence predicts success at school, amongst a broad intelligence range, at 0.7. Its predictive validity is lower at university (it is 0.5) but substantially because the entire sample are relatively highly intelligent, meaning that personality factors will become more significant in explaining differences in achievement. Nevertheless, intelligence is clearly extremely important in understanding educational and socioeconomic achievement. It is obviously not being suggested that intelligence is the dominant factor in all forms of achievement; simply that it is a significant one. This is true even in forms of achievement that are not overtly cognitive, such as getting along with people, which is predicted by IQ at 0.3 (see Kaufman et al., 2011).

We have examined the criticisms of intelligence and noted that they are highly problematic. So, overall, it is reasonable to conclude that intelligence is a meaningful, predictive category that should be defined in the way it has been defined by Gottfredson (1997).

6. The Heritability of Intelligence

We have already looked at twin adoption studies in order to understand the heritability of religiousness. The same method can permit us to discern the heritability of intelligence.

We have data on the heritability of intelligence, drawing upon studies with stable families. Obviously, brain damage caused by physical abuse or extreme adverse health in childhood will affect the heritability of intelligence and as such we would expect this heritability to be lower in less developed countries where brain damage caused by childhood conditions better controlled for in developed countries would be more prevalent. But, when comparing like samples, the heritability of intelligence is about the same across the world. Various studies have been made of the intelligence of adult identical twins reared apart between the 1930s and the 2000s in the USA. Bouchard (1998), summarizing the studies, finds a correlation of 0.75. He concludes that as the test has 0.9 reliability the correlation should be adjusted to 0.83. As this research controls for genetics, we can infer that environment only explains 17% of intelligence variation.

The second method has been to compare adult identical twins and same sex adult non-identical twins. Bouchard (1993) finds an intelligence correlation of 0.88 for identical twins but only 0.51 for non-identical twins. This gives an IQ heritability of 0.74. Lynn (2011a) argues that corrected for errors, this becomes 0.98 and 0.56 which leaves us with an overall heritability of 0.84. A Russian study also found a heritability of 0.78, corrected for unreliability to 0.87 (Lipovechaja et al., 1978) which implies that a figure of 0.8 is robust even in a somewhat less affluent environment such as Soviet Russia. Similar heritability, 0.9, has been found in India (Pal et al., 1997 and Nathawat and Puri, 1995). Lynn and Hattori's (1990) study of East Asians finds a

heritability of 0.65 amongst 12 year olds, around the same as Europeans of the same age, implying that adult heritability is about 0.8. Many experts (e.g. Eysenck, 1979 or Jensen, 1998) have concluded that intelligence is about 80% heritable and estimates generally fall within the range of 0.7 to 0.8. There are studies estimating a much lower heritability, such as 0.5 (e.g. McGue et al., 1993) and even as low as 0.25 (Mackintosh and Mascie-Taylor, 1984), but these draw on samples under the age of 20. The heritability of intelligence differs according to the age range of the sample. Intelligence is less genetic amongst children than adults because adults will create their own environments, reflecting their own intelligence, whereas children will be subject to the environment created by parents whose intelligence may be lower or higher than theirs. This can be seen from adoption studies, the final piece of evidence for our case.

The third method is to examine the intelligence correlation between adoptees, adopted parents, adopted siblings and biological parents. With regard to unrelated children who are adopted and raised in the same families, Bouchard (1998) shows that, when they are still children, adopted sibling intelligence is positively correlated at 0.22. However, it should be borne in mind that measures regarding children are unreliable because of strong environmental effects from parents that wear off in adolescence. Amongst adults the correlation was only 0.04. However, this method does not take into account childhood influences that might operate on one child but not the other so it is less reliable than the other two methods. In addition, Horn and Loehlin (2010, Table 215) found a negative correlation between adult adopted child and adopted mother IQ of -0.19 and, between two adult biologically unrelated siblings, of between -0.17 and -0.31. Loehlin et al. (1987) found that the correlation between biological mother and adopted child IQ grew from 0.23 to 0.26 between childhood and

adulthood. Though not as reliable as the other methods, this method indicates the adult IQ is significantly heritable.

Many other studies also indicate that the heritability of IQ changes depending on whether the subject is a child or an adult. This means that environmental factors are more significant in explaining a child's IQ than in explaining an adult's IQ because, during adolescence, a person's genotypic IQ rises to prominence. Bouchard and McGue (2003) have shown that the genetic component of IQ increases from 0.4 (when dealing with children aged 4 to 6) to 0.83 when dealing with adults. Indeed, this change from environmental to genetic influence appears to accelerate around the age of 16, reflecting the way in which people begin to create their own environments conducive to their innate abilities. Thus, at age 12, IQ variability is 0.2 non-shared environment, 0.3 shared environment and 0.5 heritable. By adulthood, intelligence variability is 0.2 non-shared environment, 0.8 heritable and 0 shared environment. But it is clear that for adults their adult environment explains a small part of intelligence variation.

So, we can be reasonably confident in the estimation that intelligence is around 0.83 heritable. This further implies that there are genes for intelligence and some have already been identified. Chorley et al. (1998) found that the possession on Chromosome 6 of a particular allele confers about 4 IQ points compared to those who have a different form of the gene.⁹ As with personality, there are environmental influences which will explain how intelligent a person is and, in particular, how intelligent a child is. If the issue were nutrition then children born in times of famine would be less intelligent than those born in times of plenty, but this is not the case (see Lynn, 2006, Ch. 1). A stimulating environment is another possibility. But the creation of

⁹ Chromosome 6 also plays a major role in immune response.

such an environment would, of course, reflect both the genetic intelligence and genetic personalities of the adults.

7. Parent-Child Intelligence Variation

In general, then, intelligence is highly heritable. There are three main reasons, however, why a person's intelligence might differ significantly from that of their parents.

The first is being exposed to a very different environment. Genes for intelligence will have a higher and lower limit within which phenotypic intelligence will vary. Accordingly, a very different environment, short of one causing brain damage, may lead to noticeable if limited variation.

The second reason, which will lead to far more significant intergenerational differences, is regression to the mean. This is a phenomenon whereby if a variable is extreme on its first measurement, it will tend to be closer to the mean on its second measurement. This is because the test instrument is imperfect, meaning that the correlation between the two measurements is likewise imperfect. To give an example, a child's IQ score might vary between two tests, possibly because he was ill when he took the first test. In genetics, this can mean that, due to the complexity of genetic factors involved, certain parents, occasionally, produce children markedly more or less intelligent than they are, facilitating social movement. Geneticists seem to agree that intelligence is to some extent explained by additive genes. This means that there are many genes working together to produce an individual's intelligence. In that each parent contributes one allele each with regard to each subsection of the overall intelligence of the child, the possible genetic combinations are very large and, as such, there can be relatively big, though ultimately limited, differences in intelligence between parents and children. Big

differences are unlikely and in most cases a child's genotypic intelligence is about the same as their parents' genotypic intelligence, perhaps a little less or a little more (which might imply limited regression to the mean). But with statistically rare but nevertheless possible combinations a child's intelligence can be significantly less or significantly more than either of their parents' intelligence. This is regression to the mean and it explains why genius may come from 'humble origins' or why geniuses may have children who achieve relatively little.

The third reason is a genetic mutation. This may lead to either superior or inferior intelligence.

8. Intelligence and Evolution

We have already discussed the basis of religion in our evolutionary past and accordingly it would be useful to do the same in relation to intelligence. The first point to note is that, as we have seen, there is a case for arguing that high *g* correlates with a high functioning nervous system. In other words, there is an indirect sense in which intelligence measures how well our entire nervous system is working. On average, a person with a high IQ will also have an above-averagely functioning set of motor skills, basic reflexes, memory, reward system and inhibitory system (Nettle, 2007, p.143). Accordingly, intelligence is one of a number of multiple facets that can be reduced to a *g*-like 'high functioning nervous system' which would generally be very useful for survival, though probably more strongly selected for in more challenging ecologies.

Secondly, Lynn and Vanhanen (2012) have set out in detail why superior intelligence, independent of anything else, would be likely to provide those who have it with a survival advantage. They would simply be better at solving life's problems, avoiding

accidents, and otherwise surviving. They would also be better at planning for the future. The more intelligent have lower time preference. From a meta-analysis of 24 studies, low time preference is correlated with intelligence at 0.23 (Shamosh and Gray, 2008). 'Time preference' measures how far into the future a person can be offered a larger reward before they reject the larger reward in favor of a smaller immediate reward. Those with lower time preference can defer the larger reward further, before taking the immediate smaller one, than those with higher time preference.

Lynn (2006) argues that different ecologies select for intelligence to different degrees, with more challenging, colder environments selecting for it, in prehistory, to a greater extent, as evidenced by average IQ differences between population groups evolved to these different environments. Even within these groups, intelligence was selected for over the generations, with intelligence positively predicting completed fertility in pre-industrial societies. Lynn (2011a) maintains that by about 1850, Western societies were ceasing to select in this way, a point we will discuss in more detail in Chapter Ten. We will discuss the 'dysgenics',¹⁰ which Lynn argues this change has led to, in more detail in Chapter Fourteen.

9. Conclusion

In this chapter, we have examined intelligence. We have defined intelligence, following Gottfredson's definition. We have examined the history of intelligence and the hierarchical model of intelligence, as well as IQ tests and the criticisms leveled against them. The arguments against the mainstream definition of

¹⁰ The word 'dysgenics' was originally coined by English physician Caleb Saleeby (1878-1940), seemingly in 1911 (Saleeby, 1911, Ch. 1).

intelligence have been refuted. Most importantly, we have shown that intelligence is a useful predictive category because it permits us to make accurate predictions about people's lives. We have then demonstrated that intelligence is around 0.83 heritable while also examining nuances in this regard such as Regression to the Mean. Finally, we have looked at why intelligence might be selected for, noting that a challenging ecology provides the more intelligent with an even greater than usual selective advantage.

Chapter Five

Defining Personality

- 1. Introduction.*
- 2. Humors.*
- 3. The Big Five.*
- 4. The Science behind the Big Five.*
- 5. Extraversion.*
- 6. Neuroticism.*
- 7. Conscientiousness.*
- 8. Agreeableness.*
- 9. Openness.*
- 10. Openness, Openness-Intellect and Intelligence.*
- 11. Environmental Influence on Personality.*
- 12. Religion and Personality.*
- 13. Educational Success and Personality.*
- 14. Personality and Academic Genius.*
- 15. Religious Academics: An Explanation.*
- 16. Academics and Replacement Religion.*
- 17. Conclusion.*

1. Introduction

Though the focus of this study is on the relationship between religion and intelligence, it would be useful to discuss personality at this stage. This is because an understanding of it is assumed in some of the research looking at the relationship between religion and intelligence which we will examine anon. Equally, as one of our arguments is that religiousness amongst the highly intelligent in modern Western societies can be partly explained by an atypical personality profile, defining 'personality' at this stage is

necessary. We will argue that there is now a wide consensus amongst psychologists that personality can be understood in terms of the 'Big Five' personality variables. These variables exist in everyone and differences in them can be traced back to genetic differences. In most cases, we are also clear regarding which genes are relevant to differences in the strength of these personality factors. We will show that, overall, personality differences are about 0.5 heritable. The other 50% is substantially explained by calibration to other factors during development and by life history events, during development, which are ultimately underpinned by genetics. Having established the nature of personality, we will turn to its influence on religiousness and educational attainment.

2. Humors

Personality is defined as 'the combination of characteristics or qualities that form an individual's distinctive character.' Thus, 'personality' can be seen as a series of variable traits. McAdams and Pals (2006, p.212) emphasize in their definition of personality the centrality of 'unique variation' in 'a developing pattern of dispositional traits.'

Thinkers have long attempted to better comprehend humans by constructing predictive models of personality based around these essential traits. The most well known is the four factor model. This model was first systematized by the Greek physician Hippocrates (460-370 BC). He argued that there were four 'humors' (or temperaments) which corresponded to different kinds of bile: blood, yellow bile, black bile and phlegm. This was developed by Galen (131-200), another physician, who argued that each of the four temperaments had an excess of one particular

kind of bile.¹ He mapped these temperaments onto the Four Elements, arguing that the temperaments corresponded with hot, cold, dry and wet. The balanced personality was the perfect mix of these elements. Galen highlighted the four well-known personality 'humors.' The Sanguine is impulsive and seeks pleasure, the Choleric is aggressive, dominant and full of energy; the Melancholic is introverted, thoughtful and negative while the Phlegmatic is relaxed and unadventurous (see Lynn, 1971, Ch. 1).

Galen's model does not provide us with a method for permitting us to work out what kind of humor a particular person is dominated by. This is effectively left to intuition. The four kinds of personality he presents make intuitive sense and personality descriptions which he provides permit us, to some extent, to assess behavior and categorize.

3. The Big Five

Particularly since the 1920s, psychologists have attempted to add systematic, quantitative rigor to the kinds of models proposed by early scholars such as Galen. The general agreement is that there are five, rather than four, major personality variables. These are now so commonly accepted that they are referred to as the 'Big Five.' The Big Five are not simply intuition-based. They develop logically from research on clear examples of behavior which can be quantified (e.g. Thurstone, 1934; Fiske, 1949 or Tupes and Christal, 1961). Each of these 'Big Five' variables can be conceived of as a spectrum and they are each named after the high extreme of the spectrum which they represent. Thus, for example, 'Extraversion' is the stereotypical high extravert with the person low in Extraversion referred to as an 'Introvert.' As we will see,

¹ See Galen (1991).

each of the Big Five is to a great extent independent of one another. The Five Factors are:

1. *Extraversion*: Those who are outgoing, enthusiastic and active, seek novelty and excitement and experience positive emotions strongly. Those who score low on this express Introversion and are aloof, quiet, independent, cautious and enjoy being alone.

2. *Neuroticism*: Those who are prone to stress, worry and negative emotions and who require order. The opposite are Emotionally Stable and they are better at taking risks.

3. *Conscientiousness*: Organized, directed, hardworking but controlling. The opposite are spontaneous, careless and prone to addiction.

4. *Agreeableness*: Trusting, cooperative and slow to anger. This is contrasted with those who are uncooperative and hostile.

5. *Openness*: Those who are creative, imaginative and open to new ideas. This is contrasted with those who are practical, conventional and less open to new ideas (Nettle 2007, Ch. 1). As we will see, this factor is often termed 'Openness-Intellect.'

It might be argued that the 'Big Five' are too crude to be used as a means of understanding religious differences and that instead 'religion' should be discussed as a factor in itself. But it must be possible to reduce 'religiousness' to psychology and, as religiousness is measured by belief and behavior, differences in it can be reduced to personality and intelligence. Moreover, as we will now see, these five factors are not crude but can themselves be reduced to biology.

4. The Science behind the Big Five

With regard to Extraversion, surveys have found that some people like to have a lot of sex and will put a great deal of energy into seeking out people with whom to have sex. Others are far less interested in sex. There are, of course, many possible explanations regarding why some people are more interested in sex than others. But research, with a mixed sample of 545, has also found that the same people who are interested in sex are also interested in travelling. They holiday and otherwise travel more than those who are not interested in sex and they are more competitive. Specifically, Nettle (2007, p.23) found that the correlation between competitiveness and liking to travel was 0.12, between socializing and travel it was 0.2, between socializing and competition it was 0.11 and between socializing and enjoying sex it was 0.25. All of these activities inter-correlated with a positive correlation of at least 0.1, with the highest correlations being with enjoyment of relatively frequent sex.

It could be argued that there is no one personality characteristic underpinning this statistically significant association. Perhaps people who travel more simply meet more people and thus have more sex. But the associations do not end there. As we have noted, the same people who are interested in sex and travelling are also more interested in socializing and are more competitive. Perhaps it could be argued that all interests and aspects of character are significantly related in some way but this is not the case. There is no relationship between being interested in these things and suffering from or not suffering from depression. Nettle (2007, p.23) reports that those who reported depression or anxiety (correlating with each other at 0.85) correlated with those who enjoyed social activities 0.01, with those who enjoyed travel at - 0.11, with those who enjoyed

competition at -0.09, and with those interested in sex at 0.17. These generally insignificant or weak correlations indicate that some people who are interested in these things have depressive episodes while others do not. Accordingly, this implies that there is a separate mechanism that underpins whether or not you are depressive and that, as such, we require at least two variables to explain human personality. It also implies that making this division permits successful predictions to be made about people: a person high in Extraversion will be interested in sex, travel and competition while a person low in it will not be (see Nettle, 2005a). But what this very brief summary of the research indicates is that there is a variable which underpins what seems like 'getting a lot out of life' and another which independently underpins negative feelings and this is what surveys into personality lead psychologists to conclude. The two variables are termed 'Extraversion' and 'Neuroticism.' Evidently, the variables permit successful predictions to be made about the interests of a person and how they will react to a given situation.

But, why *five* traits? Science aims to answer questions as parsimoniously as possible. Cattell (1943), for example, suggested 16 personality traits but many of these, it has been found, can be factored down to broader ones without damaging the predictive validity of the model. For example, the various statistically significant associations in the personality research that are put down to 'warmth' are also significantly positively correlated with those that can be explained as 'sensitivity,' meaning that we can reduce these to one trait. Likewise, Eysenck (1967) suggested three personality factors: Extraversion, Neuroticism and Psychoticism. The first two are already part of the Big Five. Psychoticism seems to combine low Agreeableness and low Conscientiousness. But the problem with this combination is that many psychologists have concluded that Agreeableness and

Conscientiousness appear to work independently of each other (e.g. Fiske, 1949) which implies that there are separate factors underpinning the two. For Eysenck, creativity (to some extent 'Openness') is a byproduct of a specific balance of Psychoticism: those who are high in Conscientiousness but low in Agreeableness. But the problem with this view is that more research has demonstrated that Openness operates substantially independently of Agreeableness and Conscientiousness (see below). Being high in Openness is not significantly correlated with either of these factors. Being a genius may well involve a narrow balance of these factors, as Eysenck (1994) argues, but that is another matter and, again, one which we will discuss below. So, we can draw upon Eysenck by separating out Psychoticism and adding Openness.

There are many criticisms of this kind of research but they can be answered. Firstly, it is pointed out that people's personalities change during their lifespan. This is true, to some extent, before they are fully grown. As they grow up, for various reasons that we will explore later, they may change in terms of their place on the spectrum of each variable. But once people are grown-up, their personality tends to be fairly stable. Indeed, researchers have used the same adult sample to repeat a personality test after six days and then after six years and found that people's scores are substantially the same, with a correlation of between 0.68 and 0.85 (e.g. Costa, McCrae and Arenberg, 1980).

Secondly, it has been suggested that the Big Five do not allow us to make predictions. However, the Big Five permit us to make successful predictions with regard to Life History and accordingly the results are meaningful and have significant consequences (e.g. Headley and Weavering, 1989). For example, research which began in the 1930s indicates that people high in

Neuroticism are far more likely to divorce than those low in it (Johnson et al., 2004). Couples where one is high in Neuroticism will, in old age, report that their marriages are less happy than couples do when neither is high in Neuroticism. It was also found that low male Conscientiousness, at a time when men were the main breadwinners, was a high predictor of divorce (Kelly and Connely, 1987). The 'Termites' were a cohort of 1500 Americans of above average intelligence first surveyed in 1921 and then finally in 1991 (Friedman et al., 1993). Drawing upon them, it was found that Extraversion, independent of any other factor, was a predictor of early death, increasing the risk three-fold. This is presumably because, as Nettle (2007, Ch. 1) notes, extraverts are more interested than introverts in activities that involve risk. Likewise, low Conscientiousness was a strong predictor of early death, presumably because such people were more likely to smoke, drink and overeat.²

Thirdly, it is suggested the Big Five are not grounded in science. However, the Big Five can be grounded in research in biology, the science which ultimately underpins psychology. Accordingly, in Wilson's (1998) terms, they are 'consilient.' Scientists have been able to identify the specific parts of the brain which control emotion. These are the amygdala, the anterior cingulate cortex, the nucleus accumbens and parts of the prefrontal cortex (e.g. Bouchard and Loehlin, 2001 or Canli, 2004). Differences in the structure and workings of these parts of the brain can be traced to inherited, genetic differences and,

² It is, of course, possible to be high in Conscientiousness and yet overweight or even alcoholic. Sutin et al. (2011) found that those who are high in Neuroticism are more likely to binge eat and thus dramatically gain and lose weight. They are also more likely to binge drink. Extraversion, and consequently strongly enjoying food and alcohol, is also a risk in these regards. But, in general, high Conscientiousness will limit the extent of such reactions.

moreover, differences in these parts of the brain significantly correlate with differences in terms of the Big Five personality factors, as we will see in more detail below. At least half of the variation, depending on the specific factor in question, can be put down to genetics (see Nettle, 2007, Ch. 1).

Fourthly, critics argue that even if these variations exist, we are all human and we will all react in the same way assuming that we are 'normal' humans. This may be true of obvious situations. Almost all of us will run away if we are being chased by a swarm of angry bees. But everyday life does not involve many of these situations. It involves weaker, less obvious situations and it is here that personality will come into to play. For example, if you are crossing the road and you can see a car coming towards you, how close to you does it have to be before you decide that it's too dangerous to cross the road? Or, how many annoying things need to happen to you before you lose your temper? People differ both in how easily and how strongly these five different mechanisms are set off. And these little differences have significant consequences. For example, a person who is low in Agreeableness might have one extra fight per day than an averagely agreeable person. But over a year, this adds up to a lot more fighting and will have clear consequences for how they live. It will probably be self-perpetuating because people will be unfriendly to this person, making a fight even more likely, so he will get into even more fights.

Fifthly, Digman (1997) insists that the Big Five can be reduced to just two. These are 'Stability' (high Agreeableness, high Conscientiousness and low Neuroticism) and Plasticity (high Extraversion and high Openness). He observes that the factors within these broader traits tend to correlate to some extent, perhaps for environmental reasons (which we will discuss below). However, even he concedes that using the Five Factor Model or

his Two Factor Model ultimately becomes a matter of taste.³ Accordingly, I will draw upon the more widely accepted Five Factors. Moreover, I would emphasize that two factors does not help us to take into account that some people are low in Agreeableness but high in Conscientiousness. As such, it risks oversimplification. And, as we will see, the Five Factors can be biologically explained separately which further evidences the usefulness of dividing into five factors. Perhaps it is a matter of taste, but intuitively the black and whiteness involved in using just two variables seems to me less problematic if we can justify five, which it seems we can. So, having demonstrated that the Big Five are justifiable, let us examine each of them in turn.

5. Extraversion

The word 'extravert' was coined by Swiss psychologist Carl Jung (1875-1961) (Jung, 1923). It is commonly understood to mean one who is sociable and outgoing. However, this is not how psychologists are employing it. It is not about getting on with people, because people we see as extraverts can be very low in Agreeableness, and neither is it about lacking shyness because shyness relates to Neuroticism. Rather, it relates to strongly experiencing positive emotions such as joy, enthusiasm and excitement. Extraverts feel positive feelings more strongly than do introverts who, at the extreme, experience anhedonia; the pathological inability to feel a sense of enjoyment. Strongly feeling positive emotion motivates extraverts. For example, experiments have shown that when extraverts are asked to write about positive subjects, their mood remains positive for longer afterwards than it does with introverts (e.g. Costa and McCrae, 1980). This implies that they are more affected by the induced

³ Alternatively, Brand (1994a/b) suggests six factors.

positive mood. However, similar experiments have shown no significant differences between how extraverts and introverts react to distressing photographs (Diener and Emmons, 1985). This implies that a different, independent factor predicts the strength of negative emotion and this, as we will see in more detail below, is Neuroticism.

MRI Scans (Magnetic Resonance Imaging scans which permit structures of the body to be observed in detail) have demonstrated that there is increased activity in the part of the midbrain that releases dopamine (a release of which induces positive mood) in extraverts compared to introverts when they are both shown a positive image (Canli, 2004 or Schultz, 1992). In turn, the dopamine circuits are controlled by the D4DR gene. The D4DR gene has many different forms. All have 48 pairs of DNA bases but on some of the forms these repeat as many as eleven times and on others as few as two. We each have a copy from each of our parents. Those with one or more copies of the long form are more extraverted (Ebstein, 1996). So, genetic differences in brain architecture underpin the extent to which a person is an extravert. Studies have consistently found that women score higher in Extraversion than men (see Bertrand, 2010, p.1561).

In terms of the evolution of this personality characteristic, it is widely accepted that where a local environment is unstable or depleted, the population will move towards Extraversion. These characteristics incline people to explore and gain pleasure from successfully doing so and they will need to do so to obtain food. However, in a more stable environment, that can be better predicted, introversion tends to be of greater survival value because Extraversion will involve taking unnecessary risks and will threaten stability (e.g. Nettle, 2007, Ch. 2).

6. Neuroticism

Neuroticism is the opposite of Extraversion in that it involves strongly experiencing negative emotions. Many of these, of course, all have adaptational utility because they force us to detect and avoid that which will do us harm. Anxiety means we search our environment for problems and hazards, trying to better understand and control it. Disgust means we avoid that which may make us ill or otherwise reproductively unfit. Fear means that we avoid danger. Shame and guilt mean we avoid the specific danger of ostracism. Sadness may be useful as an energy-saving withdrawal from a stressful situation, which permits us to better comprehend why the situation has occurred (e.g. Nesse, 2000). It would be of adaptive use to over-feel these negative feelings because they are so successful in helping us to avoid danger. In prehistory, those who were too low in Neuroticism would have been killed by animals, poisoned, or expelled from the band. The different negative emotions involved in Neuroticism correlate together at about 0.5 (Fowles and Dindo, 2007, p.23). Even emotions such as anger and jealousy might be regarded as motivational and of use in pre-history.

Those people who score highly in Neuroticism show a much more pronounced increase in negative mood when they watch something sad (Larsen and Ketelaar, 1991). They are more responsive to negative stimuli. MRI Scans indicate that Neuroticism is predicted by differences in the amygdala and limbic system. When these parts of the brain are damaged people are less able to understand that something is unacceptably risky or less able to experience fear (e.g. Whittle et al., 2006). Extreme Neuroticism is strongly associated (0.85) with developing depression (e.g. Watson and Clark, 1988). Those who are highly neurotic tend to have the short form of a gene which regulates the

removal of the neurotransmitter serotonin: 5HTT. Having the short form means that serotonin, which contributes to feeling positive, is produced less (Nettle, 2005b, Ch. 5). Depression, like each of the personality factors, has a strong genetic component and is a stable personality problem by adolescence in that 80% of people who have one depressive episode sufficiently severe to require treatment will have another later in their lives (Nettle, 2007, Ch. 3).

In general, the form that high Neuroticism takes will depend on whether a person is extravert or introvert. Introverted Neuroticism is associated with depression while extraverted Neuroticism is associated with anxiety (Nettle, 2007, Ch. 3). Either way, independent of other influences that may mitigate against this, Neurotics will worry more about themselves, as well as about others, which can lead to an unstable sense of identity, and even borderline personality disorder (e.g. Widiger et al., 1994). There is a weak positive correlation (about 0.1) between Neuroticism and professional achievement (e.g. Costa, McCrae and Kay, 1995) and achieving a good degree at university (McKenzie et al., 2000) which is about 0.2. Also, there is an (anecdotal) strong positive correlation between high Neuroticism and artistic achievement, as evidenced by a strong association between artistic tendencies and depression (e.g. Andreasen, 1987). It might be argued that Neurotics are motivated towards achievement through fear of not achieving, by a kind of artistic therapy, and by a feeling that the world is not right or does not make sense as it is. Studies have consistently found that women are higher in Neuroticism than men (see Bertrand, 2010, p.1561). Neuroticism is more useful in a harsh, difficult environment in which group co-operation is particularly necessary. In a less harsh environment, such people would be unnecessarily concerned

about non-existent dangers and would be less able to compete accordingly.

7. Conscientiousness

Bechara's (1994) experiments have demonstrated that if certain specific parts of the brain are damaged, the victims become impulsive, lazy and reckless. In essence, the degree to which they are inhibited in their behavior decreases while all other aspects of their behavior remain very similar. This, taken with other evidence, which we will discuss, demonstrates that it is useful to conceive of Conscientiousness - or impulse inhibition - as a distinct personality variable.

Those who are low in Conscientiousness are more likely to become addicts to anything, ranging from alcohol to gambling. Cannabis addicts show a six-fold increase in the likelihood of becoming addicted to alcohol; alcohol abusers show a four-fold increase in the likelihood of nicotine addiction. Addictions such as alcoholism, compulsive gambling and smoking tend to come in clusters and can be observed in the same families with, for example, alcoholics having relatives who are problem gamblers. In addition, this clustering is weakly correlated with anti-social personality disorder, where the impulsiveness shows up in criminality. Bingeing positively correlates with Neuroticism (e.g. Svensson and Wilson, 2002) and Extraversion predicts gaining pleasure from alcohol or food for example, but it is low Conscientiousness which is the most significant predictor of addiction (e.g. Slutske et al., 2005). In a summary of the literature, King and Trent (2013, p.206) observe that though different personality trait profiles differentially predict addiction to different drugs, low Conscientiousness is part of all such profiles. An Extravert will be attracted to socializing and to alcohol, but if

he is also Conscientious he will be aware of the negative consequences of becoming an alcoholic (or having a hangover) and he will be able to stop himself; his inhibitory mechanism will hit in (e.g. Volkow and Fowler, 2000).⁴ Low Conscientiousness is also associated with ADD (Attention Deficit Disorder) (e.g. Ranseen et al., 1998 or Nigg et al., 2002).

The part of the brain involved in inhibitory response is called the dorsolateral. According to MRI Scans, those who are the least impulsive had the largest dorsolateral areas (Asahi et al., 2004). Unsurprisingly, being Conscientious is highly correlated (0.82) with being successful at work, at least in advanced societies (Barrick and Mount, 1991). However, it should be emphasized that Conscientiousness is clearly distinct from intelligence. There is some evidence of a significant but weak negative correlation between intelligence and Conscientiousness (ranging from -0.1 to -0.2 depending on the intelligence measure compared). This may be explained by intelligent but moderately Conscientious people realizing that they can just coast through on their intelligence (see Moutafi, Furnham and Paltiel, 2005). Equally, it might be explained by the positive correlation between intelligence and Openness, one of the measures of which is 'impulsive non-conformity' (see below).

There can be a negative side to extreme Conscientiousness. The highly conscientious person is inhibited in his impulsive responses, making him hardworking and rule-following. This is why extreme Conscientiousness can be crippling, manifesting itself in Obsessive Personality Compulsive Disorder (OPCD), a condition which is marked by an obsession with rules, lists, order and plans and an inability to simply relax. Very high

⁴ Neuroticism, and high stress especially, also elevates the risk of such behavior, but the studies indicate that low Conscientiousness is the largest single factor (see Svensson and Wilson, 2002).

Conscientiousness can also be marked by perfectionism, which can make people slower and thus less productive (e.g. Widiger et al., 1994). As with the other factors discussed, high and low Conscientiousness would be of differing survival values in different ecologies. A stable, predictable but harsh environment - in which lack of Conscientiousness could get you killed - would select in favor of Conscientiousness. An unstable, ever-changing environment in which people have to suddenly react, such as many hotter hunter-gatherer environments, would mean that there was less use in being Conscientious, meaning that mutant genes for Conscientiousness would be less likely to spread (Nettle, 2007, Ch. 5). Women have been found to be higher in Conscientiousness than men (see Kling et al., 2012).

8. Agreeableness

Agreeableness is generally used as a synonym for altruism. It refers those who are soft-hearted, trusting, generous, acquiescent, lenient and good-natured (Lynn, 2001, pp.111-112). This trait also correlates with 'theory of mind' or 'empathy' at around 0.4, where it correlates with other personality factors at between -0.1 and 0.1 (Nettle and Liddle, 2008). Those who are low in Agreeableness and empathy are known, when this trait is combined with low Conscientiousness, as psychopaths. Those who are simply low in empathy are known as autistics. Most autistics are 'low-functioning', meaning they have low IQs. 'High-functioning autistics' (with high IQs) suffer from Asperger Syndrome (see Baron-Cohen, 2008). Baron-Cohen's (Baron-Cohen et al., 1985) research has indicated that autistics are distinguished by an inability to represent the feelings of others. They are less able than average to imagine what it is like to be somebody else and they are less able to work out how other people are feeling. Research

by Nettle and Liddle (2007) has found direct consequences to this: children who have a more developed theory of mind actually have more friends. But, of course, they might use these friends for their own purposes and not really care about them. So, the difference between a psychopath and a high functioning autistic is that a psychopath may have high theory of mind but the feelings of others do not affect him (he has low Agreeableness). The high functioning autistic may be moved by the feelings of others but he finds it difficult to understand what they are.

The person who is too high in Agreeableness is at risk of Dependent Personality Disorder in which she (for it is more common amongst females) sacrifices her own happiness for the good of somebody else (Widiger et al., 1994). Studies have consistently found that women are on average higher in Agreeableness than men (e.g. Costa et al., 2001).

In terms of evolution, an environment that requires complex group interaction and thus relatively large groups will be likely to select more strongly in favor of Agreeableness. In an environment of highly agreeable people, a lone psychopath is likely to do very well, and have many offspring, and as such there will likely be oscillations in Agreeableness. But, in general, a particularly difficult environment would be the most conducive to the development of Agreeableness (e.g. Maynard Smith, 1982). There is evidence that creative people, however, tend to be more successful if they are low in Agreeableness (Nettle, 2007, Ch. 6). This may be because a selfish person is more willing to promote themselves. But it may also be because a person low in Agreeableness is happier to challenge convention, which creative, original acts tend to involve doing. Low in Agreeableness, he does not care if his originality hurts the feelings of others. This is an important point about creativity to which we will return later.

9. Openness

Openness is perhaps the most controversial of the Big Five. As we have discussed, it is the newest, and widely regarded personality psychologists, such as Hans Eysenck (1916-1997), did not employ it. In essence, it is a factor that is at work in artistic, cultural and scientific originality but it is distinct from low Agreeableness. Being low in Agreeableness may mean that the budding artist is not concerned about whether his paintings offend but it won't necessarily mean that his paintings are strikingly original. This is predicted by Openness.

Openness includes a constellation of traits such as openness to new ideas and values, aesthetic and artistic sensibility, unusual or original thought patterns and psychological experiences, perceptiveness, the ability to become absorbed (and so hypnotizability) and fantasy. It is sometimes termed 'creativity,' but this is a simplification. Batey and Furnham (2008) found that 'unusual experiences' are positively correlated with creativity at 0.29. Overall, they found that Openness is correlated with creativity at about 0.75, implying that other factors, such as low Agreeableness, are relevant. The Openness measures correlate to varying degrees with each other (average 0.28) but correlate more weakly, or not all, with measures that we would place under the umbrella of different traits. So, we have sound reason to conceive of Openness as a separate domain.

The artistic are generally conceived of as the height of Openness (e.g. McCrae, 1987). In general, artistic achievement is widely understood to be characterized by original and unusual metaphor, challenging social norms, a strong sense of spirituality (often conceiving of some mystical force behind the universe) and finally by psychosis, especially evidence of hallucination (e.g. Costa, McCrae and Holland, 1984). There are high rates of mental

illness amongst artists as well as amongst poets (e.g. Claridge, 1997 or Nettle, 2006c). This is often depression, which is associated with Neuroticism (e.g. Matthews, 2000, p.726), but many also seem to have episodes which involve psychosis, and in particular hallucination.⁵ Indeed, evidence of Openness early in life significantly predicts severe mental illness as an adult (Claridge et al., 1997).

Of course, Openness is not the same thing as schizophrenia. This is not associated with being artistically successful because it is debilitating. Rather, whereas we have used spectrums ranging from Extraversion to Introversion and from recklessly fearless to highly Neurotic, psychologists have broadly agreed on a spectrum which ranges from 'normal' to 'schizophrenia.' This scale is termed schizotypy. On this spectrum can be placed those who have some aspects of schizophrenia - such as hearing voices - but who do not evidence the more crippling dimensions of the condition and can otherwise function normally. Schizotypy is not a unitary phenomenon but is composed of four distinct dimensions: anhedonia, cognitive disorganization, unusual experiences, and impulsive non-conformity. There is debate over whether 'impulsive non-conformity' is within the purview of schizotypy, though many conclude that it is (e.g. Claridge, 2006, p.153). So, high Openness would involve an optimum placing on this spectrum in relation to one or more of its traits.

Schizophrenia has a strong hereditary component. About 60% of monozygotic twins raised apart both develop it if one

⁵ Goodwin and Jamison's (2007, pp.384-385) meta-analysis of ten studies showed that the majority of eminent artists and poets have psychological abnormalities and, in a minority of cases, these involve psychosis. For example, Jamison's (1993) analysis of anthologized British and Irish poets found that 22% had suffered from psychosis and 17% had been committed to a mental hospital at least once.

does, compared to 20% amongst dizygotic twins raised apart, and research indicates that those high in schizotypy often have relatives who are schizophrenic (Nettle, 2006c). This provides further evidence that it is most useful to conceive of a schizotypy continuum in which those at the extreme are substantially incapable of artistic achievement but those with some symptoms are aided in their creativity. But in terms of understanding Openness and creativity, it is 'unusual experiences' that are the most relevant symptom. Surveys indicate, for example, that accomplished poets score as highly on unusual experiences as schizophrenics (e.g. Rawlings and Freeman, 1997).

Equally, those high in unusual experiences often tend to have highly idiosyncratic beliefs, can concentrate to an extreme degree (becoming utterly absorbed in their work), and are highly susceptible to hypnosis, the essence of which can be intense concentration (e.g. McCrae and Costa, 1987). They are drawn to investigations and professions which eschew convention and they have much higher scores than average in terms of divergent thinking (e.g. Burch et al., 2006). A typical divergent thinking test will ask people to come up with as many uses as they can for a mundane item, such as a brick. The person who is high in Openness will come up with many bizarre and fascinating possibilities: he is better at associating things which do not appear to be associated and this is how unusual beliefs are arrived at. Obviously, the stereotypically 'open' or 'creative' type is the artist, but scientific achievement also involves divergent thinking, especially when it comes to suggesting new models and theories. This is why Darwin's idea that humans are evolved from apes and that all species are constantly evolving seemed so bizarre in 1859 and was widely ridiculed (see Ellegård, 1990). Research into highly original scientists, such as Einstein and Newton, indicates evidence of schizotypy personality type (e.g. Simonton, 1988).

Adelstein et al. (2011) argue that specific brain architecture predicts aspects of Openness, although others argue that such architecture is yet to be convincingly highlighted (e.g. Nettle, 2007).

In terms of ecology and schizotypy, there are clear benefits to creative people. They are more likely to invent useful things and being artistic would thus evidence such creativity, rendering such a person an attractive mate. Nettle (2007) and others such as Lynn (2006) have argued that there is a certain cost-reward ecological balance which selects in favor of or against Openness. In any ecology, creativity would be useful but the drawback would be impractical, delusional people. In an extremely difficult ecology, it might be suggested that such a drawback would be intolerable and accordingly Openness would not be selected for; though presumably a certain level of it would exist to have worked out how to survive in such an ecology in the first place. Conversely, in a relatively unchallenging environment there would be less selection pressure against Openness. The creativity it unleashes would be a selective advantage while the delusional people it also leads to would be less damaging to the group, so you might expect high levels of Openness. As such, an even less challenging ecology might see high levels of schizophrenia. But, as we have discussed, Openness is not exactly the same as artistic achievement. This seems to mix Openness and low Agreeableness, as well, of course, as intelligence to a certain extent (see Feist, 1998). Studies have consistently found that women are higher, in general, in Openness than men (see Bertrand, 2010, p.1561).

10. Openness, Openness-Intellect and Intelligence

DeYoung et al. (2012) argue that we should divide Openness in two, in this instance into Openness (creativity) and Intellect (which has much in common with intelligence) and they term this Openness-Intellect. DeYoung et al. (2012), in an article entitled 'From Madness to Genius,' conceive of a simplex which integrates intelligence with 'positive schizotypy.' DeYoung et al.'s factor analysis found that Openness can be reduced to two factors. These are Intellect (e.g. 'Avoid philosophical discussions' - reversed) and Openness (Aesthetics: 'See beauty in things others might not'; Fantasy: 'Seldom daydream' - reversed). They argue that as the correlation between aspects of Openness-Intellect is only 0.3, the entire domain has the potential to be a facet of intelligence. This is especially so as some items of 'Intellect' cross-over with intelligence.

Openness-Intellect correlates to a greater extent with intelligence than any other personality factor. Nusbaum and Silva (2011) have observed that the more aesthetic, fantasy oriented aspects of Openness significantly correlate with creativity (at about 0.75) but not with fluid intelligence. By contrast, the intellectual aspects (such as openness to experience) significantly correlate with fluid intelligence (at 0.3) but not with creativity. Openness, as distinct from Intellect, consistently weakly correlates, around 0.26 (Leary and Hoyle, 2009, p.258), with verbal intelligence, which is closer to crystallized intelligence (see DeYoung, In Press). However, DeYoung (In Press) has criticized the distinction between 'fluid' and 'crystallized' intelligence. He argues that non-verbal intelligence is not entirely fluid and nor is verbal intelligence entirely crystallized, both being genetically and environmentally influenced. As such, Openness-Intellect may have validity as a proxy measure of intelligence. Indeed,

DeYoung et al. (In Press) found, based on two samples (n125, n189), a correlation, averaging the two studies, of 0.34 between Openness-Intellect and *g*, 0.17 between Openness-Intellect and non-verbal intelligence and 0.37 with verbal intelligence. Intellect itself correlated with verbal intelligence at 0.24. This research implies that Openness-Intellect and intelligence are underpinned by one factor and it explains the significant correlation between Openness-Intellect and intelligence in a way that contrary research does not; both dimensions correlate with verbal intelligence. It is also highlights the usefulness of distinguishing between Openness and Intellect while also employing them as one factor.

Understanding Openness-Intellect is a matter of ongoing debate and it would be beyond the parameters of this study to pursue it any further. However, I would suggest that there is a sound case both for distinguishing between Openness and Intellect (and thus terming the factor Openness-Intellect), and for arguing that intelligence may be a facet of Openness-Intellect. Indeed, meta-analyses tend to agree that Openness-Intellect correlates with intelligence at 0.3 (e.g. Kanazawa, 2012). Criticisms of such a stance include that intelligence test scores reflect maximal performance while personality tests reflect typical behavior. But it can be countered that Big Five assessments do sometimes involve maximal performance, as in avoiding distraction in Conscientiousness.

11. Environmental Influence on Personality

At a conservative estimate personality is about 0.5 heritable and this is true of each of the Big Five (see Nettle, 2007 or Jang et al., 1996). But what are the environmental differences which explain variation in personality?

The environmentalists seem to believe that factors such as childhood environment influence future personality. They argue that environment affects a person's fundamental way of being, because this is what personality can be understood to mean. There is a degree to which an individual's personality undergoes change until they have gone through adolescence, after which it tends to be more stable (e.g. Soto et al., 2011). There is an estimated correlation of between 0.3 and 0.6 between childhood personality and personality at adolescence and a correlation of between 0.6 and 0.8 between adolescent personality and personality over the age of 30 (Costa and McCrae, 1989). Indeed, if, for example, a person is so highly Neurotic that they are prone to depression then this is likely to first manifest itself in adolescence.

Nevertheless, the research indicates that childhood environment has zero influence on people's personalities. It will influence their life narrative, the conditioning involved in it may superficially influence their tastes, but it will not have any influence on how Conscientious, Open, Agreeable, Extravert or Neurotic they are. Studies of adopted children have found that their personalities are more inclined to resemble those of their biological parents than those of their adopted parents. Willerman et al. (1992) tested adoptees for psychopathic tendencies and found that they were far closer to their biological mothers than their adoptive mothers, by a factor of 3. Also, Loehlin et al. (1987) found that there is no statistically significant correlation with regard to personality characteristics of biologically unrelated, adopted siblings or between those adopted children and their adoptive parents (see also Eaves et al., 1989). Buss and Plomin (1984) show that inherited personality traits are evident in childhood. Buss and Plomin state that these temperaments show continuity through the lifespan. However, they are not perfectly stable as genes do not operate continuously but switch on and off

during development, and temperament can be modified by experience.

If the environmentalists were correct, then unrelated children who were adopted by the same parents and reared in the same environment would be more similar to each other than twins (or identical or non-identical) who were separated when very young and adopted by different parents. But the opposite is true. It is those who are biologically related who are similar. The adopted children show no evidence at all of being more similar by the time they are adults. This means that the influence of childhood environment - and how you are treated by your parents - on personality is zero, at least in the kind of fairly stable families that are tested in these studies. Parental influence will, of course, affect a person's life and conditioning but it does not affect their essential way of being. This may not be quite so clear-cut if the childhood is highly abusive, but this would only be because of issues such as brain damage caused by the abuse.

Environmentalist notions of personality should accordingly be explicable in terms of genetics. One environmentalist notion is that only-children are selfish and this tendency develops because they do not learn to share when they are children. An alternative explanation is that people who are high in Neuroticism and Conscientiousness will (when controlling for other personality factors and when there is a safe environment in which large families are not necessary) have fewer children and the only-child whom they do have may inherit their high levels of Neuroticism and Conscientiousness. Their desire for control and fear that other children may damage their toys, for example, may make them disinclined to share, leading to the accusation of selfishness. Likewise, being from a broken home is seen to be a predictor of getting divorced yourself in adulthood because you lack a stable family role model. However, a genetic explanation would be that

people are more likely to divorce if they are high in Neuroticism, low in Agreeableness and low in Conscientiousness. If they have children, they pass these predictors of getting divorced onto them, meaning that their children will be more likely to get divorced.

So, if childhood does not explain the 50% environmental influence, what does? One possibility is gene by gene interaction. Thus, a child who is highly Neurotic and happens to experience something traumatic in their childhood home (which may be more likely to happen anyway because their parents and siblings are more likely to be highly Neurotic) will react to that event far more strongly than his less Neurotic sister and this will influence his developing personality, perhaps towards even stronger Neuroticism. But, this, of course, does not explain how identical twins - who are genetically the same and have the same childhood environment - still have different personalities. Another possibility is age. The same traumatic event in the family will affect a two year old differently from a five year old. But this is a problem because twins are experiencing the same traumas at the same age. So, we really can rule out family.

Another possibility is that the condition of the mother during pregnancy has some influence on personality. It is a possibility that part of human evolutionary adaptation includes an ability to adapt and moderate personality to a perceived environment. Nettle (2007, p.220) notes that a water flea called the daphnia sometimes develops a crest, useful against predators, and sometimes does not. When these fleas hatch in an environment in which there are many predators, they grow crests. But they also do so in an environment in which there are no predators (which makes the adaptation costly) but in which there were predators when they were gestating. It seems that chemicals from the excrement of the predators, having left traces in the water, are what make the difference. It follows that built into adaptation is the possibility of

responding to environmental influence during the very early stages of development. In rats, stressed mothers produce infants who are more Neurotic and they remain so into adulthood (e.g. Patin et al., 2005). This means that stress hormones indicate to the developing rat that there is danger, producing a more Neurotic character, more able to survive danger. There is some, albeit unconfirmed evidence, of similar effects in humans (see Nettle, 2007, p.223). There is also evidence that the season in which the child is born influences personality. Children born in autumn and winter score more highly, as adults, on tests of novelty-seeking than those born in spring or summer (Chotai et al., 2002 and 2003). One possible explanation is that children born after the harvest are more likely to survive, or at least they were in pre-modern times. These babies may even now be receiving indications of good health meaning exploration - and Extraversion - are thus less risky (see Lummaa et al., 1998). These are epigenetic changes: the DNA is not fundamentally altered but it is expressed differently due to an affect early in development. Interestingly, there is some evidence of these epigenetic changes in other areas actually lasting more than one generation (Kaati et al., 2002).

The final possible explanation is simply that what a person is like in respects other than character also influences their character. Accordingly, as we develop, we may calibrate our personalities in response to our intelligence, health, physical size and looks. There is evidence that this is precisely what occurs. We have already noted that there is a weak negative correlation between Conscientiousness and intelligence. This implies that the person who has developed, and understands themselves perhaps, realizes that they are intelligent and this means that they do not need to work as hard or follow the rules. It also implies the opposite. People who are lower in intelligence learn to be more

conscientious in order to compensate for their relative intellectual disability.

Likewise, facially symmetrical - in other words good-looking - individuals are higher than average in Extraversion (Fink et al., 2005). These people are seen as 'good-looking' because facial symmetry is the essence of beauty (e.g. Grammer and Thornhill, 1983). Their facial symmetry implies that they have not been affected by mutant (almost always damaging) genes and they are therefore healthier, which, indeed, they usually are.⁶ Extraversion involves enjoying rewards but also taking risks. If one is physically healthy and if other people react well to you, it makes sense that it would be safer to take more risks. For men, Extraversion also increases with size (Faith et al., 2001). This is presumably for the same reasons as the association with good looks. But, in addition, taller men are found more attractive and they can look after themselves better in fights, again meaning that they will be more confident to take more risks, getting more out of doing so. Accordingly, it makes sense that they may become slightly more Extravert. Interestingly, Faith et al.'s research indicates that it is specifically teenage male height that makes the difference in Extraversion, implying, as a teenager is still developing, that height influences the development of adult personality. A late growth spurt makes no difference.

This all means that just as the body will react to unpredictable events in childhood - by varying a height genotype within various parameters, for example - the developing brain, within genotypic parameters, will do the same. Once children, even identical twins, go to school they will have various

⁶ Research indicates that symmetry is also essential to an attractive body. With regard to both face and body there are, of course, many factors other than just symmetry involved in being attractive. These tend to vary by gender (e.g. Dixson et al., 2010).

unpredictable experiences and their personalities will respond to these but they can only do so within a genotypic limitation, which explains their essential personality disposition. These genetic dispositions permit an upper and lower limit in terms of their phenotypic expression. This is affected by environment and, in particular, a person's reaction to their intelligence, looks and build, as they develop, as well as to random events up until they are fully developed. They will react to these using their disposition but there is a degree to which their life history, and thus the events, will also be predicted by that disposition, as we have discussed. There is, it should be emphasized, a growing body of evidence that environmental factors, such as stress and the use of certain drugs, can lead to psychosis, but this is generally amongst people with the underlying personality characteristics that would make this more likely anyway.⁷

12. Religion and Personality

The focus of this study is the relationship between intelligence and religion, but we will argue that the apparent paradox of some highly intelligent people being more religious than those who are less intelligent than them can be explained, in part, by either possessing a particularly potent personality trait profile which inclines them towards or away from religion. Thus, a highly intelligent person with a potent personality trait profile could be more religious than a less intelligent one. Alternatively, a person of low intelligence with the opposite personality trait profile could be less religious than a person of higher intelligence,⁸ even if the

⁷ E.g. Myin-Germeys (2012).

⁸ Lynn (2011a, Ch. 12) finds that those of the lowest socioeconomic strata tend not only to be low in intelligence but also low in Conscientiousness. This could lead to a situation where some members of this strata have relatively low

general trend is an inverse relationship between intelligence and religiousness.

The paradox of academics, who we would expect to be, relatively, of very high intelligence, sometimes being more religious than those who are less intelligent than them can be explained by this. And this is not mere speculation. The personality factors which predict religiousness predict academic success, at least up to a point, as well. Saroglou's (2002) meta-analysis concludes that Agreeableness and Conscientiousness predict religiousness. The results from Neuroticism and Openness are more nuanced. Extraversion has no effect. None of the differences in correlation in this meta-analysis quoted below were statistically significantly different.

Firstly, high Agreeableness is strongly associated with being religious. Francis et al. (2009) examined Christianity, paranormal belief and personality among 2950 13- to 16-year-old pupils in England and Wales. They found that those with a positive attitude to Christianity (the dominant religion) were low in psychoticism and high in social conformity. This implies high Conscientiousness and Agreeableness. Hills et al. (2004) drew upon 400 British undergraduates to look at who were the most religiously-oriented and religiously involved. They found that the more religious are low in terms of psychoticism (low Agreeableness). Francis (1993) argues based on an analysis of college students in the UK, that there is an inverse relationship between psychoticism (meaning low Agreeableness) and religiousness. Michael Eysenck (1998) concurs, based on a meta-analysis. Francis and Bourke (2003) gave Cattell's personality test to 1070 secondary school pupils in a Christian country. They

intelligence but have such pronounced irreligious personality characteristics that they are less religious than some people who have higher intelligence than them.

found that a positive attitude towards Christianity is associated with conformity, tender-mindedness (Agreeableness) and self-discipline (Conscientiousness). Indeed, in a review of the literature, Beit-Hallahmi and Argyle (1997) found that high religiousness, controlling for intelligence, was consistently associated with low psychoticism (high Agreeableness). Studies consistently show a positive correlation between Agreeableness and religiousness.⁹ From a meta-analysis, Saroglou (2002) estimates a correlation of 0.2.

Secondly, high Neuroticism is associated with religiousness in limited respects. Neuroticism is negatively associated with intrinsic religiousness (-0.1) but it is positively associated with extrinsic religiousness (-0.1). It is negatively associated with fundamentalism (-0.12). However, it is positively associated with 'religious quest orientation' (0.26) (Hills et al., 2004, N. 400). A person high in 'religious quest orientation' is seeking, doubting, and changeable in their religiousness. Francis (2003) found a 'significant positive correlation' between religiousness and guilt amongst 400 British undergraduates. Smith (2007) found that high mysticism scores were best predicted by a combination of high Neuroticism and high Agreeableness, and we have already noted that the latter is associated with religiousness. Studies have shown that those who undergo a conversion experience tend to be high in Neuroticism (Argyle and Beit-Hallahmi, 1975, p.140). Buxant and Saroglou (2008) have found that ex-members of New Religious Movements (n 20) are relatively high in Neuroticism when compared to current members and the general population.

⁹ See also, for example, Maltby et al. (1995), White et al. (1995), Carter et al. (1996), Francis and Wilcox (1996), Gillings and Joseph (1996), Smith (1996), Dunne et al. (1997), Francis (1997), Maltby (1997), Francis and Bolger (1997), Robbins et al. (1997) and Wilde and Joseph (1997).

However, they are drawn into the movement during an episode of mental instability and will often leave upon recovering.

In addition, what we might call unusual religiousness may be explained by high Neuroticism and high Openness. Williams et al. (2007) conducted a study of 279 Welsh adolescents and their paranormal – as distinct from religious – beliefs. They found that Neuroticism was fundamental to those holding beliefs in the paranormal (correlating with it at 0.32), but noted that a number of studies have shown no correlation. Thalbourne (2009) found that those who report paranormal experiences tend to report suffering from depression (which relates to high Neuroticism) as well as experiencing aspects of high Openness, such as magic ideation. At present, more studies need to be conducted on this subject before it can be discussed with greater certainty. As such, we might cautiously suggest that high Neuroticism would predict a kind of transient religious fervor. In other words, a person high in Neuroticism might have a religious experience, partly predicted by high Neuroticism, be in a religious group for a while and then leave and continue their quest for meaning elsewhere.

Thirdly, Conscientiousness is indeed a good predictor of religiousness. Saroglou's (2002) meta-analysis finds that Conscientiousness correlates with religiousness at 0.17. However, Conscientiousness is negatively associated with unusual religious perspectives, such as paranormal belief (e.g. Egan et al., 1999).

Fourthly, the studies indicate that high Openness-Intellect does not predict religiousness overall (Saroglou, 2002). However, it correlates positively with liberal religiousness (0.22), though negatively with fundamentalism (-0.14). Costa et al. (1986) and Saucier and Goldberg (1998) both find that religiousness negatively correlates with Openness-Intellect. Saroglou and Jaspard (2000) summarize the main studies up to that point and conclude that religiousness is negatively associated with

Openness-Intellect in general. However, Saroglou's (2002) meta-analysis estimates a correlation of 0.22 between Openness-Intellect and liberal religiousness. Streyffeler and McNally (1998) surveyed 68 US Protestants. They found that liberal and fundamentalist Protestants were about the same in Conscientiousness, Neuroticism, Agreeableness and Extraversion but that fundamentalists were much lower in Openness-Intellect. Lewis et al. (2011) replicated this with a sample of 1834 and found a negative correlation of -0.6 between fundamentalism and Openness-Intellect. Accordingly, we can argue that Openness-Intellect predicts liberal religiousness and negatively predicts fundamentalism, but, in itself, seems not to predict religiousness.

13. Educational Success and Personality

It is generally agreed that, as all academics have relatively high IQs, a certain personality profile predicts the highest academic success. This is why success at a postgraduate level is only correlated with intelligence at 0.4 (Jensen, 1979, p.319). Those who intend to pursue postgraduate study have relatively higher Conscientiousness than those who do not (e.g. Benovenli et al., 2011) and academic attainment in adulthood is positively correlated with childhood Agreeableness, at least until the completion of school (e.g. Shiner, 2006, p.221). Agreeableness predicts university course performance at 0.17 (see Conard, 2006) and researchers have found a positive correlation of about 0.15 between Agreeableness and intelligence (DeYoung et al., In Press). They also note that the correlation is stronger, around 0.3, between intelligence and correlates of Agreeableness, such as empathy. According to the most recent meta-analysis, Conscientiousness predicts years of education at around 0.55 and

Openness-Intellect predicts it at around 0.31 (Almlund et al., 2011, p.91).

Research with British students found that those who were above-averagely Neurotic were more likely to complete university than those low in Neuroticism (Kelvin, Lucas and Ojha, 1965) and McKenzie (2000) discovered that successful performance in university was predicted by an optimum level of relatively high Neuroticism combined with high ego-strength (impulse control). So this seems to indicate that those who are high in Neuroticism, Agreeableness, Openness-Intellect and Conscientiousness are more likely to excel at university and in academia. Conversely, there is a negative relationship between psychopathy (low Agreeableness, Conscientiousness and Neuroticism) and educational attainment.

Table 5.1 - Prevalence of Psychopathic Personality in Relation to Educational Level in the USA (Lynn, 2011a, p.216).

Sex	High School Dropout %	High School Graduate %	College Dropout %	College Graduate %
M	6.8	3.2	4.3	1.9
F	1	0.3	1.9	0.2

Table 5.1 indicates that being a 'dropout' is predicted by poor character. College would select against those who were not psychopaths but were insufficiently intelligent, hence the higher percentage of psychopaths amongst college dropouts when compared to high school graduates. We would predict that the percentage of psychopaths amongst 'Grad School Dropouts' would

be higher than the percentage amongst College Graduates for the same reason.

So, it would appear that academics are likely to be high in Neuroticism, Conscientiousness, Agreeableness and Openness-Intellect. One further nuance is differences between humanities, social sciences and natural sciences. Lievens et al. (2002) examined these differences amongst 785 undergraduate students at the University of Ghent in Belgium. They found significant differences between faculties but also significant crossover. De Fruyt and Mervielde (1996) conducted a similar analysis of 934 students at the same university. It is useful to draw upon the research on undergraduate interdisciplinary personality differences because, although postgraduate and academic interdisciplinary differences in personality may not be as pronounced as undergraduate ones, they are likely to differ in the same direction. This supposition is evidenced by Feist's (1998) meta-analytic finding (26 studies) that academics who are scientists are higher in Conscientiousness and lower in the Openness aspect of Openness-Intellect than those who are non-scientists, just as is the case, as we will see, with the undergraduate samples.

In the following table I have recorded, for each personality trait, the subjects that were significantly different in rank order from high to low. I have drawn upon De Fruyt and Mervielde (1996) as this is substantially replicated by Lievens et al. (2002).

Table 5.2 - Academic Discipline and Modal Personality (De Fruyt and Mervielde, 1996).

Neuroticism	Extraversion	Openness-Intellect	Agreeableness	Conscientiousness
1. Philosophy, Languages and History;	1.Economics, Psychology and Education,	1. Philosophy, Languages and History,	1. Science 2.Philosophy,	1.Economics, Engineering, Science, Law.

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Psychology and Education.	Science, Engineering, Law, Economics, Social Science.	Psychology and Education, Social Science.	Languages and History, Psychology and Education, Social Science, Economics, Engineering, Bioengineering, Law.	2. Social Science.
2. Law, Science, Engineering, Economics, Bioengineering, and Social Science.	2. Philosophy, Languages and History and Bioengineering.	2. Science, Economics, Law, Engineering, Bio-engineering		3. Philosophy, Languages and History, Psychology and Education, Bioengineering.

The only surprising result is on Agreeableness. Baron-Cohen et al. (1998) have found that autism occurs more frequently in the families of physicists, engineers and mathematicians than it does in the families of other scientists or of other researchers. In addition, all natural scientists, on average, score higher on autism measures than do other scholars (Feist, 2006, p.166). Accordingly, we would expect natural scientists to be lower in Agreeableness than social scientists but Lievens et al. (2002) and De Fruyt and Mervielde (1996) have unearthed the opposite. One possibility is that natural scientists are high in caring but relatively low in empathy. By contrast, social scientists may be very low in caring but high in empathy. This may be because, as we will see later, natural scientists are more intelligent than social scientists, making them better able to comprehend social situations.

Interestingly, both De Fruyt and Mervielde (1996) and Lievens et al. (2002) find a clear distinction within Openness-Intellect which can be broken down according to faculty lines. Students in 'Science' and Engineering are significantly higher in an investigative nature (in effect 'Intellect') than all other students. By contract, students in Philosophy, Languages and History are significantly more artistic (the other aspect of Openness-Intellect) than social scientists, who are in turn significantly more artistic than scientists.

14. Personality and Academic Genius

Simonton's (1988) detailed analysis of scientific geniuses through history concludes that, in addition to the high IQ held by scientists in general, the scientific genius tends, as we would expect, to show clear signs of an even more unusual personality profile. His personality a profile is unusual even when compared to other academics. In particular, Simonton observes, geniuses to be highly creative (abnormally high in the Openness aspect of Openness-Intellect) but also abnormally low in Agreeableness, and high in Neuroticism. There is some debate over the extent of their Conscientiousness in comparison to academic colleagues, but it seems that this is actually slightly lower than that of their colleagues, permitting a more spontaneous way of working.

Geniuses show signs of a prodigious and usually precocious output when compared with ordinary members of their discipline. However, high Neuroticism would also make such people more acutely prone to stress which has been shown to be, in part, behind religious experiences. Simonton quotes many researchers on academia who concur that the genius researcher is incredibly driven, essentially tending to be a workaholic. They also tend to be prone to introversion, happy to be alone and utterly absorbed in their work (Simonton, p.52). Accounts by eminent researchers of the process of reaching a scientific discovery sound noticeably similar to accounts of religious experiences. Simonton (1988, p.26) has reported that many mathematical scientists (including Einstein) have recalled 'the prominence of visual images and sometimes kinesthetic feelings during the early phases of discovery and invention.' Sir Francis Darwin (1848-1925), in describing his father's working habits, recalled, 'the sudden and immediate appearance of a solution at the very moment of sudden awakening' (Simonton, p.30). A survey of eminent British

scientists in 1931 found that 83% had experienced what they called 'scientific revelation' in reaching a new theory. Working in this way may be seen to imply spontaneity and so relatively low Conscientiousness. Simonton also emphasizes the place of luck in making a scientific discovery. Clearly, family experiences and coincidences from adolescence onwards play a significant part in whether a person's disposition for genius will manifest itself in the scientific or in some other field.

Feist (1998) conducted a meta-analysis of 83 studies over 50 years into the creative scientist and the creative artist and their modal personalities. Feist interpreted each study via the Big Five. He compared scientists against non-scientists, creative scientists against less creative scientists and artists versus non-artists. He found that (Feist, 1998, abstract), 'In general, creative people are more open to new experiences, less conventional and less conscientious, more self-confident, self-accepting, driven, ambitious, dominant, hostile, and impulsive. Out of these, the largest effect sizes were on Openness, Conscientiousness, self-acceptance, hostility, and impulsivity.' Thus, he confirms Simonton's conclusions that high Openness, high Neuroticism, low Agreeableness (confident and hostile), and relatively low Conscientiousness (when combined with very high intelligence-Intellect) are associated with academic genius, though, as we will see, the most successful academics are the least religious. Low Agreeableness and low Conscientiousness were the most crucial factors in distinguishing creative scientists from their less creative peers. The observed lower Conscientiousness may seem counter-intuitive but there is evidence that, to some extent, high intelligence provides people with characteristics that might be independently associated with Conscientiousness. A Conscientious person can suppress their impulses, perhaps out of

the desire for some future reward but the more intelligent have lower time preference.

15. Religious Academics: An Explanation

All of this indicates that the correct balance of high intelligence, low Agreeableness, high Openness-Intellect, high Neuroticism and low Conscientiousness lead to the heights of academic achievement, which is in turn associated (as we will see) with extremely low religiousness. In particular, the creative academic is lower than the standard academic in two key predictors of religiousness: Agreeableness and Conscientiousness.

However, more broadly, academic success is predicted by high Agreeableness, high Openness-Intellect, high Neuroticism and high Conscientiousness along with high intelligence. Two of these personality characteristics predict religiousness, while Openness-Intellect predicts liberal religiousness and Neuroticism predicts extrinsic religious, religious quest orientation and unusual religiousness. As such, if their strength, in relation to a person's intelligence, is too high then we might see, in the contemporary West, a religious academic. Equally, if the strength of any one of them is too high (in relation to the others and intelligence) then this might have the same result. If the 'balance' is slightly awry then we would be likely to see religious academics that probably would not reach the greatest heights of success but still might be respectably successful (in the contemporary West). For example, an academic who had the above profile but was relatively high in Agreeableness might be less inclined to iconoclastically rock the academic boat by proposing an unpopular (though possibly correct) theory.

This would also explain Dutton's (2008c) findings in anthropological fieldwork with university Christian Unions

(student evangelical groups). Oxford University was found to have a, proportionately, larger, more active and more fundamentalist Christian Union than Aberdeen University, where we might assume that students at the latter university were less intelligent.¹⁰ Oxford University Christian Union also had significantly more members from non-Christian backgrounds or who had otherwise undergone conversion experiences at Oxford. The anomaly, of Oxford University students having a larger highly religious minority, can be explained by the greater pressure exerted on students by the Oxford University system. However, it can also be explained by the fact that obtaining a place at university is predicted by a combination of relatively high intelligence and what we might call 'educational character' (high Openness-Intellect, Conscientiousness, Neuroticism and Agreeableness). As Oxford University is more difficult to get into, there will be more students at Oxford, compared to Aberdeen, who have both high intelligence and high educational character. There will also be more students at Oxford who have extremely high educational character, combined with merely high intelligence, and these students are likely to be religious. As such, we can understand why people with this personality mix would be more noticeable at Oxford than at Aberdeen at *undergraduate* level. However, they would become less noticeable as the academic ladder was ascended further because the ability to do so would be predicted by intelligence (which would negatively predict religiousness) and original thinking (which is associated with a personality profile that is negatively associated with religiousness).

¹⁰ This is a reasonable assumption based on the fact that competition to get into Oxford is fiercer and the required school leaving certificate results are higher.

16. Academics and Replacement Religion

But, more broadly, this raises the question of why some academics are 'religious' while others are 'replacement religious' in contemporary advanced societies. To put this down solely to differences in religious background is question-begging because we have seen that religiousness is around 0.44 heritable. A plausible explanation, in a broadly theistic context, is that the replacement religious academics are higher in aspects of Neuroticism (and thus less intrinsically religious, more doubting, but more prone to religious experience) and Openness-Intellect (predicting religious experiences and unusual ideas) and lower in Agreeableness and Conscientiousness than the religious academics, but that in both cases their intelligence is overwhelmed by their personality factors.

There are a number of reasons why this hypothesis is persuasive. Firstly, as we have seen, innovation is indeed predicted by a combination, relative to less innovative academic peers, of high Neuroticism, low Conscientiousness and low Agreeableness.

Secondly, this hypothesis could also potentially explain the move from 'religion' to 'replacement religion' at a national level. Following this hypothesis, we would predict that the most intelligent and high in Openness-Intellect and Neuroticism would be the most questioning of the traditional religion and the most oriented towards religious quest, meaning that they would have spearheaded the move, for example, from Catholicism to Protestantism or from Protestantism to replacement religion. This does indeed appear to be the case. There is evidence that in countries in which the native populations are divided between Catholic and Protestant, and the latter is more novel, Protestantism began amongst the educated (see Meisenberg et al., 2012 and Chapter Seven). In that strong Agreeableness would predict co-

operation (and thus not questioning the established religion) and Conscientiousness would predict rule-following, we can reasonably assume that these educated Protestants were higher in intelligence and Openness-Intellect. They may also be higher in aspects of Neuroticism because this is associated with religious innovation as we have discussed, as well as educational success.

The move from Protestantism to replacement religion would thus be predicted by the same characteristics. This theory is congruous with research we have already discussed (e.g. Thalbourne, 2009) which has noted that adherents to the most unusual religions tend to be extremely high in Neuroticism and aspects of Openness.

Thirdly, it is also congruous with discussions of the personalities of the academic pioneers of replacement religions (see Sandall, 2001 or Neduva et al., 2012) who also tend to be very high in Openness and Neuroticism relative to other personality factors and lower in Agreeableness.

Fourthly, it is further substantiated by evidence demonstrating that, with the exception of the most elite examples, natural scientists, despite having higher intelligence, are more traditionally religious than social scientists while social scientists are stronger in assent to replacement religiousness (e.g. Andreski, 1974). Social scientists, as we have seen, are higher in Openness, lower in Agreeableness, lower in Conscientiousness, higher in Neuroticism, and tend to already be more atheistic when they begin studying their discipline (see also Chapter Eight), atheism being a dimension of replacement religion.

This theory would also explain why replacement religions such as Multiculturalism are attractive to academics (see Charlton, 2009). Academics are more likely to have the intelligence and Openness-Intellect required to see through and not be attracted by traditional religiousness. However, high levels of Neuroticism

mean that they will be high in religious quest, and relatively high levels of Conscientiousness and Agreeableness will also incline them towards some form of religiosity. If their Neuroticism and Openness overwhelms their Agreeableness and Conscientiousness (and intelligence and Intellect) then this may be an innovative form of religiousness whereas if the opposite occurs it would be of a more traditional kind. (Neuroticism would, of course, predict not just periodic religious fervor and unusual religiosity but extrinsic religiosity, meaning that advocates of replacement religiousness may not genuinely believe what they advocate but advocate it because doing so will benefit them). The Neuroticism and Openness of the replacement religious academics would be sufficiently strong to counter-act their relatively high intelligence (as well as their Agreeableness and Conscientiousness which would still be high when compared to the general population), leading them to replacement religion rather than to traditional religion or no religion at all. As noted, this explains why social scientists are higher in replacement religion and natural scientists are higher in traditional religion even though natural scientists have higher average IQs, as we will see in Chapter Eight. Natural scientists are higher in Agreeableness and Conscientiousness (which predict religiousness) while social scientists are higher in Openness and Neuroticism, predicting replacement religion. As we will see in Chapter Eight, natural scientists are higher in being neither 'religious' nor 'replacement religious', implying that their intelligence is higher because it has not been overwhelmed by personality factors.

Also, we can understand why a minority of academics, in the contemporary West, might be attracted to an ideology such as right wing nationalism. If they were, relative to other academics, low in compassion (though high in some other aspects of Agreeableness), high in Conscientiousness (predicting

traditionalism), high in Openness-Intellect (partly predicting non-conformity), and high in Neuroticism (predicting periodic fervor and religious quest) then this choice is, perhaps, understandable. These characteristics would need to be strong enough to suppress their intelligence. Also, in a period of perceived social chaos or extreme egalitarianism, as we will discuss in Chapter Seven, we might expect the highly intelligent and high in Openness-Intellect, despite their higher Agreeableness, to better perceive the long-term benefits of a period of 'dominance' and anti-egalitarianism, which might make the moderate right or, in some cases, the extreme right temporarily attractive.¹¹

17. Conclusion

In this chapter we have surveyed the body of research looking at human personality. We have argued in favor of the widely accepted Five-Factor Personality Model. However, we have also been mindful that there is still some dispute over its utility. We have examined each of the five factors in turn, looking at their manifestations, correlations and putative genetic basis. In this regard, we have noted that personality is approximately 0.5 heritable and that environmental influences on it are seemingly heritable issues, such as height, interacting with the personality characteristic genotypic range. We have also argued that a particular personality trait profile explains religiousness amongst the highly intelligent and that this is especially noticeable with academics because the same personality trait profile predicts both

¹¹ However, in the nineteenth century, nationalism, in that it had a leveling effect at the ethnic in-group level, could be seen as appealing not just to Openness-Intellect but to the Agreeableness that weakly correlates with intelligence, especially if the form of nationalism combined with traditional religious belief.

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educational success and religiousness. In addition, we have looked at why 'religion' would be attractive to some academics and replacement religion to others. Having defined and examined our key terms, we will now turn to examining the relationship between religiousness and intelligence.

Chapter Six

The Historical Understanding of the Relationship between Religion and Intelligence

- 1. Introduction.*
- 2. Everyday Observation.*
- 3. Stage Theories of Societal Development.*
- 4. Religion and Intelligence in Passing.*
- 5. Conclusion.*

1. Introduction

There has been a long history - even prior to the early twentieth century when the issue began to be tested empirically - of strong opposition to St. Anselm's assertion, already discussed, that 'the fool says in his heart there is no God.' Many thinkers have been of the opinion that, in fact, the more intelligent an individual - or group of individuals - is, the less likely they are to understand the world in religious terms and the more likely they are to be skeptical of religion. This can be noted, albeit by implication, in everyday observation, in nineteenth century stage theories of religion, and in the works of critics of religion.

2. Everyday Observation

There is some evidence of historical comment that atheists and religious skeptics tended to be above averagely intelligent. One of the difficulties with finding historical comment on the relationship between intelligence and religiousness is that the word 'intelligence' has only relatively recently gained significant usage as meaning 'intelligence' in the way in which it is widely currently

employed. German psychologist William Stern (1871-1938) defined 'intelligence' in the modern sense in a 1912 work on IQ which was translated into English in 1921 (Stern, 1912). Sir Francis Galton (1822-1911) (Galton, 1869) used the word 'intelligence' in the modern sense and it is possible that its use in such an influential work as *Hereditary Genius* led to it becoming increasingly employed.¹

The next problem is that the word 'intelligence' was used very differently in the Early Modern Period and words employed to mean 'intelligence' in the modern sense also included other faculties. Goodey (2011, pp.209-210) observes that *intelligentia* was used in the Medieval Period to refer to the 'intelligences' behind the universe, such as God and the angels. Thus, 'intelligence' inherently involved some kind of transmission from God, the ultimate fountain of wisdom. Even Humanists, during the Renaissance, understood *intelligentia* to be the means by which the (rational) soul communicated with the body. In the sixteenth century, there were cases of *intelligentia* being used as a synonym for *intellectus* ('understanding') and thus in a proto-modern sense, but these were rare. Early modern philosophers such as Francis Bacon (1561-1626) and John Locke (1632-1704) would refer to 'understanding' rather than 'intelligence' when discussing what we would mean by 'intelligence',² though 'understanding' went beyond narrow intellectual understanding and into the realms of morality. Cognitive states were not totally separated from moral ones until the late nineteenth century. As such, a person who had 'understanding' also implicitly had 'moral understanding' while a 'fool' was inherently morally deficient. To some extent 'wit' was also used to mean 'intelligence' in this period

¹ However, even prior to 1869 some writers were using the word in the modern sense (e.g. Wheat, 1862).

² See, for example, Bacon's 1620 *New Organon* (2000, p.48) or Locke (1690).

as was 'wisdom' (see Barber, 1997, p.245), a capacity associated with Classical Greek philosophers.³

However, even from Classical Times, there is some evidence indicating that academics, implicitly those of considerable 'wisdom,' tended to be skeptical of religion. A number of the pre-Socratic philosophers questioned the existence of the gods, a movement implicitly noted in plays in the 5th century BC.⁴ Euripides (440-406 BC) has the eponymous hero Bellerophon ask: 'Doth someone say that there be gods above? There are not; no, there are not. Let no fool, led by the old false fable, thus deceive you.'⁵ Aristophanes (448-380 BC) satirizes the pre-Socratics when he has a character in *The Knights* exclaim, 'Shrines! Shrines! Surely you don't believe in the gods! What's your argument? Where's your proof?'⁶

St. Paul (lived circa 5-67) implies in his first letter to the Corinthians that academics, in particular, are highly doubtful of his message: 'For the message of the cross is foolishness to those who are perishing . . . Where is the wise person? Where is the teacher of the Law? Where is the philosopher of this age? Has not God made foolishness of the wisdom of the world?' (I Cor. 1:18-20). It is also noted in Acts (17:18) that, 'A group of Epicurean and Stoic philosophers disputed with (Paul) and asked, "What is this babblers trying to say?"' St. Augustine of Hippo (354-430) recalls in *Confessions* (398, Book V, par. 25) that the 'philosophers' and 'Academics' are 'doubting everything' and 'tend

³ See Blackson (2011).

⁴ Diagoras of Melos (5th century BC) is often termed 'the first atheist' for publicly declaring there were no gods (see Barnes, 2013, p.381).

⁵ Only fragments of *Bellerophon* survive. See Symonds (1902, p.87).

⁶ See Aristophanes (1837).

to fluctuate between all.' In other words, those who are considered high in wisdom tend to be the most skeptical of Christianity.⁷

In the Medieval period, Geoffrey Chaucer (1343-1400) implies in *Canterbury Tales* (Chaucer, 1990, General Prologue), which was written around 1400, that his most educated (and so likely most intelligent) characters are either not interested in religion or are heretics. This means that they have a questioning attitude towards religion or at least towards the dominant religious perspective. The Physician's 'studie was but litel on the Bible,' and it has been suggested that his supposed 'atheism' is reflected in his tale (Arnold, 1981, p.178). It has been argued that both the 'Parson of the Town' (McCormack, 2010, p.37) and the 'Clerk of Oxford' (Phillips, 2000) were Lollards; supporters of heretical proto-Protestantism (Martin, 2003, p.241).

As we move to the Renaissance, and the revival of Classical ideas in Europe, we find similar comment. Heretics were understood to be intelligent people who misused their intelligence (Marshall, 2006, p.262). 'Wit' was, to a certain extent, used to mean 'intelligence' in the sixteenth century, though it overlapped with 'ingenuity' (Barber, 1997, p.245). Many of the Protestant martyrs in Foxe's (1563) propagandist history of Protestant martyrs (*Foxe's Book of Martyrs*) are referred to as having great 'wit.' Indeed, in one instance a Catholic interrogator called 'Dr Chedsey' is quoted as saying to accused heretic Roger Holland, 'your ripeness of wit hath brought you into these errors' (Foxe, 1868, p.475).⁸ This implies that heresy, amongst the educated, can be caused by being too intelligent and thus able to question the

⁷ Mackintosh (2011, p.3) makes this suggestion, though without reference.

⁸ Roger Holland was burnt in 1558. He was a merchant tailor from Islington (now part of London) and was the last heretic to be burnt at Smithfield under Queen Mary. William Chedsey was Archdeacon of Middlesex in 1556 and Canon of Christchurch, Oxford, in 1558.

church to which you should, for moral and theological reasons, submit. This does not necessarily imply, of course, that heretics took this same questioning attitude towards all religious perspectives, as they often died as martyrs either for Protestantism or for some Christian sect.⁹

In the sixteenth and seventeenth centuries, 'atheism' was in many ways a term of abuse and moral condemnation, with an indefinite meaning. As Walsham (1999, p.108) summarizes, in her analysis of Early Modern religious non-conformity in England, the accusation of 'atheist' was 'available for the expression and repression of disquiet about 'aberrant' mental and behavioral tendencies - for the reinforcement and restatement of theoretical norms.' Both 'atheist' and 'papist' were 'categories of deviance to which individuals who were even marginally departed from the prescribed ideals might be assimilated and thereby reprov'd.' In this regard, it was akin to 'racist' in modern day England (see Chapter Twelve). The charge of 'atheism' was leveled against some heretics and it was extended to mean questioning the existence not merely of God but of God as conceived of in the Bible.¹⁰ As such, the accusation was often leveled against Unitarians and deists (Wallace, 2011, p.47). In addition, the term was sometimes used to refer to those who lived a libertine lifestyle and thus seemingly ignored God's existence, hence Francis Bacon's distinction in *Of Atheism* (Bacon, 1601) between the 'contemplative' and practical varieties of atheism. Febvre (1985, p.xxviii) has argued that the available knowledge in the Early Modern period rendered atheism in the modern sense an intellectual impossibility. However, seventeenth century

⁹ For further discussion see Freeman and Mayer (2007).

¹⁰ Heretics specifically burned for 'atheism' (a charge leveled for anti-Trinitarianism) include Lucilio Vanini in 1619 in Toulouse. Vanini had a doctorate from the University of Naples (Levy, 1995, p.74).

philosophical rebuttals of 'atheism' (clearly used to mean the belief that there is no God) and the suggestion that atheists were mentally ill (because they ignored the overwhelming evidence for God's existence)¹¹ indicate that there were some in the seventeenth century who would be seen as atheists by modern standards.¹²

It is true that some Early Modern critics of atheists simply focused on the supposed lack of morality inherent in atheism. For example, Watson (1994, p.23) quotes a seventeenth-century medic who stated that atheists are 'little better than brute beasts.' But at least some critics commented that atheists had great 'wit' but not true wisdom, as this inherently involved accepting Christian doctrines (Marshall, 2006, pp.262-263). Goodey discusses sources which appear to indicate, as already discussed, that, in the seventeenth century, atheists were seen as 'intelligent' in the modern sense. The Machiavellian, implicitly highly intelligent, Edmund in *King Lear* (c. 1606), for example, asserts that nature is his 'goddess' (Goodey, p.210). Likewise, King (2008, p.75) observes that in the seventeenth century there were 'legitimate and forbidden areas of knowledge, which meant that unbridled curiosity inevitably led to disastrous consequences.' This is epitomized by Doctor Faustus in Christopher Marlowe's (1564-1593) 1592 play of the same name. Doctor Faustus is extremely intelligent, so much so that he is dismissive of theology and is prepared to dabble in devil worship, thus completely rejecting the 'religion' of his times. At one point, Faustus even states that he is not scared of going to Hell because it will be populated by the 'old philosophers' and will therefore be an Elysium. Thus, an archetypal religious skeptic is portrayed by Marlowe as highly intelligent, though lacking in wisdom and morality. Marlowe even

¹¹ See More (1653).

¹² For further examples of these rebuttals, see Wallace (2011, p.47).

implies that it is intelligence which inclines people to reject religion: 'Faustus is gone. Regard his hellish fall/ Whose fiendful fortune may exhort the wise/ Only to wonder at unlawful things/ Whose deepness doth entice such forward wits/ To practice more than heavenly power permits.'¹³

Watson (p.23) also observes that a discussion of the seventeenth century literature strongly implies that 'atheists' (whose views are generally only preserved in biased critiques of them, because publicly espousing atheism was a capital offence) were highly intelligent, because otherwise there would be no need to refute their arguments in such depth. Indeed, Watson provides further evidence that some significant critics accepted that atheists and skeptics were often highly intelligent (in the modern sense) even if they were considered irrational with regard to their views on God's existence. Medic Thomas Browne (1605-1682) in his 1672 book *Pseudoxia Epidemica* (Browne, 1672, Ch. 5, par. 3) states, with regard to atheism and skepticism, that 'these conceptions befalling wise men' are 'as absurd as the apprehensions of fools and the credulity of the people which promiscuously follow any thing.' In other words, the 'wise' (another word that, to a great extent, is used in place of 'intelligent'

¹³ It might be argued that devil worship is another form of religion. However, Faustus' viewpoint is dismissive of many Christian ideas and he listens to a 'bad angel' who tells him that religion is merely 'illusion.' Thus, he seems to be embracing a rational form of religion in which people are encouraged to obtain the knowledge of the gods, rather than submit to God and not pursue certain intellectual issues. This is how Benoist (2004) defines Classical Greek paganism and he argues that science developed from this. Thus, Faust's religion can be regarded as highly critical and un-dogmatic religion, a form of religion which is associated with high intelligence.

in this period)¹⁴ can be persuaded into atheism by their wisdom, leaving them on a par with 'fools.' Watson (p.23) summarizes that, for Browne, 'atheists are either too clever or too stupid' to see what should be obvious to any rational person: that God exists.

So there is some observation in the Early Modern period that atheists and skeptics are intelligent (in the modern sense). Nevertheless, the word 'intelligent' is not employed. As we move into the nineteenth century, the relationship between intelligence and atheism is more clearly discussed.¹⁵ John Stuart Mill (1809-1873) stated in his autobiography in 1873 that, 'The world would be astonished if it knew how great a population of its brightest ornaments - of those most distinguished even in popular estimation for wisdom and virtue - are complete skeptics in religion' (Mill, 1909, p.34). Thus, even with Mill there is some conflation of intelligence ('brightest' 'wisdom') with morality. Indeed, 'wisdom' implies experience, knowledge and good judgment. These qualities overlap with intelligence but are not quite the same thing.

3. Stage Theories of Societal Development

An awareness of the negative association between intelligence and religion can also be seen in Stage Theories of human development, which became popular in the wake of the Enlightenment. Until the time of the Enlightenment, it was commonly believed in Europe that society was in a state of decline. The apex of human achievement lay in Antiquity, and thinking people could only hope to imitate and perhaps revive this

¹⁴ Goodey (p.126) observes that up until the eighteenth century 'wise' was contrasted with 'idiot,' the latter being 'unable to discern the universal from particulars.' Clearly, this would seem to involve dimensions of intelligence.

¹⁵ See Berman (1990) for a history of atheism in Britain.

glorious period of intellectual achievement. This way of thinking began to change in the eighteenth century, when theories of progress began to be posited.¹⁶

The identity of the thinker who first posited such a theory is moot, but there is at least a case for tracing such theories back to the Scottish Enlightenment, which came to prominence in the wake of Scotland's political union with England in 1707.¹⁷ The Scottish philosopher David Hume (1711-1776) strongly criticized, as logically flawed, the traditional 'proofs' for the existence of God, posited by the Medieval Scholastic St. Thomas Aquinas (1225-1274) (see Hume, 1779 and Aquinas, 2000). Implicit in Hume's argument was that accepting traditional religious perspectives, such as the proofs for the existence of God, implied a lack of reasoning ability, something which we generally associate with low intelligence. But the Scottish Enlightenment also produced an important stage theory of development.

Scottish economist Adam Smith (1723-1790) argued that societies seemed to move through four economic stages: (1) Hunter-gathering (2) Pastoral and nomadic farming (3) Agriculture and (4) Commerce. Smith (1776) argued that, in the mid-eighteenth century, Scotland was undergoing the change from being an agricultural to a commerce-based or 'mercantile' society. England, by contrast, was already an established mercantile society. Smith does not, even at an implicit level, examine any supposed relationship between religiousness and intelligence. But his theory is an important basis for future theories which draw upon his Four Stages to begin to make this connection.

Perhaps the best-known example of such a theory is German philosopher G. W. F. Hegel's (1770-1831) 'Theory of the

¹⁶ See Outram (2005) for a history of the Enlightenment.

¹⁷ For an examination of the Scottish Enlightenment, arguing that it did commence stage theories, see Berry (1997).

Dialectic.' Human history, according to Hegel, is an unfolding process of progress towards the Absolute, with the pinnacle of all progress conceived of as God-like perfection. Hegel's system progressed in the form of the 'Hegelian Dialectic' whereby a thesis (an idea) led to the development on an 'antithesis' (a counter idea), resulting eventually in a 'synthesis' of the two ideas, and thus the movement forward to the next 'Age' of human intellectual development (see Hegel, 1929). From a Hegelian perspective, humanity progresses in every respect towards the Absolute, including intellectually. So, implicit in Hegel's theory is the belief that humanity's religiousness is a stage in its intellectual development and that one day humanity will become sufficiently intellectually developed (in other words intelligent) such that religion, or the current religion, will be rejected in favor of a new synthesis.

French philosopher, Auguste Comte (1798-1857) argued (Comte, 1988) that as societies develop they pass through a series of stages in which their modes of thought change. Comte's stages were (1) Theological: nature is mythically conceived and explained by a supernatural being or beings. (2) Metaphysical: the world is explained through nature and vague forces. (3) Positivist: The world is explained through logic, reason and science. Comte called this process 'the Law of Three Stages' and it implies a relationship between an important aspect of intelligence (the ability to reason) and the casting off of religious modes of thought.

English philosopher Herbert Spencer (1820-1903) argued (Spencer, 1873) that, broadly speaking, one could conceive of two kinds of society: Militant and Industrial. The Militant Society was simple, undifferentiated and involved a hierarchy of sorts and obedience to it, whereas the Industrial Society was complex and associations were voluntary and contractually-enforced. Societies

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would evolve from one to the other in accordance with the principles of natural selection: as people became more intelligent and creative, they would move towards industrialism. Spencer argued that what he conceived of as the 'lower races' engaged in the most undeveloped form of religiousness: ancestor worship. As they evolved, their descendants began to worship spirits and natural forces and as they evolved further, this changed into gods. This religiousness was eventually rejected in favor of scientific thinking. So, with Spencer, we have a much more explicit assertion of the supposed negative association between religiousness and intelligence.

American anthropologist Lewis Morgan (1818-1881) advocated a similar theory (Morgan, 1877). Morgan maintained that societies could be classified on a continuum between 'primitive' and 'civilized.' Movement from 'primitive' to 'civilized' involved passing through a series of developmental stages: from band, to tribe, to chiefdom, to state and so forth. As the society progressed through the stages it became increasingly socially differentiated, developed a more complex division of labor, and became more intellectually sophisticated. This intellectual sophistication includes, in the highest civilizations, an embracing of science and a rejection of religious belief. So, once more, it is implicit in this theory that the most intelligent societies will tend to be the least religious. It is argued that religiousness is rejected as people increasingly become too intellectually sophisticated to accept it.

Scottish anthropologist Sir James Frazer (1854-1941) presented a similar stage theory of societal development (Frazer, 1890): (1) Primitive Magic (2) Religion (3) Science. Again, we can discern the implication that as society becomes more intellectually sophisticated, it rejects the more primitive, religious way of thinking in favor of the more intellectually sophisticated,

scientific way of thinking. Frazer (1890, p.712) is explicit in asserting this point in his magnum opus *The Golden Bough*. He writes that as civilizations developed 'the keener minds came to reject the religious theory of nature as inadequate ... religion, regarded as an explanation of nature, is replaced by science.' It seems clear that by 'keener minds' Frazer means 'those who are more intelligent.' For Frazer, the movement from 'superstition' to 'religion' is also caused by the rejection of superstition by those who are of the highest intelligence.

4. Religion and Intelligence in Passing

In the nineteenth and early twentieth centuries, many thinkers - who may have drawn upon though not specifically developed stage theories - also suggested an inverse relationship between intelligence and religiousness. Sir Francis Galton did not concentrate on the topic of religion, but in *Hereditary Genius* (Galton, 1869) he connects the religiousness of the Spanish to the influence of the Spanish Inquisition:

The extent to which persecution must have affected races is easily measured by a few well-known statistical facts. Thus, as regards martyrdom and imprisonment, the Spanish nation was drained of free-thinkers at the rate of 1000 persons annually, for the three centuries between 1471 and 1781; an average of 100 persons having been executed and 900 imprisoned every year during that period. The actual data during those three hundred years are 32,000 burnt, 17,000 persons burnt in effigy (I presume they mostly died in prison or escaped from Spain), and 291,000 condemned to various terms of imprisonment and other penalties. It is impossible that any nation could stand a policy like this, without paying a heavy penalty in the deterioration of its breed, as has

notably been the result in the formation of the superstitious, unintelligent Spanish race of the present day.

As with Frazer's and similar stage theories, Galton argues that high levels of superstition reflect a less developed society than standard 'monotheism' or 'science' and Spain is superstitious partly for biological reasons. In other words, whether he is empirically correct or not, Galton is arguing that the mass-murder of intelligent Spaniards has resulted in a country that is more religious and, as such, he seems to imply, intelligent people are less willing to accept religious dogmas.

However, Galton is far from the only Victorian thinker to suggest an inverse relationship between intelligence and religion. Such a relationship is strongly implied in a Victorian debate over the extent to which religion can be seen as predicted by race. Barrister Luke Owen Pike (1835-1915) (Pike, 1869) presented a paper to the Anthropological Society of London on 16 March 1869 entitled 'On the Alleged Influence of Race on Religion.' He argued that there is almost no racial influence on a group's religion. Pike's paper is reported to have evoked a great deal of criticism from the assembled anthropologists, most of whom assumed the view that the less intelligent (whether 'races' or individuals) would be more 'religious' or, at least, less skeptical of religion. For example, 'Mr. J. Gould Avery' argued that Protestants are more 'independent-minded' than Catholics and this is reflected in the races that assent to these different denominations in the British Isles.¹⁸ The Welsh are a racial mixture, and is this is reflected in their deference to their 'ministers.' Gould Avery thus ascribed qualities associated with

¹⁸ As we will see in Chapter Seven, there is some evidence that, where Protestantism is the more novel denomination, Protestants are more intelligent than Catholics.

intelligence - independent and critical thinking - with the form of religiousness adhered to. 'Mr. McGrigor Allan' asserted that, 'If race had no influence on religion, how was it that England had not been able to make the Irish Protestants?' (Pike, 1869, p.cxlvii). This remark must be understood in the context of the widely-held belief at that time that the Irish were of lower intelligence than other British 'races.'¹⁹

The discussion became so detailed that it was postponed until the next meeting, on 6 April 1869, where further criticisms of Pike's theory were leveled. For example, 'Mr. Bendir' tied the discussion in with stage theories, claiming that races will develop religions, in terms of complexity, in accordance with their abilities. So, the debate seemed to evidence the belief that religion will vary according to something akin to intelligence, even if it does not explicitly state that the non-religious would be likely to have the highest intelligence.

A series of nineteenth century thinkers argued that religion was effectively a matter of emotion while true intellectual sophistication involved the ability to, in a sense, suppress your emotions in favor of pursuing a logical analysis. Karl Marx (1818-1883) famously wrote in his *Critique of Hegel's 'Philosophy of Right'* (1976, p.131):

Religious suffering is, at one and the same time, the expression of real suffering and a protest against real suffering. *Religion is the sigh of the oppressed creature, the heart of a heartless world, and the soul of soulless conditions. It is the opium of the people.*

The abolition of religion as the illusory happiness of the people is the demand for their real happiness. To call on them to give up their illusions about their condition is to call

¹⁹ See, for example, Beddoe (1885) who argued that the Irish were 'negroid.'

on them to give up a condition that requires illusions. The criticism of religion is, therefore, in embryo, the criticism of that vale of tears of which religion is the halo.

It is important to quote this passage in full not only because Marx is often wrongly paraphrased as having actually written, 'Religion is the opium of the people'²⁰ but also because it further illustrates an implied inverse relationship between religion and intelligence. Intellectual 'criticism' (that is to say logical reasoning, a high ability in which is associated with intelligence) demonstrates the unacceptability of the religious perspective. Those who hold to this perspective, so it seems, have not comprehended the logical incoherence of religion. They are blinded by emotion; less able, like those on opium, to control their emotions and to reason.

A number of other thinkers from this period also imply that the religious are less in control of their emotions and even by definition less intelligent than the non-religious. French sociologist Emile Durkheim (1858-1917), for example, argued in *Elementary Forms of Religious Life* (Durkheim, 1915) that religion is a means by which the societal elite can control the masses and that religious experience, around which he sees religion as centering, is really only the experience of the power of society. He called this merging of the self with the collective *effervescence*. For Sigmund Freud (1856-1939), religion is an 'illusion' which keeps people happy and protects them from having to think about the more intellectually difficult aspects of existence (Freud, 1928). The British reformer Robert Owen (1771-1858) bluntly asked, 'How is it possible that religion and intelligence can ever exist together? The one has its source in the wildest fantasies of a romantic and overstrained imagination; the other is derived from fact, and is founded in real knowledge, and

²⁰ E.g. Ott (2007, p.153).

is discoverable only by the clear light of natural revelation' (Campbell, 1839, p.230).

Finally, the American anthropologist Madison Grant (1865-1937) openly argued that low religiousness is associated with low intelligence, based on his view that some races are more intelligent than others. For example, he claimed that, 'Associated with this advance of democracy and the transfer of power from the higher to the lower races, from the intellectual to the plebeian class, we find the spread of socialism and the recrudescence of obsolete religious forms' (Grant, 1916, p.12). He also stated that:

'The cross between these elements and the Nordics appears to be a bad one and the mental and cultural traits of the aborigines have proved to be exceedingly persistent and appear especially in the unstable temperament and the lack of coordinating and reasoning power, so often found among the Irish. To the dominance of the Mediterraneans mixed with Pre-Neolithic survivals in the south and west are to be attributed the aloofness of the island from the general trend of European civilization and its long adherence to ancient forms of religion and even to Pre-Christian superstitions' (Grant, 1916, p.203).

In other words, he is arguing, as Galton argued with regard to the Spanish, that the Irish are low in intelligence and this is reflected in their relatively religious nature.²¹ In terms of 'stage theories' it

²¹ Whether Irish intelligence was lower than that of the English in 1916 is a difficult question. However, currently, the Irish IQ has been put at about 93, compared to 100 in England. Lynn (2006, p.15) argues that this might be explained by the high levels of emigration which Ireland experienced from the 1840s onwards. In general, the more intelligent are more inclined to emigrate and this 'brain drain' would explain Ireland having a significantly lower IQ than its neighbors today.

is noteworthy that Grant distinguished between 'religion' and 'pre-Christian superstition.' The latter refers, in stage theory terms, to a nature even more 'primitive' than that associated with the 'religious.' Indeed, Frazer (1890) argued that the 'superstitious' have less keen minds even than the religious. Stage Theories of religion have been subject to considerable criticism, though this is beyond the purview of our enquiry (see Dutton, 2013c for summary).

5. Conclusion

In this chapter, we have presented evidence of an awareness that the more intelligent were more skeptical of religion in Antiquity and in the Medieval eras and evidence from the Early Modern era and the nineteenth century that atheism was understood to be associated with high intelligence. We have seen that from the Enlightenment onwards theorists have at least implied an inverse relationship between intelligence and religiousness. Philosophers criticized the reasoning skills of those who accepted religious beliefs (with reasoning ability being a fundamental element of intelligence). By the early nineteenth century, philosophers and early social scientists posited stage theories of human development which asserted that as societies became more centered on reason (in other words, thinking ability) they would reject religiousness. In addition, we have seen that a number of scholars, such as Galton, note in passing an inverse relationship between intelligence and religiousness.

Chapter Seven

Religion and Intelligence amongst Individuals

1. *Introduction.*
2. *Why Does Intelligence Negatively Predict Religiousness?*
3. *The Savanna-IQ Interaction Hypothesis.*
4. *The Cultural Mediation Hypothesis.*
5. *Critiques of the Inverse Relationship.*
6. *Religion and IQ.*
7. *Religion and Undergraduates.*
8. *Religion and Intelligence amongst Individuals across the World.*
9. *Intelligence and Replacement Religion.*
10. *Replacement Religion in the UK.*
11. *Conclusion.*

1. Introduction

In this chapter will we examine the relationship between religion and intelligence at the individual level. We will argue that religiousness is negatively associated with intelligence because intelligence will predict the ability to see through the fallacies of religion and will also create a questioning predisposition. Alternative theories that have been proposed to explain the relationship will be refuted. We will demonstrate, drawing upon studies both of children and adults, that the more intelligent a person is, the less likely they are to be a religious believer or practitioner. In addition, we will show that, amongst religious believers, the liberal religious are more intelligent than the conservative religious. Also, in terms of replacement religion, it will be shown that supporters of replacement religious ideologies

tend to have lower intelligence than those who support more centrist political perspectives.

2. Why Does Intelligence Negatively Predict Religiousness?

The simplest explanation for the inverse relationship between intelligence and religion is twofold. Firstly, high intelligence will provide those who have it with heightened reasoning ability, meaning that they will be better able to see through the fallacious reasoning used to uphold religious perspectives. The arguments presented for the existence of God are fallacious (for discussion see Hick, 1990). In essence, they are the following:

- (1) *The Ontological Argument*. In essence:
 - (I) God is the greatest thing we can conceive of.
 - (II) It is greater to exist than not exist.
 - (III) Therefore, God exists.

Russell (1905) notes that in that God is only the greatest thing we can conceive of if He exists, we can only accept the first premise if God does indeed exist. In that this is precisely what the argument purports to prove it is clearly circular. Some highly liberal theologians define God as 'depth,' for example, and argue that as depth exists God exists (Tillich, 1948). This defines God into existence and extends 'God' so far that we may as well jettison the concept.

- (2) *The Cosmological Argument*: There must be a first cause and this is God. This raises the question of 'What caused God?' Accordingly, it is just as likely that the world began *ex nihilo*.

- (3) *The Teleological Argument*: The world appears designed. But any functioning world will appear designed whether it is designed or not. The world could have gradually evolved to its current state.

- (4) *The Moral Argument*: This takes various forms such as:

(I) If there is objective morality, God exists.

(II) There is objective morality.

(III) Therefore, God exists.

or

(I) We know that there are certain moral truths.

(II) God is the source of these moral truths

(III) Therefore, God exists.

It can be countered that morality is not objective, but develops from a standpoint, and different cultures have differing moralities and their consciences tell them different things. As such, the first premise can be rejected. Moreover, supposed human shared morality could be parsimoniously explained through evolution selecting in favor of the pro-social (see Wilson, 1975).

(5) *The Argument from Religious Experience*: This is a fallacious appeal to intuition.

(6) *The Argument from Miracles*: It can be countered that events previously ascribed to God have been empirically explained and, as such, it is likely that any inexplicable event will ultimately be empirically explained. In addition, there are feasible empirical explanations for central Christian miracles (see Kersten, 2001) and these are inherently more likely than a miraculous explanation because they involve no assumptions.

(7) *The Cumulative Case Argument*: It is argued that though points 1 to 6 do not individually prove God's existence, when taken together they form a sound case (e.g. Swinburne, 2004). However, it can be countered that a series of arguments, none of which are valid, cannot add up to a valid argument. A cumulative case could only work if each element of the case had some validity on its own (meaning that it might be argued that it was more likely than an alternative explanation) and if the alternative explanation was itself problematic. But arguments 1 to 6 have no

validity and the alternative explanations are quite satisfactory (see Viney, 1985, pp.12-15 for summary).

(8) *The Pragmatic Argument*: It is argued that believing in God has good consequences (such as giving people hope) and therefore one should believe in God. It can be countered that this does not prove there is a God and so cannot persuade people that there is a God, that there could be negative consequences to attempting to live a lie, and that the good consequences of believing in God could be outweighed by the bad consequences of believing in God (such as suppressing truth in favor of idealism). Indeed, other philosophers, such as David Hume, have argued that we should, likewise for moral reasons, not believe in God and that we have a moral obligation to pursue the truth (see Jordan, 2011 for summary). James (1896) argues that in some cases one cannot ascertain the existence of certain things unless one has faith in them. He gives the example of 'a social organism' where each member must trust the other for the organism to manifest itself. However, this is obviously not 'existence' in the sense that God's existence is being discussed, but rather the existence of something abstract. Moreover, the pragmatic argument for God's existence is a fallacious appeal to consequences in the context of establishing an empirical truth claim. Pragmatism can be argued to be useful if interlocutors are at an impasse, with no shared presuppositions, but if they presuppose logic than this is not the case.

In addition, a number of other more obviously fallacious arguments are presented. These include: '*God's existence cannot be disproven.*' It can be countered that one cannot be asked to prove a negative. *Appeal to jargon*. Many arguments for God's existence take this form, essentially attempting to persuade the reader that they are in the presence of a mind so profound that he must be correct. Cutting through the jargon, they are often forms of the ontological, cosmological or teleological arguments or

commit other fallacies (e.g. Plantinga, 1999). There are also assorted other fallacies such as calling critics of theistic arguments 'reductionists,' 'scientific fundamentalists,' 'closed-minded' or 'arrogant' ('appeal to insult'). Or critics might be told that they'll go to Hell ('appeal to consequences') (see Dawkins, 2006).

Accordingly, God's existence cannot be proven and the arguments for it are fallacious. Such a situation would lead to the cautious rejection of any other proposition and so we would expect a rational analysis to reject such a proposition. Intelligence would predict heightened rationality and thus a greater ability to reject the arguments for the existence of God and thus to reject belief in God.

Secondly, as we have discussed, intelligence positively correlates with Openness-Intellect at around 0.3. Accordingly, we would expect intelligence to be associated with an intellectually curious attitude which would make people inclined to question what they were told. Moreover, in that Openness-Intellect also predicts liberal religiousness, this would also render intelligent people more likely to question established religion, even if they do not entirely reject it. In addition, Zuckerman et al. (In Press) have suggested that several of the functions provided by religion - such as self-regulation and self-enhancement - are also provided by intelligence. This means that highly intelligent people have less need for religion.

3. The Savanna-IQ Interaction Hypothesis¹

An alternative explanation for the negative association between religiousness and intelligence is the Savanna-IQ Interaction Hypothesis. Kanazawa (2010) argues that the human mind is adapted to life on the African Savanna in the Pleistocene period

¹ See Dutton (In Press) for a more detailed critique.

around 130,000 years ago (e.g. Cosmides, 2002). Many cognitive mechanisms evolved to optimize human ability in tasks which were vital at the time, such as foraging. Known as the 'Savanna Principle' this premise implies that the human brain may have difficulty dealing with entities which were not present in the ancestral environment; which are, in Kanazawa's terms, 'evolutionarily novel' rather than 'evolutionarily familiar.' The Savanna Principle is evidenced by experiments indicating that humans cannot distinguish between real friends and 'TV friends' (see Kanazawa, 2002) or others indicating that people will not act in the rational manner that theories such as Game Theory (see Poundstone, 1992) would predict, but rather in a way that would have made sense on the Savanna (see Kanazawa, 2010).

Kanazawa further argues that intelligence is a domain specific adaptation which developed as we moved away from the Savanna as a means of helping us solve the increasing number of evolutionarily novel problems by which we were confronted. The Savanna would have selected for intelligence to a limited degree, because some non-recurrent evolutionarily novel events would have occurred, but the selection pressure would have been much greater as we moved away from the Savanna. Accordingly, Kanazawa argues that intelligence would predict being attracted to that which is evolutionarily novel and thus being highly open to experience.

Kanazawa (2010) demonstrates that all prehistoric human groups were religious. As such atheism is evolutionarily novel and this explains the evidence, which we will examine below, that atheism is associated with high intelligence. In defining g in the way he does, Kanazawa departs from accepted definitions of it, but he insists that only his model can explain the robust positive correlation between intelligence and Openness-Intellect - they positively correlate because both have been selected for by

evolutionary novelty. Kanazawa claims that there is a strong broader body of evidence for the general association between evolutionary novelty and intelligence. This can be seen in studies of the positive association between intelligence and liberalism (defined to mean caring about genetically unrelated others) (Kanazawa, 2010), vegetarianism, healthiness and maintaining an exercise regime (Kanazawa, 2012), nocturnal activity (Kanazawa and Perina, 2009), experimentation with drugs, binge drinking (Kanazawa and Hellberg, 2010), monogamy and homosexuality (see Kanazawa, 2012 for review). Kanazawa (2012) also notes that IQ does broadly increase as we move away from the Savanna (e.g. Ash and Gallup, 2007 or Lynn and Vanhanen, 2012).

This theory has been subject to considerable criticism. Penke et al. note that the data does not support Kanazawa's proposal that *g* is a domain-specific adaptation. Kanazawa argued, in essence, that general intelligence is a universal human adaptation but that there are also individual differences in general intelligence. Kanazawa then inferred that *g*, an individual-differences variable, can be used as a 'measure' or 'indicator' of a general intelligence adaptation. Penke et al. argue that the fundamental problem with this argument is that *g* is a psychometric construct which underpins the positive relationship between scores on different kinds of cognitive tests. The data does not permit us to infer that *g* is anything more than that. Accordingly, the existence of *g* does not indicate that general intelligence is present in every normal human, only that, in a sufficiently large sample, there is a statistically significant positive correlation among individuals between scores on the different kinds of cognitive tests. In addition, Penke et al. point out that there may be multiple adaptations underpinning this relationship and there is no reason to assume that there is just one. Indeed, Penke et al. cite studies indicating that, 'Different individuals seem to use their brains

differently to solve intelligence tests equally well, and different rare (probably private or family-specific) mutations likely contribute substantially to the genetics of *g* in different individuals' (Penke et al., p.1). So, this would seem to imply that *g* is underpinned by multiple adaptations, as if it were underpinned by one then people with the same *g* score should obtain that score for the same reasons. Thus, Kanazawa's hypothesis makes the unwarranted assumption that *g* is a domain-specific adaptation.

In addition, there is strong evidence that evolution actually accelerated after humans left the Savanna, during the Holocene (around 12,000 years ago) (Evans et al., 2005 or Cochran and Harpending, 2009). But, most importantly, there are very serious problems with Kanazawa's division between 'evolutionarily novel' and 'evolutionarily familiar.' In essence, the same phenomena can be argued to be both 'evolutionarily novel' and 'evolutionarily familiar,' meaning that Kanazawa's theory is unfalsifiable because it can be used to predict opposites. An obvious example is liberalism. Kanazawa defines this as caring about genetically unrelated others and claims that it is evolutionarily novel. But we might equally argue that utter selfishness is evolutionarily novel because it would have led to being ostracized on the Savanna. As such, we would expect the most intelligent to be libertarians, who care only about themselves and their immediate kin.²

The same point can be made with regard to every single example Kanazawa provides in order to prove his theory. Atheism would be another example. Kanazawa (2010 or 2012b) argues that this is evolutionarily novel and positively predicted by intelligence. We might counter that intelligence/Openness-

² Kimmelman (2008) found at a US university (N 7279) that intelligence did indeed predict dimensions of libertarianism such as anti-regulation attitudes. It also negatively predicted more clearly conservative values, such as a belief in traditional gender roles.

Intellect would predict the curiosity involved in constructing any kind of comprehensive worldview, including a theistic one. Accordingly, we would expect any kind of comprehensive worldview (including a theistic one) to be positively associated with intelligence and thus for certain kinds of theist to be more intelligent than certain kinds of atheist. In addition, it could be argued that primitive peoples believe in 'spirits' rather than 'God.' Belief in God is thus evolutionarily novel and should be associated with high intelligence. Also, we might argue that having fervent belief of any kind is evolutionarily familiar and as such those who are the most atheistic (the most sure of their atheism) should also be amongst the least intelligent. As the Savanna-IQ Interaction Hypothesis is unfalsifiable it cannot be accepted.

In addition, it is perfectly possible to explain the relationship between intelligence and Openness-Intellect without recourse to Kanazawa's theory. An alternative hypothesis, submitted by Kaufman (8 January 2012), is that the dopaminergic system (which controls the release of dopamine) underpins variation in the spectrum from intelligence to Openness-Intellect, as this has been shown to lead to variation in both Openness-Intellect, broad thinking and mental flexibility. Kaufman may be wrong, but he at least suggests a plausible alternative possibility, one that is inherently more persuasive than Kanazawa's because it makes no assumptions about the nature of general intelligence.

4. The Cultural Mediation Hypothesis

A second alternative explanation is the Cultural Mediation Hypothesis. Woodley (2010) argues that human societies are in a constant state of tension between dominance (right-wing) and counter-dominance (egalitarian/ left-wing) instincts (see Charlton,

1997), the latter evolved later in prehistory to facilitate successful bands (see Woodburn, 1982; Knauff, 1991; Barkow, 1992, or Erdal and Whiten, 1994). Environmental factors, such as the extent to which basic needs are met or the success with which dominant males can disguise or justify their dominance, will affect whether a society is more 'dominant' or 'anti-dominant.' If basic needs are met, or there develops a greater awareness of inequality, then anti-dominance instincts will become more prominent. At any given time, there is a political norm which reflects the heightened position of one or other of these instincts. The highly intelligent would be better at 'norm mapping' (perceiving which was the dominant political perspective) and could, through 'effortful control' (e.g. MacDonald, 2008 or 2009) convince themselves that they accepted the dominant political perspective and so obtain the benefits of being on the winning team. In addition, they would be better able to understand the benefits of conforming. This is why intelligence is associated with center left-wing perspectives in societies where the dominant position is 'counter-dominance' but with center right perspectives in others, where the dominant perspective is 'dominance.' This might also imply that the highly intelligent would better understand the benefits of conforming to the dominant religious, or anti-religious, perspective.

A number of problems with this hypothesis have been examined in detail elsewhere (see Dutton, 2013b). However, with regard to religion, as we will see below, the evidence indicates that even in societies which are extremely religious the more educated tend to be the least religious (see Meisenberg et al., 2012). In that 'education' has been shown to have no effect on religiousness when intelligence is controlled for (Ganzach et al. 2013), it seems probable that it is higher intelligence which, even in highly religious countries, is associated with low religiousness.

Moreover, we would expect those who were high in intelligence to also be high in Openness-Intellect. This would predict not conformity but rather a questioning attitude with regard to authority, including with regard to religious authority. There are studies which indicate that this is true. Intelligence predicts political protest and voting for non-mainstream (though democratic) political parties in Western, democratic countries (Deary et al., 2008). In Brazil, it predicts voting for democratic parties which challenge the dominant political dispensation (Rindermann et al., 2011). In both cases, this is congruous with research which has found a -0.78 correlation between extremism and intelligence (Meisenberg and Williams, 2008). The more intelligent will tend towards a certain perspective and seemingly towards a more democratic one, as democracy is predicted by intelligence at a national level (see Lynn and Vanhanen, 2012 or Vanhanen, 2009). But they will tend to be repelled by the political extremes, presumably because they are better able to perceive the negative consequences of taking extreme action. With regard to a question such as belief in God, this would seem to predict that high intelligence would be positively associated with cautiously not believing in God. Fervently believing or not believing in God would be extreme (and thus associated with low intelligence) while cautiously believing in God would imply an inability to see through fallacious reasoning. The lowest intelligence would be associated with fervent belief in God and we will see below that this is indeed the case. As we will see below, this is congruous with the weak negative correlation which we have found at an individual level between religiousness and intelligence.

As such, we would expect the more intelligent to be more skeptical of religion in any kind of society and both direct and proxy evidence does indeed point in this direction. It may be, of course, that those who are highly intelligent but have a religious-

type personality profile (see Saroglou, 2002) will behave as Woodley suggests in the contemporary West. However, it seems that, in general, Woodley's hypothesis does not fully explain the behavior of the highly intelligent.

5. Critiques of the Inverse Relationship

Before turning to the large body of evidence proving the inverse relationship between intelligence and religiousness, it is worth noting two critiques of the idea that religion is negatively correlated with intelligence. The first has been presented by Cofnas (2012). Firstly, Cofnas argues that religious instincts are insufficient to explain the diversity of religion across the world, suggesting that intelligence plays a part in the diversity. Few people would argue, though, with the idea that the more intelligent will pursue different forms of religion when compared to the less intelligent.

Secondly, Cofnas rejects the idea the religion attracts those low in intelligence, arguing that some religions, such as Hinduism and Judaism, have levels of initiation which only the most intelligent can reach, so we would expect them to attract the more intelligent more than the less intelligent. This could be argued to be true of any religion, even dogmatic religions, as many have precisely such levels of initiation based around education, even if it is not explicitly stated that some are somehow lesser members.³ But, more importantly, this non-dogmatic, intellectualized religiousness sounds very much like liberal religiousness, a kind of religiousness which is between the religion archetype and atheism. Our theory would predict that the highly intelligent would be attracted to liberal religiousness, but merely add that the even more intelligent would be attracted to atheism and this is

³ It is true, for example, of many New Religious Movements. See Lewis (2004).

precisely what the evidence indicates. In some cases, those of very high intelligence may be religious but, as we have seen, this would be explained by a particular personality trait profile.

The second critique has been presented by American psychologist Caleb Lack (21 March 2013). Despite having been published on his website *Skepticink.com*, rather than in a peer-reviewed forum, it is a serious engagement with the evidence for the relationship between religion and intelligence. Firstly, Lack argues that the evidence for an inverse relationship is 'mixed,' though we will see that majority of studies find an inverse relationship and there are generally serious flaws in those that do not.

But, secondly and more importantly, Lack argues that the reason why religiousness, at least in the USA, negatively correlates with intelligence is that fundamentalists have low education (especially low levels of 'collegiate level' education) and, for this reason, they have lower intelligence. This hypothesis is contradicted by a large body of evidence indicating that intelligence predicts education (at 0.5 overall) while education does not strongly predict intelligence. This latter point is evidenced by the very high correlation, which we have already noted, between IQ aged 11 and adult IQ amongst samples with the same amount of education at age 11. In addition, as we will discuss below, evidence of a substantial decline in intelligence throughout the twentieth century in Western countries, despite a significant rise in education (Woodley et al., 2013), refutes this argument and implies that education may increase performance on aspects of the IQ test that measure something other than intelligence but not intelligence itself. Serious brain damage caused by illness or violence in childhood may reduce intelligence but it is not feasible to argue that university education, for example, significantly increases intelligence. Lack's argument is

further refuted by studies of students, with the same education level, which show a negative correlation between religiousness and IQ (see below).

In addition, Lack's hypothesis would have to blame the lack of education amongst fundamentalists not on low intelligence but on personality factors or environmental factors. Explaining fundamentalism solely in terms of personality characteristics is not sustainable because Openness-Intellect, which negatively predicts fundamentalism, also positively correlates with intelligence at 0.3. Blaming fundamentalism solely on poverty is highly question-begging, not only because of the heritable dimension to religiousness and fundamentalism but because, as we have discussed, income is significantly predicted by intelligence. So, this hypothesis can be dispatched.

Lack also presents a slightly different hypothesis. He observes that religious beliefs become 'more liberal' over the period that students are at college, implying that having a college education explains why the more intelligent are less religious. Fundamentalists, in the USA, are less likely, he suggests, to have a college education. But, again, there are serious problems with this hypothesis. An alternative explanation is that between the ages of 18 and 22 people's intelligence increases. As we will see in Chapter Nine, intelligence increases up to the cognitive peak of around age 35 and people become less and less religious as they reach this peak. This is a far more plausible hypothesis in that religious liberalism is predicted by intelligence even amongst school children and students who have the same level of education, as we will see below. Moreover, there is evidence that fundamentalists who attend fundamentalist colleges graduate more religiously liberal than when they started whereas fundamentalists who attend secular colleges graduate more fundamentalist than when they started (e.g. Hammond and Hunter,

1984). This all implies that there is nothing about secular education in itself that is making people more religiously liberal. Also, Ganzach et al. (2013) have found that, when controlling for intelligence, the influence of education on religiousness is nil. Lack counters with the following argument:

To those who would disagree with my assertion that innate intelligence does not differ between the religious and non-religious, I would pose a thought experiment: Someone is born into a religious family, and then later deconverts and becomes a non-theist. At what point did their intelligence increase? Was it with their deconversion? Did he/she became an atheist and get smarter? Did he/she get smarter suddenly, which then caused the deconversion? Obviously, this is a ludicrous question. It is especially odd given that we know people's IQ scores are relatively stable from age five to adulthood (at least on standardized intelligence tests). Something else must be driving any noted intelligence differences.

IQ scores are relatively stable beyond the age of 11, but they are in relation to a reference group of the same age. Intelligence, by contrast, increases with age, rising to a cognitive peak aged around 35. Deconversions tend to happen in adolescence and, as we will see, apostates are more intelligent than those who remain faithful (e.g. Zuckerman, 2011). As such, a reasonable explanation for 'deconversion' is that intelligence gradually reaches a certain point which allows a person to perceive the fallacious nature of religion. The evidence, reviewed in Chapter Nine, showing that as people reach their cognitive peak they become less religious proves that this is precisely what is happening.

Also, once a person moves out of the parental home they start creating an environment which reflects their own intelligence rather than that of their parents, which, as we have seen, may slightly boost their intelligence or reduce it. People's IQ scores are indeed 'relatively stable' but they are not completely stable, so, in some cases, delayed cognitive development may also contribute to understanding why 'deconversion' occurs when it does. Of course, intelligence in itself is not the only issue. In addition, life events (especially those that reduce stress), which are ultimately underpinned by intelligence and character, might play a part in 'deconversion,' as might adolescent changes in the strength of personality characteristics that predict religiousness. But Lack's thought experiment can be perfectly plausibly explained in terms of intelligence.

6. Religion and IQ

Having countered the criticisms of our thesis, in this section we will look at the research on the relationship between intelligence and religiousness at an individual level.

1. College Entrance Exams and Religiousness: A number of studies have used exams similar to IQ tests in an attempt to measure the relationship between religion and intelligence.

In 1928, both Howells (1928) and Sinclair (1928) independently published research indicating a negative correlation between religiousness and intelligence on this basis. Howells found a correlation of -0.27 while Sinclair found a correlation of -0.36. The research by Howells and Sinclair has been replicated in a variety of studies. Carlson (1934) found a correlation of -0.19 between religiousness and intelligence drawing upon 215 college seniors.

Brown and Lowe (1951) studied 788 students and found that, on average, the IQs of the highly religious students were 30% lower than those of the non-religious ones. They actually commented that their findings 'strongly corroborate those of Howells.'

Plant and Minium (1967) studied a sample of American university students. Using their SAT scores, they divided the sample into 'high aptitude' and 'low aptitude' and found that those of 'low aptitude' were more dogmatic and more religious.

Pothen (1975) discovered that religiousness was a strong negative predictor of success in SATs. The most irreligious scored 1148, the moderately irreligious scored 1119, the slightly irreligious scored 1108, and the religious scored 1022.

Wuthnow (1978) found that of 532 students, 37% of 'Christians,' 58% of 'apostates,' and 53% of 'non-religious' scored above average on the SATs. Wiebe and Fleck (1980) found that religiousness inversely correlated, at -0.24, with intelligence amongst 158 Canadian university students, to whom they administered Cattell's Sixteen Personality Factor Questionnaire.

Clark (2004), using a sample of 77 undergraduates at the University of California-Davis, found a negative correlation of -0.31 between SAT scores and religiousness. In summary, studies have fairly consistently found a weak negative relationship between religiousness and scores in university entrance and similar exams.

2. *Course Grades:* Rhodes and Nam (1970) arranged categories of religion according to their average degree of fundamentalism and anti-intellectualism. They found Baptists to be the most fundamentalist and Jews to be the least. Following this, they found that when religious groups were ranked according to their

distance from fundamentalism there was a correlation with intelligence of 0.17.⁴

3. *IQ Tests and Religiousness*: Franzblau (1934) studied 700 Jewish children and found an inverse correlation (-0.15) between 'accepting traditional Jewish dogmas' and IQ.⁵ Symington (1935) found that Sunday school children whose parents were religiously liberal were higher in intelligence than those whose parents were religiously conservative. Symington found that a religiously conservative background amongst school children correlated at between -0.13 and -0.29 with IQ.

Verhage (1964), using a nationally representative Dutch sample of 1538, found that agnostics scored 103.8, two Protestant groups scored 100.55 and 99.85 respectively and Catholics scored 97.95 IQ points. This meant that the average IQ for the religious was 99.45.

Blau (1981) studied 1000 Chicago school children, controlling for social class, profession, wealth and education. She found that children whose mothers were non-denominational had the highest IQs: 110 for whites and 109 for blacks. Children whose mothers were part of fundamentalist churches had the lowest IQs, up to 10 points lower.

Bell (2002), writing in *MENSA Magazine*, observed that a study of members of MENSA (he provides no reference nor sample number) assessed non-Mensans, Mensans and Super-Mensans. Non-Mensans had an IQ of around 115, Mensans had an IQ of around 130 while Super-Mensans had an IQ of at least 146. The research, in the USA, found that belief in Christianity was 83% among non-Mensans, 56% among Mensans and 47% among

⁴ Correlation quoted from Zeidner (1995, p.315).

⁵ See Baskin (2011) for a discussions of the differences between liberal and conservative Judaism.

Super-Mensans.⁶ Indeed, of all of the 43 studies up to 2002, when Bell conducted a meta-analysis of the issue, only four had not found a negative correlation between religiousness and intelligence. Unfortunately, Bell does not state which studies were actually involved.⁷ In addition, Bell's analysis does not appear to be complete. For example, no significant relationship was also reported, for example, by Glassey (1943), Garrity (1960), and Povall (1971). These were unpublished Masters theses, but as we will see below there are published studies that he must have missed. However, it is clear that the overall trend is towards a negative correlation.

White et al. (2010), using a sample of 216 college students from a 'small, state university,' found no significant correlation between IQ and fundamentalism. However, not only was the sample small but very unrepresentative in that, as the authors note, Protestant fundamentalists in the USA typically have low education levels.

Kanazawa (2010) drew upon those that had participated in the American National Longitudinal Study of Adolescent Health. Their intelligence was initially tested using the Peabody Picture Vocabulary Test and they were interviewed as young adults in 2001 and 2002 (N 14,277). These 'young adults' evidenced an inverse relationship between religion and intelligence. Those classified as 'not religious at all' had the highest IQ: 103.09. The IQ declined the more religious they were. The 'slightly religious' had an IQ of 99, the 'moderately religious' had an IQ of 98 and the 'very religious' had an IQ of 97. Kanazawa found that there was a -0.78 negative correlation between religiousness and IQ.

⁶ It seems he was referring to Southern and Plant (1968). The N was 72.

⁷ I attempted to contact Paul Bell in January 2013 to discover which 43 studies he was referring to. A MENSA representative told me that Mr. Bell had died in 2003.

Kanazawa's methods may be slightly crude because 'religious' can be a provocative term, with some highly evangelical Christians insisting that they are 'believers' or 'Christians' but are not 'religious,' associating being 'religious' with rituals and Catholicism.⁸ But, in general, we can likely expect those being surveyed to understand that such an interpretation of the word 'religious' is rather idiosyncratic and to understand what is generally meant by it. However, even so, the negative correlation might be far weaker if religiousness was measured by asking a series of questions about religiousness and scoring them. Dividing subjects into broad categories is obviously much less subtle and thus likely to yield an extreme correlation. This is precisely what happens if we correlate Bell's (2002) findings (-0.95 between IQ and Christianity).

Lewis et al. (2011) drew upon 2307 people (92% white American) and found a negative correlation (-0.25) between 'fundamentalism' and IQ. They also controlled for Openness and found, when doing so, that intelligence was significantly negatively correlated with 5 out of 6 measures of religion (including 'fundamentalism'), with a possible correlation of zero with 'spirituality.'

Nyborg (2009) used representative data from the National Longitudinal Study of Youth in the USA to find that atheists scored 1.95 IQ points higher than agnostics, 3.82 points higher than the liberal religious, and 5.89 IQ points higher than dogmatic religious where atheists had an average IQ of 111.08 and the dogmatic religious of 105.19. He also found that out of 14 significant Christian groups, as well as Jews, Muslims, 'others,' atheists and agnostics, the highest IQ in the USA was associated with Episcopalians (113), Jews (112), and Atheists (111). The

⁸ I found this in my own anthropological fieldwork with evangelical university students. See Dutton (2008c).

lowest were associated with Pentecostals (101) and other fundamentalist groups. The finding is likely to reflect the way that atheism is associated with replacement religions, the adherents of which, as we will see, have relatively low IQs. In addition, the American Episcopal Church is highly liberal. Judaism is likely to be a strongly ethnically-based identification and Jews have the highest average IQ of any ethnic group (see Lynn, 2011a).

In an analysis of US states, Pesta et al. (2012) have found that, broadly, the states with the lowest IQs have the highest rates of theistic belief and the highest rates of fundamentalist belief. The states with the highest IQs are the most religiously liberal and irreligious. This was discovered as part broader research into a negative correlation between religiousness and state well-being, examining such issues as income, crime-rate and health. This cluster would be congruous with the evidence that low intelligence leads to high time preference and poor health (see Lynn and Vanhanen, 2012, Ch. 6). Overall, IQ correlated with religiousness at -0.55. Interestingly, the banning of gay marriage, a good indicator of state conservative religiousness, had a -0.36 correlation with intelligence.

There is, therefore, we can hypothesize, a weak but significant negative relationship between intelligence and religiousness, based on the above discussion. The correlation can be calculated by tabulating all the available studies that provide a correlation between intelligence and religious belief or intelligence and a mixture of religious belief and practice. The data for this meta-analysis was accrued by drawing upon Zuckerman et al. (In Press) and through the use of academic and non-academic search engines.

Table 7.1. Correlation between Religious Belief and Intelligence Amongst Individuals.

	Measure	Sample	Correlation	Reference
1	Beliefs	278 students	-0.15	Bertsch and Pesta, 2009
2	Beliefs	96 students	0.04	Blanch-Fields et al., 2001
3	Beliefs	219, population	-0.33	Blanch-Fields et al., 2001
4	Fundamentalism	108, students	-0.43	Brown and Lowe, 1951
5	Attitude to God	215 students	-0.19	Carlson, 1934
6	Beliefs	216 students	-0.14	Ciesielski-Kaiser, 2005
7	Religiousness	77 students	-0.31	Clark, 2004
8	Beliefs	234 students	-0.03	Corey, 1940
9	Beliefs	123 students	-0.14	Cottone et al., 2007
10	Beliefs	75, population, female	-0.36	Crossman, 2001
11	Beliefs	11,936 school children	-0.1	Deptula et al., 2006
12	Belief	44, population, extreme group	0.5	Dodrill, 1976
13	Beliefs	60, population	-0.13	Dreger, 1952
14	Beliefs	165 male students	-0.16	Feather, 1964
15	Religiousness	36, population	-0.49	Foyle, 1976
16	Beliefs	2272, population	0.03	Francis, 1979
17	Dogmatism	711 school children	-0.18	Francis, 1997

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18	Attitude to religion	290 low IQ school children	-0.12	Francis et al., 1985
19	Jewish Dogmatism	700 Jewish school children	-0.15	Franzblau, 1934
20	Attitudes to God	349 students	-0.19	Gilliland, 1940
21	Belief in God	100 students	-0.2	Gragg, 1942
22	Beliefs and Practice	261 students	-0.06	Hadden, 1963
23	Belief	172 school children	-0.05	Horowitz and Garber, 2003
24	Religious conservatism	552 students	-0.32 (median)	Howells, 1928
25	Beliefs	22 students	-0.13	Inzlicht et al., 2009
26	Beliefs	268 students	-0.24	Jones, 1938
27	Religiousness	14277, population	-0.12	Kanazawa, 2010
28	Religiousness	7160, population	-0.14	Kanazawa, 2010
29	Fundamentalism	2307, population	-0.25	Lewis et al., 2011
30	Fundamentalism	951, population	-0.45	McCullogh et al., 2005
31	Religiousness	20 school children	-0.20	Nokelain and Tirri, 2010
32	Beliefs	223, population	-0.20	Pennycock et al., 2012
33	Beliefs	267, population	-0.18	Pennycock et al., 2012
34	Beliefs	195 students	-0.19	Poythress, 1975
35	Beliefs	120 students	0.07	Saroglou & Fiasse, 2003
36	Beliefs	94 school children	0.13	Saroglou and Scariot, 2002

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37	Beliefs	306 students	-0.06	Shenhav et al., 2011
38	Beliefs	12994, population	-0.29	Sherkat, 2010
39	Beliefs	1780, population	-0.34	Sherkat, 2011
40	Mysticism	500 students	-0.27	Sinclair, 1928.
41	Beliefs	439 students	-0.24	Stanovich and West, 2007
42	Beliefs	1045 students	-0.18	Stanovich and West, 2007
43	Religious conservatism	Sunday school children (Conservative background)	-0.21 (median)	Symington, 1935 (Used 612 children and students)
44	Attitude to religion	200 school children	-0.04	Turner, 1980
45	Attitude to religion	200 school children	-0.02	Turner, 1980
46	Religiousness	216 students (fundamentalist)	0	White et al., 2010
47	Beliefs	481 students	0.03	Young et al., 1966
48	Beliefs	574 students	-0.11	Young et al., 1966

If we remove the 5 studies which involve extreme groups then we have 43 studies. The first point worth noticing is that if we focus solely on the relationship between intelligence and fundamentalism then the average of the three studies is -0.38. If we focus, however, on the relationship with religious belief and focus on the 43 samples the correlation is -0.15. With student samples, the correlation is -0.14, with population samples it is -

0.23 and with child samples it is 0.09. This is as we would expect because children would be under the influence of the religiosity of their parents, thus reducing the influence of intelligence while intelligence would have already been heavily selected for amongst the student sample relative to the general population.

At the time of going to press, a broader meta-analysis of 63 studies on the relationship (Zuckerman et al., In Press) found that for college students and the general population the mean correlation between religion and intelligence was -0.24. However, this correlation reflects the fact that the meta-analysis includes not just 'belief' but mixtures of different measures, church membership, and church attendance. It includes non-religious extreme samples (such as MENSA members) and tests which only weakly correlate with intelligence. Zuckerman et al. also found that the negative correlation between intelligence and religious practice was weaker than the one between intelligence and religious belief. This is as we would expect because extrinsic religiousness can be motivated by factors such as image maintenance rather than genuine belief. In Table 7.2, we can see the studies which examine the relationship between intelligence and religious participation.

Table 7.2. Correlation between Religious Practice and Intelligence Amongst Individuals.

	Measure	Sample	Correlation	Reference
1	Attendance	96 male, population	-0.10	Bender, 1968
2	Behavior	96 students	-0.03	Blanch-Fields et al., 2001
3	Behavior	219, population	-0.3	Blanch-Fields et al., 2001
4	Attendance	230, students	-0.15	Bloodgood et al., 2008
5	Attendance	101, population	-0.25	Carothers et al., 2005
6	Behavior	2272, population	0.05	Francis, 1979
7	Behavior	172 school children	0.15	Horowitz and Garber, 2003
8	Behavior	2307, population	-0.15	Lewis et al., 2011
9	Membership	3742 school children	-0.05	Nyborg, 2009
10	Behavior	223, population	-0.18	Pennycock et al., 2012
11	Behavior	267, population	-0.18	Pennycock et al., 2012
12	Beliefs	12994, population	-0.01	Sherkat, 2010
13	Attendance	236 children	0.15	Szobot, 2007
14	Membership	1538, population	-0.12	Verhage, 1964

We can see here that the mean correlation between intelligence and religious practice is only -0.08. As discussed, such a weak a negative correlation is not unexpected.

7. Religion and Undergraduates

We will look separately at religion amongst those argued to have the highest intelligence level, such as academics and research scientists. However, studies of undergraduate university students, who have an average IQ of around 115 (e.g. Simonton, 1988), have consistently shown that they are markedly less religious than the nations in which they study and that students at the most prestigious universities are the least religious of all.

Gilkey (1924), in a qualitative and rather impressionistic analysis, commented that American university students are less religious and more liberal in their religiousness than the general population. Goldsen (1952) found the following percentages for undergraduates believing in God: Harvard 30; UCLA 32; Dartmouth 35; Yale 36; Cornell 42; Wayne 43; Wesleyan 43; Michigan 45; Fisk 60; Texas 62; North Carolina 68. Although there may be other factors contributing to these differences, such as the regions from which the students hail, their general direction inversely correlates the prestige of the university with the percentage of undergraduates strongly claiming to believe in God. In 1948 (Gallup, 1948) 95% of Americans believed in God. Caplovitz and Sherrow (1977) found that apostasy rates were 5% at the least prestigious universities compared to 17% in the highly ranked universities.⁹ Niemi et al. (1978) found that in 'elite schools' 26% of students judged religion 'important' compared to 44% of students in a broader sample of colleges.

⁹ A qualitative analysis of 87 apostates by Zuckerman (2011) also indicates that apostates tend to more intelligent than those who remain faithful.

There is some evidence that, within universities, the more educated are less religious than the less educated. Simonton (1988) argues that the average IQ of an undergraduate at a US university would be about 118 while a PhD researcher would have an IQ of about 130 (see Chapter 8). Indeed, if we turn to students at the more elite universities, where students have higher IQs than average students (see Heim, 1968), we find evidence of low religiousness.¹⁰ Lee and Bullivant (2010) note that in a 2007 survey, 48.9 % of a sample of 728 Oxford University students agreed with the statement 'I do not believe in God' while a further 7% agreed with it cautiously or were agnostic. As such, 57% of Oxford University students were atheist or agnostic compared to about 5% of British people, who, according to Lee and Bullivant, class themselves in this way. Postgraduates in the Oxford University sample were more religious than undergraduates in terms of belief in God. The authors speculate that a larger portion of non-Europeans is likely to be a strong factor here. Oxford University's 2012 survey (Religion and Belief Survey, 2012) implies that they may be right. There are many problems with the survey in question. For example, responses (N 1680) were collected by email request and the 'staff' category does not distinguish between academic and administrative staff. Nevertheless, in 2012, 42% of undergraduates were atheist (33%), agnostic (8%), or humanist (1%). This is contrasted with 38% of postgraduates who selected one of these categories: atheist (29%), agnostic (7%) and humanist (2%). 43% of university staff selected one of these categories while they made up 44% of 'college only' staff. But the difference in the composition of the undergraduate and postgraduate sample is very striking. Over 83% of the

¹⁰ Mascie-Taylor et al., for example, found that the average Cambridge University student possesses an IQ half an SD higher than the average British student.

undergraduate sample is British. We can assume these were mostly white British or, at least, white people composed 88% of Oxford University undergraduates in 2012 (Cunnane, 19 December 2011). A further 7% of undergraduates were 'EU or EEA,' and 7% were from 'outside the EU.' But amongst postgraduates, only 46% were British, with 21% EU or EEA and 32% were from outside EU. The authors even state, though without giving precise statistics, that most of those subscribing to non-Western religions in their survey are from outside the EU. Accordingly, we might even suggest that the substantial nationality difference between undergraduates and postgraduates together with the very slight increase in religiousness amongst postgraduates might imply that an 83% British postgraduate sample at Oxford would lead to higher atheism, agnosticism and humanism rates than an undergraduate one. The college staff (the most atheistic category) were 91% British while the university staff, the second most atheistic group, were 79% British. So although there are difficulties with this survey, it seems to imply that, were the survey focused on the British, the university staff would be more atheistic than the postgraduates who would in turn be more so than the undergraduates. This is as we would expect.¹¹ In addition, as we have discussed, intelligence only predicts postgraduate success at 0.4 and the same personality factors that predict religiousness predict educational success, so this may also be a factor in Oxford's relatively high postgraduate religiousness. However, it seems likely from the results that the most significant factor is high numbers of international postgraduates.

A similar survey at Bath University actually provides comparable results (Bath University, 2012). Although not as prestigious as Oxford University, Bath is still respected and was

¹¹ I wrote to the 'Diversity Officer' of Oxford University in January 2013 asking for the original data but she informed me that it had been destroyed.

ranked the third best university in Britain by the *Sunday Times* newspaper in 2011 in terms of research (Bath University, 28 September 2011). Its survey, advertised around the university, attracted 671 responses. We are not told the nature of 'staff,' and we can assume it includes non-academic staff. Usefully, 'postgraduate' is divided between 'taught' (a Masters degree) and research (usually for a PhD). Unfortunately, the authors provide no analysis of the nationalities of participants. Nevertheless, those who felt they 'had no religion' constituted 25% of undergraduates, 31% of taught postgraduates, 42% of PhD researchers and 39% of staff. Staff, as a category, is difficult to analyze because their precise educational level is unclear. But putting them aside, the results are as we would expect. The most intelligent group, PhD researchers, is the least religious while the least intelligent group, undergraduates, is the most religious. Indeed, they parallel the results achieved by US-based researchers who found that 11.1% of BA graduates were atheist or agnostic, while this was true of 23.4% of university lecturers and 36.6 % of elite university lecturers (all of whom might be expected to have PhDs) (see Gross and Simmons, 2009).

8. Religion and Intelligence amongst Individuals across the World¹²

Until now we have mainly focused on research in the USA and the UK, but in this section we will broaden this to a worldwide analysis. A relatively comprehensive analysis has been conducted by Meisenberg et al. (2012) drawing upon the results of the World Values Survey between 1981 and 2009 and comparing these to measures of education (as a proxy for intelligence). They found,

¹² This section is presented in more detail in Dutton (2013a).

as we would predict, that overall religiousness and education (an imperfect proxy for intelligence) were weakly negatively correlated in the majority of the 96 countries surveyed. They also found that at the country level religious belief was also, in most cases, negatively correlated with this proxy for intelligence (70 negative, 25 positive, 1 with no correlation).

Table 7.3 - Religious Belief and Education in Different Countries (Meisenberg et al. 2012)

Area	Correlation between Religious Belief and Education
Protestant Europe	-0.38
Catholic Europe	-0.82
English-speaking Countries	-0.47
Ex-Communist	-0.1
Latin America	-0.6
Middle East	-0.94
South Asia	-0.35
East Asia	-0.42
Africa (Black)	0.42

They conclude that intelligence, at 60.5% of variance, is the biggest single predictor of religious difference. However, they observe a number of counter-intuitive findings.

Firstly, they note that in countries with a very low IQs religiousness positively correlates with education. They suggest that this is because, in such societies, religion is a system of explanation meaning that the more intelligent will be more religious because they can comprehend a more complex explanation. I think a more obvious explanation is that in such countries those with low intelligence are more likely to adhere to

what might be regarded as 'superstition' rather than 'religion.' If researchers attempted to discern the extent to which the 'superstitious' and 'religious' were fervent and perceived an agent behind events the results may well be reversed. 'Religion' is, thus, being defined here much more narrowly than how we are defining it in this study and Meisenberg et al., (2012, p.115) do seem to be aware of this problem, noting that small scale societies do not employ 'elaborated religion.'

Moreover, Meisenberg et al. used 'education' as a proxy for intelligence in reaching their correlations. This is slightly problematic because educational success only correlates with intelligence at 0.5 (e.g. Jensen, 1980, p.316). The same personality characteristics that predict educational success also predict religiousness (e.g. Saroglou, 2002 or Feist, 1998). As such, it is perfectly possible that intelligence does negatively predict relative religiousness, even if only weakly, within Sub-Saharan African countries.

Secondly, they found that in a number of Western countries, such as Sweden and Britain, being 'religious' is positively correlated with education. They put this down to the highly intelligent rationalizing their own desire to be religious and arguing that there are two separate realms, somehow permitting them to identify as rational and concomitantly obtain the benefits of religion. They argue that this is congruous with research indicating that physical scientists are more religious than social scientists (e.g. Gross and Simmons, 2009), though it might be noted that Ecklund and Scheitle (2009) found the opposite with a sample of scholars from only the most elite US institutions. But this supposed 'separating of realms,' a rationally justified religion in itself, sounds very much like liberal religiosity (which, at its extremes, some might legitimately call atheism whatever adherents call it) which is, anyway, associated with relatively high

intelligence (see Argyle, 1958 or Kanazawa, 2010), though not as high as the intelligence associated with atheism. It might be argued that in countries with strong welfare states it may even be that it is more stressful to be in a high status profession than in a low status one, which would promote high religiosity amongst those of high status. However, a survey of the studies indicates that this is not the case. Those of low status are more stressed (e.g. Berry and Ataca, 2010, p.644). As such, the simplest explanation for their finding is that education is an imperfect proxy for intelligence and that the same personality factors that predict educational success predict religiosity. In addition, Meisenberg et al's (2012) datasets do not appear to clearly distinguish between, for example, having a degree and having a doctorate. Thus, broadly, in certain countries, education may positively correlate with religiosity due to a failure to distinguish between different levels of higher education.

Thirdly, they noted that in South Korea, Buddhists have the lowest education, followed by Catholics and followed by Protestants (who are regarded as the most religious). But, again, education is an imperfect proxy for intelligence. They explain the difference by arguing that Protestantism is attractive to the highly educated because, with its internally consistent system of dogmatic teachings, it is rather like science. Indeed, they hypothesize that religions with a 'positive attitude to critical thinking' will be more attractive to the educated. This may be so, but, as already emphasized, education is an imperfect proxy for intelligence. So, the simplest explanation is that Protestantism provides more order and structure. This is attractive to people of high Conscientiousness and Conscientiousness strongly predicts years of education. And in addition, as Meisenberg et al. (2012) rightly point out, the educated are likely to be higher in Openness-Intellect and Protestantism is relatively new to South Korea and

originally flourished, in the nineteenth century, amongst the more educated, also partly explaining the relationship (see Yu, 2002).

Finally, they observe that amongst the Mormons education positively correlates with religiosity (see Albrecht and Heaton 1984, Merrill et al., 2003; Stark, 2005 or Charlton, 2012). However, they point out that the most intelligent Mormons are likely, every generation, to leave such a religion, explaining the positive relationship. In the absence of the most intelligent, educational success will be strongly predicted by personality traits which also predict religiousness. If Mormons are more educated than the general population then, as discussed, personality factors may be behind this rather than intelligence *per se*. Meisenberg et al.'s (2012) research seems to demonstrate the pattern we would predict. More research is needed to understand the positive correlation between religion and IQ in Sub-Saharan Africa but I have proffered what seems to be the simplest explanation.

9. Intelligence and Replacement Religiousness

As we have discussed, there is a persuasive case for broadening the definition of religion to include certain political ideologies and especially Communism (and related ideologies) and Nationalism. These perspectives, and most obviously Communism and Nationalism, tend to be at the extremes of political discourse in contemporary Western nations. As Popper (1957) observes, supporters of ideologies of these kinds want a revolution; they want extreme action rather than sensible, thoughtful, cautious steps in a certain direction. Researchers have found a strong negative correlation between extremism and IQ, as discussed (Meisenberg and Williams, 2008). Accordingly, we would expect political extremists to be low in intelligence. We would predict that supporters of political parties that might reasonably be termed

replacement religions - generally those of the far left and far right¹³ - would be the least intelligent. High intelligence would be associated with the center and with that which is, as long as it is not extremist, challenging the dominant discourse and perceived as necessary to achieve a particular goal; hence the association in Brazil between the center right and high intelligence (Rindermann et al., 2011). As with 'religion,' this association can be explained by the fact that intelligent people are more able to see through the fallacious arguments presented by the proponents of replacement religion. In addition, they will be repelled by its extremism, better able to foresee the future negative consequences of it, more focused on the future (due to low time preference), and more skeptical, inquiring and open to new ideas (meaning they will be more critical and especially repelled by extreme conservatism).

10. Replacement Religion in the UK

Support for the nationalistic and socialist British National Party (BNP) and for the nationalistic and libertarian UK Independence Party (UKIP), is mainly found amongst those of relatively low intelligence according to Deary et al.'s (2008) analysis of how the British 1970 cohort voted in the country's 2001 General Election. Of the eight political parties mentioned in the survey - Labour, Conservative, Liberal Democrat, Green, Scottish National Party, Plaid Cymru, UKIP and BNP - BNP voters had the lowest IQs, at 98.4 (Deary et al., 2009). UKIP voters had the second lowest IQs

¹³ I appreciate that there has been considerable debate over the utility of the left/right division and further discussion of the degree to which 'far right' in particular does or does not remain a neutral terms of analysis. See Gabb (2007) or Bobbio (1996). I use the term here because, despite the degree to which it has become an insult, it is the most efficient way to convey the perspective I am discussing.

(101.1) while Green and Liberal Democrat voters had the highest IQs (108). UKIP, and to an even greater extent the BNP, are nationalist parties of the far right. We would expect the less intelligent to be the most easily persuaded by the rhetoric of such groups and, as intelligence positively correlates with Openness-Intellect, to be drawn to their conservative way of thinking. Low Agreeableness (which may be associated with low IQ) would predict being drawn to their tough-mindedness and lack of desire to co-operate while low IQ would predict being drawn to their extremism.

Unfortunately, there is no manifestly 'far left' party in Deary et al.'s analysis. The SNP and Plaid Cymru are problematic because, though left wing, their nationalism is likely to appeal to instincts for genetic preservation in both nations (see Rushton, 2005). Nevertheless, their voters do indeed have relatively low intelligence (102.5 for Plaid Cymru and 102.2 for the SNP). It may, however, be possible to argue that Labour, as a strongly pro-Multiculturalism party that is intolerant of dissent in a way untrue of the Liberal Democrats or the Greens,¹⁴ can be regarded as (relatively) 'extreme' and 'religious.' This being so, we would expect its voters to have lower IQs than the Conservatives, Liberal Democrats or the Greens and this is indeed the case. Labour voters have an IQ of 103, compared to 103.7 for Conservatives, and 108 for the Liberal Democrats and the Greens. So, it appears that a party that lacks the centrist dimension which sits poorly with religiousness can be problematic for the most intelligent. In addition, 77% of the 'unskilled' (the least intelligent) voted Labour. It might be argued that, as Labour is traditionally the

¹⁴ Gabb (2008) has looked in-depth at the illiberal nature of the New Labour government that governed the UK from 1997 to 2010. He argues that it introduced a raft of laws restricting freedom of speech, freedom of political association and the like, and took Britain close to being a police state.

party of the worker, they are simply voting in their own interests. But, by 2001, Labour had conspicuously shed this image, advocating more centrist economic policies combined with Multiculturalism and high immigration, which is generally detrimental to the unskilled as they must compete for jobs with immigrants.¹⁵ Accordingly, the high unskilled vote can be interpreted as the least intelligent being the least critical of a replacement religion, which is precisely what we would expect. 'Professionals' were the most skeptical of it; with the Labour vote percentage increasing as the class-intelligence hierarchy is descended. With the Greens, the opposite pattern was precisely observed and with the Conservatives and Liberal Democrats it was broadly observed.¹⁶

10. Conclusion

In this chapter we have surveyed the studies which examine the relationship between holding religious beliefs and intelligence from 1928 to the present. We have found that almost all of them have uncovered an inverse correlation between intelligence and religious belief and an even more pronounced inverse correlation between intelligence and conservative religious belief. We have also looked at studies which show that the more educated (education being a proxy for IQ) are less religious than the less

¹⁵ For a detailed examination of New Labour, as the Labour Party has commonly been termed since 1994, see Bevir (2012). He looks in detail at the party's anti-democratic tendencies. See Zweig (2012) for a discussion of the negative impact of immigration on unskilled workers.

¹⁶ Fractionally more 'managerial' voted Conservative than did 'professional' and fractionally more 'skilled non-manual' voted Liberal Democrat than did 'managerial.' Britain's voting system means that there are constituencies (parliamentary seats) that are a Lib Dem-Conservative fight, meaning it is pointless voting Labour. This may partly explain this anomaly.

educated and studies showing that attendees at the more prestigious universities are less religious than those at the less prestigious ones. We have explained how potentially anomalous data is actually congruous with our hypothesis and we have also found that the most obviously replacement religious parties are disproportionately supported by the least intelligent portions of the population. In general, there is a negative correlation between religiousness and intelligence. However, we would expect this to be especially pronounced amongst the very highly educated - who would have very high intelligence - and we will turn them in the next chapter.

Chapter Eight

Religiousness and the Intelligence Elite

- 1. Introduction.*
- 2. Education and Intelligence.*
- 3. IQs of Academics in Different Disciplines.*
- 4. Religion in Academia.*
- 5. Nobel Prize Winners and Academic Societies.*
- 6. Academia and Replacement Religion.*
- 7. Conclusion.*

1. Introduction

This chapter will examine religiousness amongst the highly educated, focusing on academics in the USA and in the UK. It will argue that, as academics (and the highly educated in general) would be expected to be the most intelligent people in any society, we would also expect them to be the least religious and the data we have demonstrated this to be so in terms of religion and replacement religion. It will be demonstrated that, even within academia, there may be an inverse relationship between intelligence and religiousness.

2. Education and Intelligence

We have already observed that education level is a reasonable proxy for intelligence. Overall, educational achievement correlates with IQ at 0.5. However, it is 0.7 for those at high school, 0.5 for university students and 0.4 for postgraduates (Jensen, 1979, p.319). Accordingly, as the sample becomes more educated, factors other than IQ, such as aspects of personality,

become increasingly important in predicting educational achievement. Nevertheless, there is sound evidence for arguing that the more educated a person is, the more intelligent they are likely to be. In general, the PhD is the highest academic honor which most universities can confer.¹ Accordingly, we would expect those who have PhDs to have particularly high intelligence. Herrnstein and Murray (1994, Part 1, Ch. 2) argue that, in relatively crude terms, the US socio-economic hierarchy can be divided-up in terms of IQ. The lower-middle class of office workers, police officers and the like will have an average IQ of around 100 (the mean in Western European countries), the middle class or 'lower professionals'² (for example school teachers or accountants) have an IQ of about 110, those who are further educated (and often more respected) known as the 'higher professionals,' such as lawyers, physicians and 'college lecturers,' tend to have an IQ of around 120. Herrnstein and Murray do not specifically look at the IQ of academics beyond the broad 'college lecturer' category (which would presumably include those teaching at community colleges who hold Masters degrees).

However, a number of studies have gone beyond this category. In general, the minimum requirement in a Western European country, or in the USA, to be a professional academic (a university lecturer and researcher) is a PhD. The average IQ of those who have PhDs is significantly higher than those who are simply lawyers or physicians. Jensen (1979) predicted 130 as the minimum IQ required to obtain a PhD. Simonton (1988, p.42) has found similar results. He estimated the average PhD holder to have an IQ of 130, with the average Physics PhD being 140. This

¹ However, some English universities confer higher doctorates and some European universities confer 'docentships,' which are comparable to higher doctorates in many respects.

² See Argyle (1994).

would place the average person with a PhD in the top 2% of a Western country's intellectual hierarchy. Accordingly, we can reasonably assert that those who have PhDs, which is the overwhelming majority of academics in Western countries, can be reasonably regarded as the intellectual elite. In addition, there is evidence of clear intelligence differences between PhD holders in different subjects.

3. IQs of Academics in Different Disciplines

A summary of the research looking at the IQs of academics in different disciplines is shown in Table 8.1.

Table 8.1 -IQs of Academics in Different Disciplines

Study	Findings	Comments
Roe (1953). N. 64 'eminent American scientists.'	<i>Psychologists</i> : 163 (verbal), 141 (spatial), 162 (mathematical). Average: 155. <i>Anthropologists</i> : 165 (verbal), 135 (spatial), 142 (mathematical). Average: 147. <i>Biologists</i> : 162 (verbal), 137 (spatial), 165 (mathematical). Average: 154. <i>Experimental Physicists</i> : 154 (verbal), 141 (spatial). Average: 147 (of two tests). <i>Theoretical Physicists</i> : 168 (verbal), 149 (spatial). Average: 158 (of two tests).	Small sample. Ages not stated. Discipline members selected in different ways. E.g.: Psychologists by recommendation from a few 'eminent psychologists' but others more randomly. Roe created a special test for all of them seeing it as 'impertinent' (Simonton 2002, p.150) to have them take a standard one. Physicists did not have to take the math test because it was 'too easy for them.' This means we can only estimate physicist IQs.
Gibson and Light (1967). N 148 academics at Cambridge University.	<i>Social Scientists</i> - 121.8. <i>Agricultural Scientists</i> - 121.6. <i>Mathematicians, biochemists and chemists</i> : 130.0. <i>Biologists</i> : 126.1. <i>Medics</i> : 127. 0. <i>Physicists</i> : 127.7.	Small sample. Male only. Age range: 25 - 34. Used the WAIS test. Does not state whether sample have PhDs, but merely that they are academic staff. Considerable range overlap. E.g. 112 - 132 for social scientists and 112 to 136 for physicists. Scientists not ranked

		'eminent' but working at Cambridge University implies a certain degree of eminence (Simonton 2002, p.151). Possibly higher IQs than average PhD holders. Average IQ of Cambridge academics may have increased since 1967 due to increased competition to work there.
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Gibson and Light (1967) are more reliable than Roe (1953) because they obtain their results more systematically and administer the same test, the WAIS, to each sample. Their sample is also larger. Many of Gibson and Light's differences were statistically significant. For example, social scientists had significantly (0.01 confidence) lower IQ scores than mathematicians, biochemists, chemists, and physicists.

There are more recent data for undergraduate students from the USA (e.g. Educational Services, 2012) but we cannot be sure about the relative percentages from each subject that go on to do PhDs, complete their PhDs or become academics, rendering Gibson and Light's (1967) data more helpful. Even so, this research replicates the interdisciplinary differences that Gibson and Light (1967) found. An analysis of the average SAT scores achieved by undergraduates in different 'majors' in the USA, converted into IQ (Educational Testing Services, 2012, no N provided)³, attest to clear interdisciplinary differences: *Physics*: 133, *Mathematics*: 130, *Physical Sciences*: 125, *Humanities and Arts*: 120, *Social Science*: 115. There are considerable variations within the faculties. For example, the average Philosophy major has an IQ of 129 while the average historian has an IQ of 119, yet both are Humanities.

³ I wrote to the testing company asking for details in January 2013, and have received no response at the time of writing.

In addition, Harmon (1961) researched the school records of all 8930 PhDs awarded in the USA in 1958. She ended-up with a usable sample of 6259, 80% of the US-national PhD graduates of 1958. Using their various school IQ tests, she standardized the tests according to the Army General Classification Test. The test was not precisely comparable to an IQ test. It had a mean score of 100 and an SD of 20. Harmon found that the average PhD student scored 130.8, which, claims Eysenck (1979, p.96), is an IQ of 'about 125' (in fact 123). Math PhDs scored 138 (IQ: 128), Physics PhDs scored 140 (IQ: 130), Social Science PhDs scored 132 (IQ: 124), but the mean score was dragged down by Education PhDs, who scored only 123 (IQ: 117). We can see that these are approximately comparable to the Cambridge University sample and the significant difference between social science and physics and math is replicated. However, the small differences are noteworthy. Gibson and Light's 'Social Science' was composed of 'Geography,' 'Economics' and 'Politics' while Harmon conflates all social sciences, possibly partly explaining the different scores. Gibson and Light not only use an elite academic sample, which replicates Harmon's interdisciplinary differences based on a large sample, but they allow us to be more specific.

Later in this chapter, once we have established that academics are less religious than the general population, we will draw upon Gibson and Light to look at the relationship between interdisciplinary religious and replacement religious differences and intelligence within academia. We will compare Gibson and Light to a number of relatively recent US studies on academic religiousness and replacement religiousness (e.g. Ecklund and Scheitle, 2007 and Rothman et al., 2005). However, drawing upon Gibson and Light raises a number of problems and it is worth dealing with them at this stage.

Firstly, it will involve using a British sample to assess the USA. However, this seems unproblematic in that the average intelligence in these countries is approximately the same (see Lynn and Vanhanen, 2012) and the essential differences are replicated by a large US sample of PhD graduates and a large US sample of undergraduates.

Secondly, it raises the issue of differing academic systems, especially when comparing England and the USA, the latter having a broader 'academia' including more community and religiously affiliated colleges which are 'teaching only' (see Pepovic and Green, 2012). However, this can be obviated if we compare the Cambridge University sample to Ecklund's (2007) sample of academics at USA elite universities (which we will discuss below), as Cambridge University would be comparable to these institutions (see Simonton 2002, p.151). Moreover, we might legitimately expect the IQ differences between academic subjects to be about the same when comparing scholars at elite and non-elite universities and the comparable differences in Harmon's research imply this.

Thirdly, there is evidence that since the 1950s Western countries have been becoming increasingly cognitively stratified (see Herrnstein and Murray, p.56). Greater meritocracy has meant that intelligence is now less equally distributed across social classes and, this being so, we might expect the average IQ of an academic to have increased. But, concomitantly, higher education has expanded substantially over this period which may have ameliorated this (e.g. Richards, 2007). Indeed, even in 1990, Herrnstein and Murray (Ch. 3) estimated that a PhD holder was likely to have an IQ of at least 120.

Fourthly, the IQ differences between natural and social scientists may have changed since 1967. The social sciences expanded in the USA and Western Europe in the 1960s and 1970s

(Commission on the Social Science, 2004, p.61), something which occurred disproportionately in relation to the natural sciences. However, the main expansion - a tripling of social science degrees in Europe and the USA - occurred between 1960 and 1970 (Backhouse and Fontaine, 2010, p.195; National Center for Education Statistics, 2013) so may only partially have affected data gathered in June 1965 as Gibson and Light's was. A relative increase in the numbers of the social scientists between 1967 and 1970 might imply a slight overall change in the average IQ of social science scholars.

However, more recent data on student IQ do not indicate that the social sciences have, since 1967, attracted students who are proportionately more intelligent, when compared to natural scientists, than they were in 1967. Mascie-Taylor et al. (1983) drew upon a sample of 141 Cambridge University undergraduates. They found that the most important predictor of IQ was subject studied. 'Science' students scored the highest while 'humanities' students (including some social sciences) scored the lowest. 'Mixed' subjects, such as Economics, were in the middle. Mascie-Taylor et al. do not provide the average results by subject, but their research does replicate, broadly speaking, Gibson and Light's findings. Mascie-Taylor et al. also note that Heim (1968) found the same interdisciplinary IQ differences when testing a sample of 946 British undergraduates and postgraduates.

Gibson and Light put the difference between the average Cambridge social scientist and mathematician at about half a standard deviation while Harmon found a fractionally lower difference between the average physicist and social scientist. It is around a standard deviation amongst US Math and Social Science students in 2012 (Educational Testing Services, 2012). The difference between the samples may be explained partly by the disproportionate expansion of the social sciences and partly by the

way in which the more intelligent undergraduates are scientists who are, at least in the case of most sciences, averagely capable of a PhD and that, to a greater extent than in social science, factors other than intelligence will predict whether they pursue one. This would explain why the interdisciplinary IQ differences between the Cambridge University faculties are lower than among US students in 2012.

Fifthly, it may be that social science faculties have failed to expand in proportion to the growth in students, boosting the relative IQ of social science academics in relation to natural science ones. I can find no evidence for this proposition. Indeed, at Birmingham University in the UK, the Economics Department, for example, expanded in the 1970s, 'reflecting a much wider expansion of social science education. In 1962/63 there had been only 7 academic staff, which expanded to 22.5 by 1970/71, the number remaining around 20 till the early 1990s' (University of Birmingham, 2013) when, seemingly, it expanded further because higher education began to expand anew in the West around this time (e.g. Bathmaker, 2003 or Gumport et al., 1997).

Sixthly, the datasets are presented in such a way that like is not always being precisely compared with like. Thus, Ecklund and Scheitle (2007) use, for social science, sociology, economics, political science and psychology whereas Gibson and Light have conflated data for 'social science' composed of economics, political science and geography. In addition, in making comparisons with Rothman et al.'s (2005) analysis of politics in academia, though there is economics and political science, there is no geography. Finally, Gibson and Light's sample is all-male whereas Ecklund and Scheitle is 73% male. However, Gibson and Light's main differences are also found in Harmon, which is gender-mixed. This being the case, it cannot be argued that religious differences between social science and physical science

are due to different subjects in the samples or due to there being a higher percentage of women in the social sciences, with women having lower average intelligence than men (see Chapter Eleven). Gibson and Light's research finds that the interdisciplinary differences in intelligence exist even in an all-male sample. This sample, it might be added, was also entirely native British. That it may not control for background is not relevant, because twin studies demonstrate that shared environment plays zero role in adult intelligence (see Bouchard and McGue, 2003).

So, in summary, this research indicates that there are robust interdisciplinary differences in IQ, with those in the physical sciences (and Mathematics) having higher IQs than those in the social sciences, amongst undergraduates, PhD holders and elite academics. Physical scientists (though not biologists) are seemingly more intelligent than social scientists of a comparable academic rank.

4. Religion in Academia

If our theory is correct, we would expect academics to be considerably less likely to believe in God, or in general be religious, than people of average intelligence. In addition, in countries with a culture of church attendance, we would expect academics to go to church less and be less likely to be church members. We would expect natural scientists to be less religious than social scientists. These predictions appear to be borne out in the relevant studies, though with considerable nuance regarding the religious difference between natural and social scientists.

As long ago as 1916, Leuba (1916) conducted a survey of US scholars at eminent institutions. He found that 39% of them believed in God, compared to around 95% of the US population who believed in God in a 1948 Gallup Poll (Gallup 1948). He also

found some departmental variation, with 48% of historians believing in God as against 24% of psychologists. Lehman and Witty (1931) found that of 1189 eminent scientists, half reported belonging to no denomination, a proxy for low religiousness, in a survey despite being specifically asked for one. Bello (1954) found that of 87 eminent scientists 23% had no church affiliation compared to 5% of their parents and 1.9% of the US population. Roe (1953) conducted a survey of 64 eminent scientists in the USA and found that 61 of them described themselves as 'indifferent' to religion. As such, only 4.8% of these 'eminent scientists' could be described as believers in God. Indeed, Larsen and Witham (1998) set out the data in the journal *Nature* and observed that 39 studies had been conducted on the relationship between education and belief in God between 1927 and 1998 and all had found that, on average, the more educated people were, the less likely they were to believe in God. Clearly, the direction of these studies implies that those who hold PhDs, the most educated, are particularly unlikely to believe in God. Accordingly, this implies, in addition, an inverse relationship between intelligence and belief in God because, as we have seen, those with PhDs will be part of the intelligence elite.

Trow (1969) surveyed 60,000 US professors and found that 42% of life scientists, 32% of political scientists, 38% of sociologists and 20% of psychologists regularly attended church, as against 75% of Americans at the time. Two other studies also found that social scientists are less religiously involved than natural scientists (see Lehman and Shriver, 1968, and Thalheimer, 1973). More recently, Gross and Simmons (2009) conducted a survey of faculty religiousness in 2006. They drew upon 1471 responses from not only 'elite, PhD-granting institutions' (the 'Top 50 ranked' US universities) but also BA-granting institutions and community colleges. Gross and Simmons found that 23.4% of

professors were either atheist (10%) or agnostic, as against 5.9% of Americans and 11.1% of college graduates. Elite universities were the most atheistic, with 36.6% atheist or agnostic as opposed to 22.7% at BA-granting institutions and 15.2% at community colleges. Gross and Simmons found clear differences between departments. 61% of biologists and psychologists were atheists or agnostics as were 50% of mechanical engineers and 40% of economists and political scientists. By contrast, 56.8% of educationalists and 46% of humanities professors had 'no doubt God exists' in contrast to 35.7% of the broader sample. Their sample was very broad and they concede that differential distribution of subjects over institutions of different standards may have significantly influenced their results.

Ecklund and Scheitle (2007) conducted a study of 1646 scientists working at Ivy League and other elite American universities between 2005 and 2006; interviewing 275 in depth. They found that 34% of scientists class themselves as 'atheists,' claiming that they 'do not believe in God.' A further 30% would be classed as 'agnostics,' claiming that they are not sure whether or not God exists. So, 64% of scientists at elite, or at the most elite, American universities are not believers. This is compared to just 8% of the US population who would fall into this category. Accordingly, they are much more atheistic than the elite US academics more broadly surveyed by Gross and Simmons. However, Ecklund and Scheitle's 'elite' were more elitist. Gross and Simmons' sample were merely from the Top 50 ranked colleges in the US while Ecklund and Scheitle's sample were from 21 elite colleges that were selected according to how often they appeared in the top twenty-five universities for nine indicators, including research funding, endowment assets, faculty awards and doctorates granted. According to Ecklund and Scheitle, the most recent surveys indicate that 3% of Americans are atheists and 5%

are agnostic. Ecklund and Scheitle's survey also found that academics were even less likely than the general population to be part of a conservative religious church. 14% of Americans identify as 'evangelical' or 'fundamentalist' compared to just 2% of Ecklund and Scheitle's RAAS (Religion Among Academic Scientists) sample. 52% of their sample was not affiliated to any religious organization, in contrast to only 14% of the broader US population being in this position.

It is worth observing that those identifying their faith as 'Jewish' were heavily over-represented amongst those whom Ecklund and Scheitle surveyed. They note that 2% of Americans identify as Jewish while it was 15% of their sample. Judaism, unlike Christianity, is a religion based not only around belief but also blood-bonds. The more liberal forms of Judaism are more likely to actually accept converts (see Armstrong, 2001 or Borowitz, 1983).⁴ Ecklund argues that the Jews in her sample would have been overwhelmingly liberal, because there was no statistical difference in their beliefs when compared to those of non-Jewish academics. However, it is unsurprising to find that Jews are over-represented at elite universities and that they are relatively irreligious. Lynn (2011b, p.295) observes that in 1969 Jews were heavily over-represented, compared to their percentage of the population, in the faculties of elite US universities. At these institutions, 36% of law professors were Jewish (over-represented by a factor of 13.3), 34% of sociology professors were Jewish, 28% of economics professors were Jewish, and 26% of physicists were Jewish. Lynn puts this down to the superior IQ of Ashkenazi Jews (most Jews in the USA having ultimately migrated from

⁴ Even so, it has been suggested that many Jews are admixture of Jewish and host-population racial characteristics (see Lynn, 2011b).

Eastern Europe) of around 110, the highest IQ of any race.⁵ So, the over-representation of Jews in Ecklund and Scheitle's sample is not surprising and nor, in light of Jewish superior intelligence, is their apparent lack of belief in God.

If our theory is correct, we would also expect physical scientists to be less religious than social scientists. Ecklund and Scheitle concluded either that there are no interdisciplinary differences in religiousness or that they exist only in one comparison. The only statistically significant difference on all measures of religiousness was found to be between physicists and political scientists. About 33% of physics professors answered, 'There is very little truth in any religion' compared to 15% of political scientists who gave this answer. Their other measure of religiousness was belief in God.

Table 8.2 - Belief in God amongst Elite University Scientists in the USA (Ecklund and Scheitle, 2007)

	Ph	Ch	Bio	Nat. Sci. Av.	So	Ec	Pol Sc.	Psych	Soc. Sci. Av.
I do not believe in God	40.8	26.6	41	37.6	34	31.7	27	33	31.2
I do not know if there is a God and there is no way to find out	29.4	28.6	29.9	29.4	30.7	33.3	32.5	27.8	31
I believe in a higher power but it is not God	8.1	9.4	7.7	8.2	11.8	4.9	5.5	7.7	7.2

⁵ The Ashkenazi Jews are mainly from Eastern Europe, the Sephardi were from Iberia and the Mizrahim from Asia and the Middle East. The Ashkenazi have the highest average IQ of these three groups (see Lynn, 2011b).

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I believe in God sometimes	2.8	6.3	4.1	4.2	2.8	4.9	5	7.7	5.4
I have some doubts but I believe in God	12.8	18.2	10	12.9	11.8	14.8	21.5	12.9	15.5
I have no doubts about God's existence	6.2	10.9	7.4	7.8	9	10.4	8.5	10.8	9.7

Key: *Physics (Ph), Chemistry (Ch), Biology (Bio), Nat. Sc. Av. (Natural Science Average) So (Sociology), Ec (Economics), Pol. Sc. (Political Science), Psychology, Soc. Sci. Av. (Social Science Average).*

We can see from Table 8.2 that the general direction is for social scientists to be more religious than natural scientists. However, Ecklund and Scheitle emphasize that only the difference between physicists and political scientists is statistically significant.⁶

If our theory is correct, we would also expect physical scientists to be less religious than social scientists and for physical scientists to be less politically extreme than social scientists, as this would be predicted by their higher intelligence. We would expect to find this, in particular, when personality factors are controlled for.

⁶ In this regard, it might be pointed out that both Chemists and sociologists were significantly less likely than physicists to say that there is no truth in religion, according to Ecklund and Scheitle's research. Thus, it might be asked, 'Is the argument that chemists are less intelligent than physicists?' The answer is no. The difference between physicists and chemists on this question was not 'statistically significant.' These data show a statistically significant difference between a natural science and a social science. This may imply, given a larger sample, that there might be such differences between natural and social science *per se*, but it does not imply such differences between physicist and chemist senior academics. As noted above, the IQ differences between chemists and physicists at Cambridge were not statistically significant.

We will discuss, first, the research on religion. According to Ecklund and Scheitle, the largest single predictor of whether an academic would believe in God was religious background. Scientists who rated religion as 'very important' in their childhood homes and whose background was Protestant had a 14% probability of classing themselves as atheist. This is compared to a 54% probability that a scientist, who was raised in a home with 'none' (in terms of religion) and in which religion was 'not at all important' would class themselves as an atheist.

Ecklund and Scheitle downplay the significance of the difference between physicists and political scientists with regard to religiousness. Their findings imply that, amongst elite scientists, there are insufficient religious differences to make a binary social science/natural science division. But there are sufficient differences to see a clear difference between what might reasonably be seen as the most scientific subject (Physics) and, following Mascie-Taylor et al.'s division, one of the least (Political Science) (of those assessed). This, in turn, might imply a weak relationship, if Ecklund and Scheitle had pursued a larger and more representative sample, between academic discipline and religiousness.

Ecklund and Scheitle's results conflict with other studies that have found that, in general, natural scientists are more religious than social scientists within specific state universities (e.g. Thalheimer, 1973). A number of scholars have looked at why natural scientists are more religious than social scientists. Beit-Hallahmi and Argyle (1975) put the greater religiousness of natural scientists down to 'scholarly distance' - that social scientists are more likely to come across religion in their research and thus think about it. However, this appears unlikely because God's existence is a fundamental philosophical question that all intelligent people think about, and it is an abstract question.

Intelligence especially strongly predicts abstract, to a greater extent than social, reasoning ability (e.g. Kaufman et al., 2011).

Wuthnow (1985) regards the difference as reflecting a 'boundary posturing mechanism' whereby social science scholars wish to create a sense of 'otherness' and use non-religiousness as a means of creating distance between themselves and the public. Natural scientists have already achieved this sense of 'otherness' with codified language. But it can be countered that social science is notorious for using academic jargon which is incomprehensible to ordinary people (see Andreski, 1974), so social scientists have no greater motive than natural ones for rejecting religion.

A further possibility is that social scientists study human cultures, may adopt relativistic accounts, and are therefore more likely to see everything in these terms, including religion, as most religions make truth claims. The problem with this argument is that natural scientists are trained to rigorously test truth claims so would be just as likely to be critical of religion as social scientists.

A more likely explanation is that social scientists, at least at the student level, are lower in Conscientiousness and Agreeableness (e.g. De Fruyt and Mervielde, 1996), traits which positively predict religiousness. In addition, they are higher in Openness-Intellect and Neuroticism, which predict questioning forms of religion, and higher in Openness, which is negatively associated with religiousness. This being so, we would expect them, to a greater extent than natural scientists, to be already irreligious when they begin their courses. Argyle and Beit-Hallahmi (1975, p.88) demonstrated that this is so. 20% of 429 USA social scientists (in contrast to 1.9% of Americans) surveyed in 1967 reported 'no religious preference' even in adolescence, implying that they were already atheists when they elected to study social science. In some cases, atheism amongst social scientists may be part of an ideology (such as Marxism) and

believed fervently, rather like a religion. It may be that significant numbers of atheists choose to study subjects that reflect their ideology while Christians, for example, avoid subjects of this kind precisely because they are seen to reflect an atheistic ideology (see Rothman et al., 2005), a point which has been found in fieldwork with evangelical students (e.g. Dutton, 2008c).

A further explanation is that neither Lehman and Shriver, Thalheimer, nor Gross and Simmons concentrate on the most elite universities. Accordingly, it is likely that Ecklund and Scheitle's anomalous results can be explained by the rarified intelligence and personality profile in their sample. As we have discussed, the personality profile that predicts educational success is very similar to that which predicts religiousness. However, there is a distinct personality profile associated with highly successful academics. This includes high Neuroticism, high Openness-Intellect, relatively low Conscientiousness and relatively low Agreeableness (in comparison to other academics of similar intelligence). A possible explanation for the way in which natural (and implicitly physical) scientists may be less atheist than social scientists overall, but with a reversal of this pattern at highly elite universities is that highly elite universities may be more likely, in selecting the academically most able physicists, to select those who are extremely high in intelligence (negatively predicting religiousness), but also extremely high in Openness-Intellect and, relative to less prestigious universities, lower in personality factors which predict religiousness (Agreeableness and Conscientiousness). In doing so, they would select a (relative to lower level academia) more irreligious personality trait profile. Political science would be doing the same, but we know that, even amongst elite academics, such as at Cambridge University, social scientists (including political scientists) are less intelligent than physical scientists. So, in that personality would have been

substantially selected for, the lower intelligence of elite social scientists would be reflected in higher religiousness.

It might be cautioned that personality has not been completely selected for and, as such, social scientists remain, even if only marginally, higher in Openness (though not Intellect), lower in Conscientiousness and lower in Agreeableness than physical scientists, and that this contributes to their possible higher religiousness. However, lower Conscientiousness and lower Agreeableness would negatively predict religiousness and high Openness (though not Intellect) would, in itself, merely predict a proneness to spiritual experiences (see Lewis et al., 2011), experiences which 22% of self-described atheists and 27% of self-described agnostics implied they had undergone amongst the RAAS sample (see Ecklund and Park, 2009). Moreover, the difference in having religious experiences between RAAS natural and social scientists was not significant. 69% of social scientists and 66% of natural scientists described themselves a 'spiritual,' a term defined in terms of an awareness of something outside yourself.

It might also be speculated that the personality profile of elite scientists might not include many 'creative scientists' meaning that the personality differences between natural and social scientists would be the same as those noted by De Fruyt and Mervielde. However, this would predict that natural scientists would be more religious than social scientists, further implying that the difference between elite academics and less elite academics is explicable in terms of intelligence.

Finally, it might also be countered, as Rothman et al. argue, that social science has been, to a greater extent than natural science with its clearer quantitative base, taken over by left-wing ideology: Postmodernism (see Charlton, 2009). As such, being highly creative, in that it might persuade you to critique such an

ideology, would make it less likely that you would be appointed to an elite social science post. However, elite social scientists would need to be more original in their thinking in comparison to less elite ones, even if certain areas were taboo (see Chagnon, 2013). Also, it might be argued that there are taboos in natural science which might be problematic for highly creative scientists (see Segerstråle, 2000) and other research has found that there is no discrimination against 'conservatives' in the social sciences (see Prentice, 2012).

It is true that Ecklund and Scheitle's sample of natural scientists are slightly more likely to have been raised in a non-affiliated home (16.8%) than social scientists (12.4%). However, Ecklund and Scheitle find that the correlation between an elite scientist being an atheist and that scientist having a religiously non-affiliated childhood is 0.54, a moderate positive correlation. Twin studies have found that childhood environment predicts adult religiousness at about 0.12 (e.g. Bouchard, 1998). However, if we compare Ecklund and Scheitle's results on theistic belief to the average IQs of social scientists and physicists at Cambridge University in 1967 then we can see that there is 0.94 positive correlation between atheism and the average IQ of a scientist in a given subject at Cambridge University. This result is achieved by comparing the IQs of physicists, social scientists (composed of economists, political scientists and geographers) with the atheism rates for physicists, political scientists and economists. We have avoided comparing differences in atheism rate found to be non-statistically significant by Ecklund and Scheitle but included economics because it was part of the Cambridge University sample. The strength of this correlation means that, even accounting for problems with the comparison, the difference is very likely to be meaningful. This finding would add credence to the hypothesis that at a very high academic level, personality

profile is already heavily selected for, so intelligence becomes the main predictor of atheism, although childhood irreligiousness may be a factor as well. But, the likely intelligence of an elite scientist is a much better predictor of their adult atheism than their childhood lack of religiousness.

5. Nobel Prize Winners and Learned Societies

Ecklund and Scheitle's results indicate that elite academics are less religious than ordinary academics. It appears that the most successful academics, such as Nobel Prize winners and leaders of leading scientific societies, are even more irreligious. Larsen and Witham (1998) noted that 40% of 1000 top US scientists (taken randomly from *American Men of Science*) disbelieved in or doubted the existence of God compared to 7% of the general population. Indeed, only 7% of them firmly believed in God while 72% of them firmly did not, as against around 3% of Americans who hold the latter view.

However, an examination of scientists who are regarded as the most eminent by their peers demonstrates miniscule levels of religious belief. Beit-Hallahmi and Argyle (1997) found that of 700 Nobel Prize Winning scientists only one believed in God. Clearly, the implication of this is that the most successful scientists are even less likely to believe in God than the less successful ones. It is questionable whether this has anything to do with IQ. Simonton (1988, p.42) observes that eminent mathematicians, for example, do not ordinarily have higher IQs than ordinary Math researchers who simply hold PhDs. He argues that it is creativity, beyond an IQ of about 130, that predicts achievement and not intelligence. Eysenck (1994) argues that beyond an IQ of around 120, personality factors become the main predictor of academic achievement. But it is not in dispute that the

Nobel Prize Winning scientists are likely to be extremely intelligent people and they overwhelmingly do not believe in God and are not religious.

Further evidence can be obtained from leading academic societies. Larsen and Witham (1998, p.313) report that just 7% of members of the US National Academy of Scientists believe in God. This compares, according to Ecklund (2007), to 36% of academics at leading American universities. Members of the American National Academy of Scientists are even less religious than a sample of academics at leading American universities. In Britain, the lack of religious belief amongst the most eminent scientists is even more striking. Only 3.3% of members of the Royal Society strongly agree with the statement 'God exists' while 78.8% strongly disagree. Larsen and Witham (1998) note that relatively recent studies have found that as many as 68.5% of British people claim to firmly believe in God (see Chapter Ten).

6. Academia and Replacement Religion

The evidence on the relationship between academia, personality factors and replacement religiousness has not been pursued in such depth. I am not aware of any survey asking academics about the degree to which they assent to what would clearly be 'ideologies,' such as Multiculturalism or nationalism. There is, however, USA-based research which examines the degree to which academics are 'Liberal' or 'Conservative' (based on their stated views). These categories, it might be argued, contained strong ideological elements, especially in the USA, and reflect attitudes to significant social issues such as abortion, gay rights, religion, and environmentalism.

DeYoung (In Press) has observed that there are problems inherent in making this dualistic division. The current consensus

in psychology is that two broad dimensions are necessary to describe socio-political attitudes (Duckitt et al., 2002 or Jost et al., 2007). One of these is 'resistance to change' or 'traditionalism' and the other is 'anti-egalitarianism' or justification of inequality. Collapsing the two, therefore, may lead to problems. For example, DeYoung (In Press) points out that the people high in 'Compassion' (a trait of Agreeableness) will tend to be egalitarian (Hirsh et al., 2010), but this does not predict 'traditionalism' which is associated with politeness (another dimension of Agreeableness) and orderliness (Conscientiousness). This implies that some people will be traditionalist yet egalitarian and *vice versa*, based on their personality mix, which seems to imply that the single factor 'conservative' ignores too much nuance.

Rothman et al. surveyed 1643 full time academics at 183 US universities, ranging from elite universities to lesser colleges, in 1999. They used a combination of questions on social issues and political affiliation (usually Democrat or Republican) to reach their conclusions. They found that 72% of US university teachers were 'Left/liberal' compared to 15% who were 'right/conservative.' Similar research in 1984 (Carnegie, 1984) found that only 39% of US academics, nationwide, were liberal while 34% were conservative and 25% were moderate. Amongst the public, in 2005, 33% identified as conservative while 18% identified as liberal, although this 'identification' is not the same as the process used by Rothman et al. There are also problems comparing the 1984 and 1999 surveys. The 1984 Carnegie survey used a three point spectrum: liberal, moderate, conservative. Rothman et al. used a 5 point spectrum. This might imply that the political change amongst academics between 1984 and 1999 has not been as dramatic as indicated. It should be borne in mind that Rothman et al.'s sample is relatively small and also excludes community

college lecturers, who tend to be more conservative (see Gross and Simmons, 2007).

Rothman et al. found that 84% of academics were in favor of abortion, 67% thought homosexuality was an acceptable lifestyle, 88% wanted more environmentally-friendly policies even if they reduced living standards, and 65% wanted the government to provide full employment. At the 'elite universities,' 87% of the faculty was identified as liberal. However, there were clear departmental differences. 88% of English Literature scholars were liberal and 3% conservative. By contrast, 51% of engineers were liberal and 19% conservative.

Table 8.3 - Politics in American Academia (Rothman et al., 2005).

Field of Study	Lib%	Mod%	Cons%	Dem%	Indep.%	Repub.%	N
All Faculty	72	13	15	50	39	11	1643
Social Science	75	16	9	55	38	7	289
Humanities	81	10	9	62	32	6	449
Other	67	13	20	43	42	15	905
English Lit	88	9	3	69	29	2	87
Performing Art	84	0	16	63	35	2	31
Psychology	84	8	8	63	30	7	68
Fine Art	83	9	8	55	41	4	36
Theology	83	8	5	49	35	16	26
Pol. Science	81	17	2	58	34	8	67
Philosophy	80	15	5	62	27	11	26
History	77	13	10	70	26	4	62
Sociology	77	14	9	59	41	0	61
Biology	75	8	17	56	31	13	59
Communic.	75	11	14	47	42	11	66
Music	74	18	8	56	38	6	63
Computer Sc.	74	0	26	43	36	21	44
Mathematics	69	14	17	43	42	15	49
Physics	66	23	11	48	47	5	37
Linguistics	65	24	11	64	34	2	53
Chemistry	64	7	29	41	34	25	52

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Field of Study	Lib%	Mod%	Cons%	Dem%	Indep.%	Repub.%	N
Education	61	10	29	55	38	7	88
Economics	55	6	39	36	47	17	44
Nursing	53	0	47	32	42	26	32
Engineering	51	30	19	34	53	13	90
Business	49	12	39	26	48	26	101

Key: *Lib.* (Liberal), *Mod.* (Moderate), *Cons.* (Conservative), *Dem.* (Democrat), *Indep.* (Independent), *Repub.* (Republican).

There are two related ways of understanding these results. Firstly, as we have discussed, we would expect the more intelligent to be attracted to liberal perspectives to the extent that this would involve rejecting the common viewpoints when they were young. Their high Openness-Intellect would also predict being attracted to change and novel positions.

In addition, we have also noted that the more intelligent are attracted not just to liberalism but to protest, questioning the *status quo*, and to cautious, moderate positions. This being so we would expect to find evidence, relative to other academics, of lower intelligence amongst the extremely liberal and extremely conservative, who tend to be more traditionally religious (Gross and Simmons, 2009). The results in regard to politics among academics (Rothman et al., 2005) add further credence to our case. However, the predictive value of intelligence would be lower because Rothman et al.'s sample was not selected for personality and intelligence in the way that Ecklund and Scheitle's (2007) sample was. We can see that academics in the disciplines that have higher average IQs tend to be more moderate, in general, in their degree of liberalism, something that was predicted by Meisenberg and Williams (2008), who found a -0.78 correlation at a country level between extremism and intelligence. It is very difficult to explain the differences between natural and social sciences using personality alone. Natural scientists are likely to be

lower in the Openness aspect of Openness-Intellect and higher in Intellect (De Fruyt and Mervielde, 1996). But both of these dimensions would predict nonconformity (DeYoung, In Press). Natural Scientists are higher in Agreeableness and Conscientiousness than social scientists, as we have discussed. This being so, based on personality alone, we would expect natural scientists to be as extreme as social scientists assuming that political extremism is similar to religiosity. Also, because natural scientists are higher in Agreeableness, we would expect them to be more liberal (at least in terms of egalitarianism); but because they are higher in Conscientiousness, we would expect them to be more traditionalist. Social scientists are more Neurotic than natural scientists, but Neuroticism negatively predicts fundamentalism and so if extremism is assumed to be similar to fundamentalism, high Neuroticism would predict moderate political views. In that Neuroticism predicts religious quest orientation, it would likewise predict being highly questioning and thus moderate. As we have seen, it might be argued that Neuroticism predicts temporary religious fervor, in the wake of paranormal or religious experiences. It may, therefore, be that this trait also predicts political extremism. But this characteristic will have been an element in the samples examined by Saroglou (2002) but it was clearly outweighed by other aspects of Neuroticism as the influence of this trait on religiousness was nil. Therefore intelligence would seem to be a significant factor that is likely to explain political differences between the two kinds of scientists. In addition, were it not, then we would have to assume that intelligence differences between the disciplines were simply coincidental to political differences. Explaining the differences in terms of intelligence is also congruous with other research which has found that low intelligence predicts political extremism which we have examined. This is as we would predict because

individuals at the extremes tend to have more implicitly religious dimensions.

As such, overall, we would expect to find that the most intelligent scholars were moderately liberal and highly independent while the least intelligent would be either extremely high in liberalism or extremely high in conservatism. This is indeed what we find. If we compare Rothman et al.'s results to IQs for Cambridge University scholars we find that there is a weak positive correlation between the percentage in each subject (for which we have both IQ and political data) who are 'moderate' (neither liberal nor conservative) and intelligence, of 0.25. This is achieved by comparing Political Science and Economics (for social science) and Biology, Physics, Chemistry and Mathematics. However, making the same comparison using the intelligence results from Harmon's (1961) study provides a much stronger correlation. If we compare Education, Math, Physics, Chemistry, Biology, Engineering, 'Social Science' and 'Arts and Humanities' IQ scores to the degree of political moderateness in Rothman et al. we find a correlation of 0.59. This difference may reflect the way that Harmon's sample includes a broader array of social sciences and includes humanities and these scholars tend to have lower intelligence and be more politically extreme.

7. Conclusion

Our analysis of religion in academia indicates, as we would expect, an inverse relationship between intelligence and religiousness. Academics are amongst the most intelligent sector of the population and studies have consistently shown, since 1916, that they are considerably less religious than the general population. In addition, theists make-up a miniscule fraction of the leading scientific societies, and the most recent research attests

that around three quarters of scientists - despite around two thirds believing that they are 'spiritual' - are not religious. Indeed, there is some evidence that the most intelligent scientists - physical scientists - are less religious than averagely less intelligent social scientists when substantially controlling for personality influences and that, amongst this sample, intelligence predicts atheism more than background. This finding is congruous with other data on interdisciplinary intelligence and is as we would expect. In addition, academics are more liberal than the general population, probably due to higher Openness-Intellect and Agreeableness, but the most intelligent academics are more centrist in their liberalism, implying that a lower adherence to replacement religiousness is predicted by higher intelligence.

Chapter Nine

Age and Religion

- 1. Introduction.*
- 2. Age and Religiousness amongst Children.*
- 3. Religion and the Life Span.*
- 4. Age and Religion in the UK.*
- 5. Age and Religion in Canada.*
- 6. Age and Religion in the USA.*
- 7. Conclusion.*

1. Introduction

This chapter will examine the relationship between age and religiousness. It will demonstrate that intelligence rises up to a cognitive peak around the age of 35, after which it declines. We would expect religiousness to parallel this rise and fall in intelligence and we will see in this chapter that this is indeed the case.

2. Age and Religiousness amongst Children

Cognitive ability increases from childhood into adulthood and then declines from around age 35 onwards (e.g. Kirasic, 1989). As such, if our hypothesis is correct we would expect religiousness to follow this rise and fall. In looking at this issue we will begin with the age extremes, as most popular polls of religious belief tend to lump together the under-18s as one category and the over-65s as one category.

Argyle (1958) summarizes the early research in this field with regard to religious belief. He observes, for example, that

MacClean (1930) surveyed school children and found that they were highly religious up until the age of around 12, when more doubts about religion started to be expressed. Hollingworth (1933) found that an awakening of interest in religious questions, in contrast to a more trusting acceptance of religion, generally began when children reached the mental age of 12, which, of course, sometimes happened before or after they were actually 12 years old. Intelligent children would begin to question religion earlier. Hollingworth even found that children with an IQ of 150 would begin questioning religion at around the age of 8.

In Germany, Fritsch and Hetzer (1928) analyzed the diaries of adolescents, finding that they began to express doubts about religion to a greater extent as they grew through the adolescent period. In the USA, Kuhen and Arnold (1944) assessed the religiousness of 500 children ranging in age from 12 to 18. They found that 94% of 12 year olds endorsed the statement 'I believe there is a God' while only 78% of 18 year olds were prepared to endorse this statement. Equally, 72% of 12 year olds believed that 'only good people go to Heaven' compared to 33% of 18 year olds. Evidently this finding cannot be put down simply to increased education, because we have already observed that even amongst children there is an inverse correlation between extent of religiousness and IQ.

More recently, returning to the general trend, Kuhen and Arnold's findings were replicated in Britain by Francis (1989). Drawing upon a sample of 400 school pupils, he found the following for percentages agreeing with religious statements:

Table 9.1 - Religion amongst English School Children; Percentages Agreeing With Religious Statements (Francis, 1989)

Age	Boys	Girls
5-6	87.9	96.0
11-12	79.6	84.1
15-16	55.7	70.4

This replicated research by Turner (1980), using a sample of 50 children at a Northern Irish Protestant school.

Table 9.2 - Attitude to Religion amongst Northern Irish School Children (Turner, 1980)

Age	Positive Attitude to Religion %
12	69.54
13	66.10
14	58.86
15	57.94

3. Religion and the Life Span

Further studies indicate that religion declines from adolescence onwards, reaching a trough at about the age of 35, when cognitive ability is at its peak. After this, it begins to rise. This can be observed using a number of measures. Cavan et al. (1949), in a USA study of 1200 people aged 60 to 100, found that certainty that there is an afterlife increases from 70% to 100% as people

age from about 60 up to 90. Interestingly, there was a distinction between this belief and 'favorable attitude towards religion.'¹

Table 9.3 - Favorable Attitude towards Religion amongst American Elderly % (Cavan et al., 1949).

Age	Male	Female
60-64	38	51
65-69	41	56
70-74	42	57
75-79	39	64
80-84	53	69
85-89	55	81
90-94	50	93
95-99	-	100

Table 9.4 - Certainty of Belief in the Afterlife amongst American Elderly % (Cavan et al., 1949)

Age	Male	Female
60-64	71	83
65-69	64	78
70-74	69	86
75-79	67	77
80-84	72	91
85-89	-	90
90-94	-	100
95-99	-	100

¹ See Moberg (1965) for further discussion of religion in old age.

Thus, the trend is that people become more favorable to religion with age, though there are discrepancies. In addition, we should remember that it might be possible to have a favorable attitude towards religion - possibly because you see it as an important means of holding society together - but to not actually believe in its doctrines yourself. Equally, it is possible to have a negative attitude towards organized religion but still accept some of its key ideas.

In addition, Gorer (1955) found that engaging in daily prayer falls from close to 50% of those aged 15, down to around 32% of those aged 30. Thereafter, daily prayer rises to almost 60% by the age of 80. Gorer also found that 'belief in an afterlife' was 50% at 15, 40% at age 30, back up to 50% aged 60 and close 60% aged 70. Argyle (p. 69) summarizes that, 'Children are considerably religious, at first holding fairytale beliefs, later accepting the standard ideas of their group . . . Intellectual doubts start at a mental age of 12.' These are usually resolved aged about 16 by either a 'religious conversion' or 'abandoning' religion. Between 18 and 30 there is 'a sharp decline in all aspects of religious activity' with 30 to 35 being 'the lowest point in the life cycle.' Thereafter, there is 'a steady increase from 35 to old age, which is marked by a widespread belief in God and the afterlife.' One anomaly in these results is the slight decline in religiousness which occurs for women between 65 and 69 and 74 and 79, and for men between 70 and 74. This is observed by Cavan et al. but is not seen in Gorer's research, though the maximum interview age there was 70.

4. Age and Religion in the UK

More recent research, albeit not looking at the extremes of age, evidences our broader hypothesis. This conclusion can be drawn

from large-scale polling from pollsters such as Gallup and YouGov. However we should retain a degree of caution when employing these results. The responses may be sensitive to the exact wording of the questions, the mode of interview and even the ordering of the questions. In addition, some of the samples may be small and insufficiently weighted for key variables, so it is important to only draw upon the most reputable surveys. A YouGov Poll (2012) in England and Wales of 1642 British adults found the following.

Table 9.5 - Belief in God in England and Wales (YouGov, 2012)

Age	Believe in God %	Disbelieve in God
18-24	36	34
25-39	33	33
40-59	36	38
65+	44	27

Overall, it found that 37% of British people firmly believe in God, compared to 29% who firmly do not. These results are broadly congruous with other YouGov and similar polls inquiring into British religious belief and behavior, though asking different questions. The survey enquired, for example, about church attendance and religious identification. Church attendance can be a problematic proxy for belief and can only even be reasonably employed as a proxy for it in cultures in which regular church attendance is normative. Finland, for example, has very low regular church attendance with around 4% attending church once a fortnight (Davie, 2000) compared to 7% attending *weekly* in Britain at the time. However, in 2000, 85.1% of Finns were paid-up members of the Finnish Lutheran Church with a further 2.3% being members of other churches (Ketola, 2008, p.346).

Age and Religion

The research indicates that church attendance, once people are independent of the childhood home, declines until the age of around 35, when it begins to rise, which is as we would predict. YouGov (2011) surveyed 1896 people in England and Wales:

Table 9.6 - Measures of Religiousness (England and Wales) (YouGov, 2011)

Age	Are you religious? %		Have you attended a place of worship for religious reasons within the last week? %	Do you believe Jesus Christ was a real a person who died and came back to life and was the son of God? (Christians only) %	
	Yes	No		Yes	No
			-		
18-24	22	70	8	48	28
25-34	23	71	5	44	30
35-44	23	73	9	45	26
45-54	27	68	7	45	28
55+	38	56	11	50	26
National Average	29	65	9	48	27

Though there are certain anomalies in these results, they are broadly congruous both with our hypothesis, earlier research and the 2012 YouGov Poll into religious belief. Identification as 'not religious' reached its highest point roughly at the cognitive peak, before steeply declining. Although identification as 'religious' less clearly follows this pattern, older people are evidently more religious than younger people and, anyway, the percentage differences amongst the younger groups are small. Attendance at places of worship for religious reasons follows precisely the pattern which we would predict, as does believing in Christ. Overall, the YouGov Poll (2011) found that 29% identified as 'religious' and 65% identified as 'not religious.'

These results are far from anomalous. Davie and Vincent (1998) summarize research in the UK from the 1990s indicating that, just as in the 1940s, religion rises steeply with age after about 35. A Mori Poll in 1990, for example, found that 67% of those aged between 15 and 34 claimed to believe in God compared to 87% of those aged over 55. Davie and Vincent added that belief in God declines as we go down the age group, such that only a minority believe in God amongst 18 to 24 year olds. Again, this is as we would predict and it parallels the broader fall in cognitive ability which accompanies age.

5. Age and Religion in Canada

Canada testifies to similar age-bound differences in religiousness. The 2001 Canadian census asked Canadians about 'religious affiliation.' If we focus only on those who are not affiliated to any church we can see the following.

Table 9.7 - Religious Non-Affiliation in Canada (Canadian Census, 2001)

Age Group	Not Affiliated to Any Religion %
Under 15	19
15-24	20
25-34	21
35-44	17
45-54	14
55-64	10
65+	8

This is as we would predict. To the extent that religious affiliation is a marker of religiousness, religious affiliation falls until the cognitive peak of the mid-30s and then thereafter begins to rise such that only 8% of Canadians over the age of 65 are not affiliated to a religious organization.²

6. Age and Religion in the USA

Research in the USA by the Pew Forum (2007) indicates a similar age profile with regard to religious disbelief drawing upon a sample of 34,695.

Table 9.8 - Religious Non-Affiliation and Atheism in the USA (Extrapolated from Pew Forum, 2007).

Age	Religiously Unaffiliated %	Atheist %
18-29	31	11.4
30-49	40	14.4
50-64	20	3.2
65+	8	0.96
National Average	14.2	1.4

As with the UK, church attendance in the USA parallels the rise and fall in intelligence. For example, Fichter (1952) found that weekly attendance by US Catholics (a group in which weekly church attendance is normative) is about 90% amongst those aged 18, 70% amongst those aged 30 and back up to 90% amongst those aged 60. Gorer found that weekly church attendance among Protestants was 30% among 18 year olds, 10% amongst those

² For religion in Canada see Beaman (2012).

aged 30, and 20% amongst those aged 60. Cavan et al. reach similar conclusions with their elderly cohort, but they also find that church attendance declines beyond the age of around 85. This is presumably due to increasing infirmity leading to inability to get to the church.

7. Conclusion

We have seen in this chapter that, as we would predict, religiousness parallels the rise and fall of intelligence across the lifespan. People become less religious as they reach their cognitive peak of early middle age and more religious thereafter. This is true both of religious belief and religious participation, and we have looked at examples, based on large datasets, from the UK, Canada, and the USA.

Chapter Ten

Era, the Flynn Effect and Religion

- 1. Introduction.*
- 2. The Flynn Effect.*
- 3. The Decline of the Flynn Effect.*
- 4. Religion and Flynn Effect.*
- 5. Religious Identification and Church Attendance.*
- 6. The Secularization Thesis.*
- 7. Problems with the Secularization Thesis.*
- 8. Explaining Modernization.*
- 9. Conclusion*

1. Introduction

The next piece of evidence for our case is that religiousness has declined, especially in the West, over the last 100 years. It has been suggested that this may be due to rising intelligence in the West, as highlighted by the Flynn Effect (e.g. Lynn and Vanhanen, 2012). In this chapter, we will examine the Flynn Effect, which has highlighted secular gains in IQ scores in Western countries since around 1930, and note that it would accordingly predict that, as intelligence is increasing, religiousness would thus decrease. It will be shown that religiousness has indeed decreased over this period in Western countries. However, it will be argued that the Flynn Effect is not in fact measuring intelligence, that intelligence has actually declined over the period, and that the likely reason for the decline in religiousness is increasing modernization which leads to a reduction in levels of stress. Alternative theories for this, such as the Secularization Thesis, will be shown to be problematic.

2. The Flynn Effect

Firstly, let us examine the Flynn Effect in more detail. The Flynn Effect refers to an observed increase in IQ scores in Western countries, beginning from around 1930, although some scholars trace the phenomenon further back further than this (e.g. Merrill, 1938, see Lynn, 2013 for review). Periodically, the IQ tests have been revised and standardized using a new sample of test-takers. The average result is set to 100. But it has been found that when the new test-takers take the previous (older) sample's test, the average score is more than 100. Accordingly, the Western world has seen a fairly linear increase in IQ scores between the 1930s and the 1990s. The phenomenon has also been observed outside of the West (e.g. Must et al., 2003). It has now been observed in 30 countries, including in some developing countries (see Flynn 2012).

The apparent IQ test score rise varies depending on which test is revised. Mean IQs on the Wechsler tests increased by about 3 IQ points per decade from the mid-1930s to the 1990s. On the same test, verbal intelligence increased by 2 IQ points per decade (Flynn, 1984, 1998; Lynn and Pagliari, 1994). For the Standard Progressive Matrices, the British mean IQ increased by 2 IQ points per decade from 1938, when the test was first developed, up to 1979, when the last British standardization on children was conducted (Flynn, 1987). However, research from Belgium, Norway, the Netherlands, Britain, Israel and Argentina all indicate that since 1950, while all aspects of IQ have increased, the increase is far more conspicuous on the Raven test (which is focused around discerning patterns using shapes) and on subsections of other IQ tests that are similar to Raven by virtue of focusing on fluid intelligence ('Similarities'). On 'Similarities' the increase was around 25 points between 1950 and 2005. IQ has

increased overall over this period, by around 17 points, but it has increased the least with regard to the Mathematical and Linguistic subsections. Scores in these sections grew by 3 points between 1950 and 2005 (Flynn, 2007, p.8).

Experts are not in full agreement on what exactly is causing the Flynn Effect and it has even been termed 'officially mysterious' (Deary, 2001, p.112). Flynn (1987) initially suggested that there has been no change in 'real intelligence' and that people have simply become better at taking the tests because modern society teaches an analytical way of thinking. However, one of the problems with this argument is that IQ test scores at age 4 have reflected the Flynn Effect despite such children not being experienced in taking IQ tests (Lynn, 2009). For many years thereafter, most psychologists, however, including Flynn (2007), believed that the effect was genuine. It was regarded as a combination of genuine increases in intelligence and improved ability in taking the tests (e.g. Colom et al., 2002).

Greenfield (1998), Mackintosh (1998), and Williams (1998) have argued that the increases in intelligence might be explained by a more cognitively stimulating environment. Examples of this greater cognitive stimulation might include better education, better parental education, easier access to books and access to television. Lynn (2006, p.6) is doubtful of this, arguing that it is not reflected in quickened rates of infant development such as the average age at which an infant can first stand up. He suggests that increased infant nutrition may be the cause of the Flynn Effect, as this would tally with observed increases in height during the twentieth century as well as increasingly early menarche (MacLeod, 2007) and puberty in boys (Karpati, 2002). In addition, improved infant nutrition, within the boundaries likely in Western societies over this period, does more generally correlate with

higher adult intelligence while infant malnutrition leads to lower adult intelligence (Kanazawa, 2012, p.188).¹

Flynn (2009) suggests that we are becoming better at cognitively demanding tasks, by doing them more from a very young age, and learning to stand would, presumably, not be an acutely cognitively demanding task. In essence, Flynn (2007) argues that the Industrial Revolution caused a self-perpetuating feedback loop which has altered our cultural priorities, making us all think in a more analytical way from a very young age, or use 'scientific spectacles' as he puts it (Flynn, 2007, p.173), and this is why 'Similarities' have improved so much more markedly than other intelligence measures. Indeed, many psychologists are now returning to questioning whether the Flynn Effect has anything to do with rising intelligence at all. There are four main lines of critique in this regard:

1. The Flynn Effect Tests Are Not Factorially Invariant: Wicherts et al. (2004) argue, based on five intelligence tests, that the tests being compared to assess the Flynn Effect do not possess factorial invariance; that is the instruments are not measuring exactly the same thing (see Schultze, 2004, p.158). This implies that secular gains in IQ scores could be due to latent variables, something which, if true, could undermine the Flynn Effect at least in part. Lack of factorial invariance has also been found by Beaujean and Sheng (2010), Beaujean and Osterlind (2008) and Wai and Putallaz (2011). However, it might be countered that though these critiques at best require us to be more cautious, such analyses conclude that the Flynn Effect is not happening on *some* tests such as Peabody (e.g. Beaujean and Osterlind, 2008) or on some parts

¹ Mingroni (2007) suggests that higher heterosis (out-breeding) explains the effect as cousin-marriage depresses IQ scores. Woodley (2011b) counters that, as we will see, the Flynn Effect is not occurring on genetic intelligence.

of tests (e.g. Vocabulary). They do, however, conclude that it is occurring on others or on parts of others. But this raises the question of whether these parts of the test - generally 'shapes' - are really measuring *g*.

2. The Flynn Effect is Not Measuring General Intelligence: Rushton and Jensen (2010) observe that though the most significant secular IQ gains are on the most *g*-loaded tests or portions of tests, IQ gains are negatively correlated with the most *g*-loaded portions of these tests or sub-tests. In addition, the tests lose their *g*-loadedness due to training, re-testing and general familiarity. Accordingly, Rushton and Jensen (2010) conclude that the Flynn Effect is not measuring a rise in *g*. Their conclusion, based on US results, has been replicated in Estonia where Must et al. (2003) also found that IQ gains had occurred since the 1930s on the least *g*-loaded parts of tests. Wai and Putallaz (2011) argue that the increase in scores has occurred across the intelligence range, though, to a small extent it has involved 'the smart getting smarter.' They suggest that a combination of factors may be a possibility. Improved nutrition might explain gains amongst the less intelligent (and those not yet exposed to education) while better education might explain them broadly and especially amongst the more intelligent.

3. Raven and Similarities are actually a poor measure of g and crystallized intelligence has declined: A negative Flynn Effect has been observed on measures of crystallized intelligence (especially knowledge) in a number of countries spanning multiple decades (Khaleefa et al., 2008; Lynn, 2009; te Nijenhuis, 2012 and Wicherts et al., 2004). As these declines are drowned out by the rise in fluid intelligence they are little remarked upon (see Woodley and Meisenberg, 2012). However, a number of

researchers have argued that measures of crystallized intelligence may better measure g than measures of fluid intelligence (e.g. Gignac, 2006; Gregory, 1999; Matarazzo, 1972 or Robinson, 1999). Indeed, Johnson et al. (2004) have found precisely this comparing a large sample of measures. This gives us sound reason to believe that g is in decline and that the Flynn Effect is not measuring intelligence.

4. The Flynn Effect Can Be Explained Solely by Environmental Factors: Woodley (2011a) notes that, according to Life History Theory, some organisms live 'faster' than others. Some engage in high mating effort, having as many offspring as they can (r-strategy). These lives are lived quickly. Others have a small number of offspring and put their resources into growth, repair, maintenance, learning and general high parenting effort (k-strategy).² Thus, faster lives seem to involve putting effort into diverse abilities (because little more is being ensured than survival of some of the offspring) whereas slower lives involve putting effort into distinctive abilities (such that the few offspring that survive learn important things). Slower life history is promoted by a safer environment. In Chapter Four, we discussed the widely accepted hierarchical model of intelligence where g is the apex of the pyramid, beneath which sit a set a narrower abilities, beneath which sit a larger set of even narrower abilities. According to Woodley, modern life (including better health and nutrition) would encourage a slower life history and better education, leading to the improved development of specific, narrow cognitive abilities even if g is not improving (these abilities merely correlating with g). This, in turn, would explain the Flynn Effect and how it can occur if g is not rising.

² The division was coined by MacArthur and Wilson (1967).

Charlton (personal communication, 2013) argues that improved health and less childhood illness would improve concentration and other such issues that might improve the taking of IQ tests but not necessarily the underlying *g*. And, more importantly, we might argue that a more intelligent human would be more likely to follow a *k*-strategy as the forms of behavior associated with this strategy - e.g. low infant mortality and small numbers of children - are strongly predicted by intelligence (see Rushton, 1995 or Lynn and Vanhanen, 2012). Intelligence would be required, in part, in order to create the safer environment conducive to a *k*-strategy but, independent of that, we would expect the more intelligent to pursue such a strategy and there is evidence that they are doing so independent of environment.

5. Correlates of Intelligence Have Been Declining Since the Nineteenth Century: It has been argued since Galton (1869) that a process of dysgenics is likely to occur in the West because those of lower intelligence have significantly more children and have them significantly younger than do those of higher intelligence (see also Lynn, 2011a). Before the Industrial Revolution, the most intelligent had the highest fertility. It is beyond the scope of this study to examine the reasons for this in detail, but there are a number of possibilities when we consider that socioeconomic status and education are predicted by intelligence.

In preindustrial England the richer 50% of the population had a fertility advantage of around 40% over the poorer 50% (Clark, 2007). Firstly, the richer could afford to have large numbers of children, perhaps to ensure that some survived in a context of high infant mortality.³ By contrast, the poorest mothers

³ This has been suggested by Clark (2007). However, more recently (pers. comm. 2013) he cautions that 'in subsequent work we show that the reduction of the fertility of the rich after 1800 meant that their chances of dying without

practiced infanticide to get rid of children who would impoverish them even further (Coleman and Salt, 1992). Secondly, strong social controls and limited poor relief meant that men with no livelihood could not marry and therefore could not have children. There was also a prohibition against servants marrying, so men unable to rise from this station did not marry either. Thirdly, richer people were better able to feed, clothe and look after their children. They lived in healthier conditions, had better access to rudimentary healthcare, and had a better diet. Also, if they were more intelligent they would be more forward-thinking with regard to these issues. Fourthly, malnutrition, which was much more likely to be suffered by the poorer, leads to infertility or delayed puberty. Fifthly, the better off lived longer, even once they had reached adulthood, meaning that they could have more children.

But this began to reverse from around 1800. Lynn (2011a) argues that a reasonable explanation is that the Industrial Revolution substantially removed two checks on the fertility of the poor: illness, and the threat of starvation (which led to infanticide, abortion and abstinence). It also introduced two checks on the fertility of the better-off: reliable contraception and the emancipation of women.

any descendants increased between 1800 and 1900.' As we have discussed, wealth is a sound if imperfect proxy for intelligence, which in turn predicts Openness-Intellect. The greater propensity amongst the wealthy to have no children in this period could be explained, in part, by some wealthy people being so high in Openness-Intellect that they were simply not interested in having children, preferring to focus on intellectual or other pursuits. Modernization would also reduce stress and thus reduce the potency of their instincts, explaining why more of them would have no children in this period, but have the most children in pre-industrial England when checks on the fertility of those of low intelligence (usually the poorest) were also at their height.

Industrialization introduced better medicine and sanitation (helping to eliminate one check on the fertility of the poor) and better poor relief (helping to eliminate the other). The working class began their families youngest as they always had (see Dutton, 2012b), but now saw far more of their children reach adulthood. Each child, for poor families, was an asset because it could start working at around the age of five and help to care for its parents in old age. (In pre-industrial England, in which the population was not growing, there would have been insufficient work for these children). The better off had fewer unplanned (illegitimate) children and tended to begin their families much later (only after they had built up a household). They were also better educated about contraception (the use of which began amongst the educated, with education predicted by intelligence). They had much less of an incentive to have many children, as large families would simply reduce their living standards. However, even once children ceased to be an economic asset, the new pattern continued. Thus, Lynn argues that the reversal is best explained by the lower intelligence of the working class meaning that that they are more impulsive and less competent at using contraception, leading, as is widely documented, to a positive association between low intelligence and unplanned children.⁴ In addition, female emancipation led to women becoming more educated and entering the professions (also predicted by

⁴ Alternative (environmental) theories do not stand-up to scrutiny. Nettle (2009) implies that the poor have higher fertility because their environment is more dangerous and they must guarantee complete fertility. But this argument cannot be sustained. Studies have shown that low socioeconomic status is associated with *unplanned* children (Lynn, 2011a, p.67). Moreover, intelligence negatively predicts a desire for high numbers of children in Western countries even when socioeconomic status, education, wealth and religiousness are controlled for (Kanazawa, 2012, p.179). As discussed, intelligence predicts socioeconomic status at around 0.4.

intelligence) thus delaying pregnancy. This has meant that the inverse relationship between intelligence and fertility in the West is stronger amongst women than men (e.g. Meisenberg and Kaul, 2010).

If the Flynn Effect is understood to demonstrate rising intelligence since 1930 then the Flynn Effect might be seen to contradict Galton's prediction. However, Woodley (2012) has conducted an historical analysis based on levels of innovation between 1455 and 1850 and 1850 to the present. He found that genotypic IQ estimates, and the fall of genotypic IQ since 1850, best fitted the historical growth and decline of innovation rates. Woodley insists that the accusation of subjectivity in deciding the significance of inventions is obviated by broader agreement from a number of analyses that scientific accomplishment is at its height, in terms of important ('macro-') innovations per year divided by world population, between 1455 and 1850. But even if this obviates this objection, it might be further objected that it is difficult to be as sure of the significance of more recent innovations because their full impact is not yet as clear. We might legitimately question the rather subjective distinction between 'macro' and 'micro-inventions' which the research employs or at least demand that it is explained in greater depth. But, most importantly, a flattening in the frequency of 'macro-inventions' does not necessarily imply reduced intelligence. It might be argued that as humans control their environment to a great extent, innovations will inherently seem increasingly nuanced (i.e. 'micro'). Nevertheless, Woodley's conclusions dovetail with a more concrete analysis and, for this reason, gain persuasiveness.

Silverman (2010) compared 12 studies on young adults published between 1941 and the present with two studies published on young adults in the late 1800s with regard to their reaction times. These studies measured the same reaction times

and used similar methodologies. Silverman found that RTs had significantly increased between the late 1800s and the modern day. The tests are highly reliable and representative so the only reasonable conclusion is that RT has become significantly longer since Victorian times. His findings were replicated in a meta-analysis by Woodley et al. (2013) drawing upon studies in the UK, Finland, Canada and the USA. This would imply either that something superficial is lengthening reaction times (Silverman suggests 'a build-up of neurotoxins in the environment') or that something underpinning reaction times is changing. There is some evidence that exposing children to fluoride reduces intelligence (e.g. Cheng and Lynn, 2013), though nothing specifically relating it to reaction times. But, anyway, as a complete explanation this would be incongruous with research on dysgenic fertility (which we will discuss in more detail below). So, a combination of the two explanations, with a significant influence from the latter, appears more likely. Charlton (28 February 2012) suggests that this evidences a decline in intelligence.

RT is also strongly influenced by physical health and, as such, lengthening RT could be explained, in part, by more and more people, since Galton's time, of less than robust health surviving into adulthood, a point suggested by Silverman (2010) and Silverman (2006). This would be congruous with a large body of research indicating dysgenic fertility in terms of health since Galton's time, something which Galton (1869) predicted would occur (see Lynn 2011a, Ch. 4).⁵ But, even so, as we have seen, the correlation between RT and IQ is significant. And Woodley et al. counter that we do not need necessarily to distinguish between dysgenic health and dysgenic intelligence. They argue that

⁵ Also, Shelton and Kumar (2010), using a sample of athletes, found that RT is significantly improved by repeated, regular, exposure to tasks which require quick reactions.

dysgenic mutations, leading to poor health, can simultaneously reduce RT and IQ.

This research would imply that intelligence is decreasing and, indeed, Woodley et al. estimate that modern Western Europeans are about 14 IQ points below the Victorians. As such, falling religiousness in the West over the last hundred years cannot be blamed on rising intelligence, because intelligence is falling. It can instead be blamed (substantially) on a less stressful environment, a point argued by Inglehart and Norris (2004) in a worldwide survey of differences in religiousness. This would also be congruous with the theory that religious participation has partly evolved as an honesty signal (e.g. Alcorta, 2012). In a safer environment, following Life History Theory, those who refused to conform would be less of a threat to the group, meaning that 'religion' would be less tightly adhered to. But the Flynn Effect is not measuring increases in intelligence so much as, as Flynn (2007) himself suggests, increases in the ability to think in a way which seems intelligent or analytical, something that could be underpinned by better education throughout the twentieth century, with schools less focused on teaching by rote. In terms of the hierarchy of intelligence, the Flynn Effect is measuring an increase in a narrow ability or set of narrow abilities at the base of the pyramid of intelligence. This change could itself be put down to an increasing need for more analytical thinking put in place by Modernization. Up to a point, this would hide decreases in *g* on IQ tests. But it could only continue up to the brain's genotypic limitation in thinking analytically, after which the genotypic decline in intelligence would reveal itself on IQ tests. This point was reached, in the West, in the 1990s.

3. The Decline of the Flynn Effect

It has been argued, based to some extent on the assumption that it is measuring intelligence, that the phenotypic Flynn Effect has actually reached its genotypic ceiling and that intelligence stopped increasing some time in the 1990s in advanced Western countries. As such, the genotypic decrease is now becoming noticeable on IQ tests. Kanazawa (2012, p.189) argues that this would fit with Lynn's (2006) nutrition hypothesis, as it would imply that the optimum nutrition level for the highest possible intelligence has been surpassed. Increases in nutrition beyond this level would lead to no further intelligence gains and, indeed, they would lead to people simply being overweight and obese.

Sundet et al. (2004) have found that IQ scores for Norwegian conscripts reached a peak in the mid-1990s with a steady decline in mathematical scores since. Teasdale and Owen (2005) noted a slowing in the increase in Danish conscript IQ and, since 1998, a decline. Cotton et al. (2005) have observed a decline amongst Australian children (N 618) while Shayer and Ginsburg (2009) have observed a decline amongst British children, based on a sample of 10,000. Lynn and Harvey (2008) observe that these results are difficult to interpret because both Norway and Denmark have seen, since the 1960s, immigration from countries in which IQs are typically lower. This is, of course, also true of Britain and Australia. However, it appears that this is not influencing the results, at least in Norway. According to Sundet (pers. comm. 2013): 'Men from Asian and African countries have around 5-6 IQ points lower than non-immigrants. But they seem to comprise not more than around 2-3% of the conscripts in this period. This would deflate the total mean IQ by around 0.1- 0.2 IQ points.' In addition, conscript IQ tests from Finland show the same pattern. There were increases in the scores on tests of shapes,

number and words over the years 1988 to 1997 averaging 4 IQ points a decade (see Koivunen, 2007). From 1997 to 2009 there were declines in all three tests averaging 2 IQ points a decade (Dutton and Lynn, 2013). Finland did not experience any significant third world immigration until around 1992 (see Nykänen et al., 2011).

But it must be emphasized that whether the Flynn Effect involves a boosting of phenotypic intelligence (or, more likely, a narrow intelligence ability) then there would have to be a maximum phenotypic effect, after which intelligence would cease to increase and genetic intelligence, and any decline in it, would thence become visible on IQ tests. In addition, if the Flynn Effect is underpinned by a system of education which somehow boosts IQ test performance and analytical thinking ability, there would be an inbuilt ceiling on the system's ability to heighten this performance as the ability to produce a successful education system is underpinned by intelligence and also there would be a genotypic limit to this intelligence ability. Accordingly, the end of the Flynn Effect in some Western countries seems to indicate, either way, that the ceiling has been reached. This is compounded by evidence from the 1950-1990 birth cohorts in the Netherlands which has found that the Flynn Effect is not occurring on *g* but the negative Flynn Effect, which has been occurring since the mid-1990s, is occurring on *g* (Woodley and Meisenberg, 2013). This implies that the Flynn Effect has masked a genotypic decline in intelligence in the West, which is now revealing itself.

The end of the Flynn Effect could be interpreted as increasing childhood obesity negatively affecting intelligence by reducing nutrition, rather than a genotypic decline.⁶ But this

⁶ Childhood obesity (2-11 year olds) in the UK increased from 7% in 1980 to 20% in 2008. Over the same period, adolescent obesity (12-19) increased from

argument is flawed. Most significantly, there is no evidence that the rise in being overweight in the West has been caused by consuming more high fat food and less nutritious food. Between 1990 and 2002, fat consumption in the USA fell by 6% yet obesity (BMI over 30) grew from 23% of the population to 30%. Accordingly, the 'obesity epidemic' is put down to people simply eating more - average male, daily consumption rose 2200 to 2700 calories between 1960 and 2000 - and not burning that fat off in the way that people used to with their more physical lives (see Weiss, 2002). There is no consistent evidence that obesity reduces cognitive functioning (see Chandola et al., 2006). In addition, studies generally concur that obesity (and BMI in general) is about 0.7 heritable, so 70% of obesity differences are genetic (e.g. O'Rahilly and Farooqi, 2008 or Drewett, 2007, p.158). Studies have consistently found a negative correlation between obesity and intelligence (e.g. Li et al., 2008 or Chandola et al., 2006) and have suggested, in particular, that the genetics of intelligence may be inversely associated with the genetics of being overweight and especially of obesity (see Miley, 1999, p.47). Kanazawa (In Press) found, based on a sample of 12,000, that, even controlling for education, a 'one standard deviation increase in childhood general intelligence decreases the odds of adult obesity at age 51 by 11%.' As such, rising obesity may partly reflect the reversal of the Flynn Effect.

So, it appears likely that the reported decline in IQ scores, therefore, reflects the kind of breeding patterns in Western countries highlighted by Lynn (2011a) and Herrnstein and Murray whereby, since around 1850, females with the highest IQs have had the fewest children and have had those children the latest while females with the lowest IQs have had the most children and

5% to 18%. This parallels a similar pattern in other advanced societies (Krebs et al., 2007).

have had those children the youngest (see Chapter Fourteen). The Flynn Effect has hidden this pattern of declining intelligence on IQ tests but its consequences are now being seen in IQ tests and have long been observed in reaction times (Silverman, 2010) and innovation levels (Woodley, 2012).

4. Religion and the Flynn Effect

Lynn and Vanhanen (2012) suggest that the decline in belief in God throughout the twentieth century might reflect the Flynn Effect (interpreted as genuine rises in intelligence). As we will see, data on the decline in religious belief in the West over this period are congruous with this theory. There is certainly strong evidence in the UK, and other developed countries, that people have indeed become less religious since the 1930s. This can be observed in polls of belief in God, which have been conducted regularly since 1947.

However, we have observed that there is a reasonable case for arguing that the Flynn Effect is not measuring intelligence increases. This being the case, declining belief in God could plausibly be explained by a less stressful environment and the spread of various ideologies - whether scientism or forms of Multiculturalism - which are anti-religious (in the sense of opposing Christianity in historically Christian countries) but religious in an operational sense and accordingly appealing to those of low intelligence. It might be argued that the development of 'scientific spectacles' would make people less religious but this seems unlikely because Ganzach et al. (2013) have shown that education does not mediate the effect of intelligence on religiousness. So, reduced stress and an anti-religious replacement religion (which replaces lexical religious belief with similar belief which appeals to the same instincts) would explain how it would

be possible for g to decline while religious belief (something negatively associated with intelligence) concomitantly declines. As long as the decline in stressfulness outpaces the decline in intelligence, religious belief will continue to decline, but this cannot continue indefinitely because, as we will see in this chapter and the next, civilization is underpinned by intelligence. We will discuss this in more detail in Chapter Fourteen. However, it is worth noting here the decline in religious belief.

Table 10.1 - Do you believe in God? (UK Polls: 1947-2011)
(British Religion in Numbers, 2010, up to 2000. I have omitted the categories 'unsure' and 'don't know.' 'Spirit or life force' percentage can be seen below).

Year	Agency	Yes %	No %
1947	Gallup	45	-
1957	Gallup	41	6
1961	NOP	57	7
1963 (March)	Gallup	38	9
1963 (Dec.)	Gallup	43	4
1968	ORC	37	9
1970	NOP	40	7
1974	Harris	29	6
1979	Gallup	35	8
1984	Harris	40	11
1990	Gallup	32	10
1993	Gallup	30	14
1999	TNS	25	16
1999	ORB	28	17
2000	ORB	26	15
2011	YouGov	37	1

Table 10.2 - Belief in a Spirit or Life Force (UK) %

Year	Agency	Spirit or Life Force	Spirit + Personal God
1947	Gallup	-	-
1957	Gallup	37	78
1961	NOP	22	79
1963 (March)	Gallup	33	71
1963 (Dec.)	Gallup	43	86
1968	ORC	42	79
1970	NOP	37	77
1974	Harris	35	64
1979	Gallup	41	76
1984	Harris	33	73
1990	Gallup	41	73
1993	Gallup	40	70
1999	TNS	43	68
1999	ORB	37	65
2000	ORB	44	70
2011	YouGov	4.4	41.4

We have already discussed the difficulties with using survey results and there are some conspicuous anomalies here, especially when comparing YouGov and the larger-scale surveys. Nevertheless, the surveys at the very least indicate a broad decline in belief in God (or in a spirit or life force) in the UK between 1947 and 2011 and this is inline with our hypothesis.

There has also been a decline of religious belief during the course of the last century in the United States. Hoge (1974) has reviewed several surveys that have found a decline in religious belief among college students. For example, students at Bryn Mawr were asked whether they believed in a 'God who answered

prayers.' Positive responses were provided by 42% of students in 1894, 31% in 1933, and 19% in 1968. Students beginning at the University of Michigan were asked to provide a 'religious preference.' In 1896, 86% of students did so. In 1930 this had dropped to 70%, and in 1968 it had dropped to 44%. At Harvard, Radcliffe, Williams and Los Angeles City College the percentages of students who believed in God, prayed daily or fairly frequently, and attended church about once a week all declined between 1946 and 1966. Heath (1969) has reported a decline in belief in God among college students from 79% in 1948 to 58% in 1968. Gallup Polls have found that 95.5% of the US population stated that they believed in God in 1948 (Argyle, 1958), but by 2004 this had fallen to 89.5% (Zuckerman, 2006).

5. Religious Identification and Church Attendance

Recent censuses in Britain can also be used to discern a rise in atheism and agnosticism. They show a clear rise in the percentage of the population who describe themselves as having no religion at all and a significant fall in those describing themselves as 'Christian,' which would be the default option for almost all native British people. The 2001 census was the first census since 1851 (when the question was anyway not compulsory) to ask people about their religion. 72% marked themselves as 'Christian' while 15% claimed to be of 'no religion.' The statisticians included in that category those who inserted frivolous religions such as 'Jedi.'⁷ By the time of the 2011 census, the results were rather different. It should be emphasized that the UK experienced record

⁷ There was a campaign in 2001 to persuade as many as possible to put 'Jedi' as their religion (BBC, 15 February 2003). It succeeded in persuading 0.7% of respondents to do so, meaning there were more British Jedi than Buddhists or Sikhs.

immigration, much of it non-Christian, between 2001 and 2011. Nevertheless, only 59% identified as Christian in 2011. The percentage of those who claimed to have 'no religion' had risen to 25%.

However, the 25% who have 'no religion' may hold religious-type beliefs and the census may simply reflect a decline in identifying with an organized religion and in organized religion more generally. Even so, we would expect some decline in religiousness between 2001 and 2011 and censuses appear to indicate that this is what has happened. Censuses in other countries reflect similar trends. According to the Canadian census of 2001, 77% of the population claimed to be Christian while 16.5% recorded 'no religion.' This was an increase from 12.3% of the population on the 1991 census.

In the USA, Gallup has found an almost completely linear rise since 1948 in the percentage of the population who identify as having no religious affiliation.

Table 10.3 - Religious Non-Affiliation in the USA, 1948-2010 (Gallup, 2013)

Year	No Religious Affiliation %
1948	2
1951	1
1960	2
1970	3
1980	7
1990	9
2000	8
2010	14

In addition, Schwadel (2013) drew upon the General Social Survey from 1974-2010 to show that religious affiliation in the USA is in decline. His results showed little change in the percentage of Americans who reported strong affiliation, though the percent with a somewhat/not very strong affiliation declined from 1990 to 2010, as the number of unaffiliated respondents increased.

With regard to the UK, Brierley (2010) has aggregated the figures for church membership in the Church of England and other English churches between 1900 and 2010. Church membership is defined as regular church attendance (in the Church of England) or tithing in the free churches. He finds the following:

Table 10.4 - Church Membership in England, 1900-2010 (Brierley, 2010)

Year	Church Membership (% Population)
1900	27
1920	22
1940	21
1960	19
1980	13
2000	12
2010	11

Church attendance has historically tended to be higher in English villages than cities and between 1900 and 1920, England saw substantial migration from the countryside to the cities. Brierley argues that immigration has caused anomalies in the rate of decline. For example, decline slowed down in the 1950s due to

high Irish immigration, and has slowed since 1980 in part due to immigration from less developed countries. But certainly this demonstrates that religious participation in the UK is declining. As Bruce (2002) has observed, in the mid-nineteenth century rural church attendance - though not obligatory - was subject to social pressure. As people moved to the cities, the pressure to conform and attend church lessened and church attendance became much less a matter of convention. But even in the cities in the 1930s there could be social incentives for the poor to attend church, such as a free summer trip for example (see Watson, 2000). So, church attendance is a problematic measure because there is clear evidence that the non-religious may attend while many people of a religious inclination may not. But we can perhaps accept that church membership works as a crude measure.

6. The Secularization Thesis

On a *prima facie* level the data above can be understood to reflect the Flynn Effect. Populations in Western countries such as Britain, Canada and the USA have seen a decline in all measures of religiousness and most importantly a decline in believing in God and believing in other religious doctrines. As discussed, the decline is probably explained not by rising intelligence (which is falling) but by modernization leading to lower levels of stress.

The counter-argument is that the decline in belief in God, and the decline in religious involvement, is part of a broader sociological trend known as Secularization. It is changes in social structures which are causing a decline in religious belief and practice. Secularization is underpinned by modernization. According to Bruce (2002, p.2), 'modernization creates problems for religion' because it encompasses the industrialization of work, a shift from small villages to more anonymous towns and cities, the replacement of a small community by a larger society, the rise

of individualism (as community bonds are broken), the rise of egalitarianism, the rationalization of thought and social organization and the rise of scientific thinking. He adds that modernization gradually causes religion to be of less social importance and religion becomes taken less seriously. Hence, society becomes more 'secular.' Secularization also, 'supposes that changes in religious belief and behavior are best explained by changes in social structure and culture which make religion more or less plausible or more or less desirable' (p.3).⁸

In attempting to understand why modernization began in some countries before it began in others, Bruce argues that monotheism was a 'rationalizing force' because it simplified religion and made it a matter of ethics, rather than simply pleasing a capricious 'despot.' Accordingly, Judaism, a religion, Bruce argues, which is fundamentally based around laws and ethics, was the first step to modernization because it was, in its purest form, rational. The next step was the Reformation. This was a return to the ethical principles of Judaism, claims Bruce, whereby, once again, rituals to placate God were rejected in favor of obeying God's laws. In addition, the Reformation, with its focus on returning to sources, led to a rise in literacy and individualism, because it focused on the relationship between the self and God, insisting that faith alone led to salvation while Catholic ritual was not necessary. This rational analysis of the Bible led to a general atmosphere of questioning tradition from which the Enlightenment followed. Protestantism also re-emphasized the New Testament belief in believers being equal before God and in

⁸ I cite Bruce here because he is one of the most prominent advocates of the Secularization Thesis. See also Martin (1969), Dobbelaere (1981), Wilson (1982). Even within sociology, considerable criticism has been leveled against the thesis (e.g. Stark, 2001). See Dutton (2008a) for an examination of rhetoric in this debate.

siding with the disadvantaged, leading to a rise in egalitarian ideas. Calvinism, in particular, led to the 'Protestant Ethic' (see Weber, 1930). According to Calvinist theology, God preordained His elect, meaning that even believers could not be sure they were saved. Accordingly, believers theorized that God would surely materially bless His elect and so a desire to be certain of election led to Protestant diligence. This culminated in the Industrial Revolution which undermined the small communities to which the churches were central and this process continues.

7. Problems with the Secularization Thesis

This is effectively a description rather than a theory. It does not really appear to explain *why* modernization or secularization happened, at least not in a way that is consistent with psychology; the discipline which underpins sociology. It may be the case that the Secularization Thesis partly explains why religious *involvement* has decreased - because secularization has led to the compartmentalization of society into anonymous cities - but it does not explain why actual religious belief, to which humans are evolutionarily hard-wired, should have declined.

A sound theory will explain this in a consistent way without leaving questions unanswered. The most plausible theory is that at an individual level, as we have discussed, people are more open to religion when they are stressed, if they have certain pronounced personality characteristics, and if they have low intelligence. When they are stressed and uncertain they are more religious. Modernization has created conditions in 'modern' countries which heavily reduce stress. Since the nineteenth century, Western European people have had the causes of many of their fears effectively controlled. Europeans need no longer fear numerous formerly devastating diseases, nor need they fear famine,

predators, lawlessness nor death in a whole host of accidents which are now controlled for, and their material standard of living has undergone considerable improvement (see Clark, 2007). There is even a (relatively comfortable) safety net in welfare states, which almost all Western European countries have to varying degrees (see Cousins, 2005). In such an environment, in which people are less fearful, we would expect more of them to be able to permit their reason to over-ride their instincts meaning that the level of religious belief would decrease. This raises the question of what underpins Modernization itself. This is underpinned, as we will demonstrate below, by high intelligence and by auspicious environmental conditions. Such a theory is superior to Secularization because it is possible to ground it in psychology, rendering it consilient, it does not leave questions unanswered and it can be applied across cultures and time periods.

Secularization Theory is deficient in all these respects. Firstly, Secularization Theory does not work in countries like Japan or India where there is historically no monotheism and no Reformation. It cannot permit us to make predictions in these countries. A broader, evolutionary theory, by contrast, could work in these societies as well, so it would explain more, rendering it a superior theory. And indeed, it does, because, even without the mechanisms Bruce describes, Japan has modernized and has become less religious in terms of belief, though, unsurprisingly, this process reversed in the wake of the stress of World War II before reasserting itself again.⁹ Secularization Theory also doesn't explain why polytheistic Ancient Greece or Rome, in contrast to other societies, were able to develop civilizations whereas our model answers this question. Secularization Theory does not

⁹ Davie (2000) observes that in England, weekly church attendance rose in the wake of World War II before falling back to its downward trajectory in the 1960s.

explain why the USA, and even the European Americans, should have secularized so much more slowly than Europe. Bruce (2002, pp.219-227) has suggested that it is because America's federal system uniquely insulates fundamentalist sects, but why should it do so more than any other federal country? Alternatively, he argues that immigrants remain religious for longer and the USA experienced considerable immigration from around 1900. But, if this is so, the richer States, which absorbed most of these immigrants, would be more religious than the poorer States, but this is not the case (see Pesta et al., 1997). A psychological theory provides an answer to the anomaly of US religiousness, as we will see in the next chapter. Put simply, the USA was founded by the religious (and religiousness is significantly heritable) and the kind of person who emigrates is likely to have the characteristics of religiousness and character is around 0.5 heritable.

But, most importantly, Secularization Theory leaves questions unanswered. Secularization Theory describes what has happened in Western Europe to bring about modernization but it does not explain why modernization leads to secularization in a consilient way and nor does it explain what caused modernization in a consilient way. Bruce asserts that modernization leads to changes in 'culture' and seems to have been caused by changes in 'culture.' But this leads us to ask what 'culture' is? It is, in social science, 'that complex whole' (Tylor, 1871, p.1) the 'way of life of a people' (Hatch, 1985, p.178) which includes their religion. Accordingly, 'culture,' as Alarcon et al. (1998, p.11) note, is essentially the modal personality and intelligence of a group of people in a bounded geographical area who are often an ethnic group, more related to each other than to outsiders. Currently, Bruce's argument is question-begging and circular. He is arguing that cultural differences lead to cultural differences. But these differences cannot simply be due to slightly different

environments because we know that key examples of cultural differences, such as religion, are about 0.44 genetic. Also, the factors that underpin differences in behavior (and thus culture), such as intelligence and personality, are partly genetic and, in the case of intelligence, 83% genetic. To avoid a circular argument, it must be accepted that genetics plays some part in cultural differences. And this would be congruous with research demonstrating that innovation is underpinned by a combination of genetics and environment (e.g. Simonton, 1988).

So, we can render Bruce's model consistent by arguing that Modernization is partly caused by changes in modal intelligence and personality. These changes also reduce religiousness. Modernization, by massively reducing stress, further reduces religiousness. And the optimum environmental conditions combined with the optimum personality-intelligence profile would explain why the process began where it did.

8. Explaining Modernization

Intelligence and character combined with environmental conditions will predict innovation (e.g. Simonton, 1988). This being so, we would expect the first civilizations to develop amongst relatively intelligent populations with relatively auspicious environmental conditions. This is indeed what occurs (see Clark, 2007). Their innovations would spread to more intelligent peoples, limited in their ability to develop due to harsher environments (which would have more significantly selected in favor of intelligence), but once they did so, and once these people could control their environments better, they would begin to lead in terms of civilization, hence the rise of East Asia and Europe.

By the early Medieval period, China was higher in civilization than was Europe. But, nevertheless, we can understand why modernization began in Europe rather than amongst the more intelligent East Asians. As Lynn (2006, p.156) points out, the East Asians have lower levels of psychopathology than Europeans and 'a low level of social conformity and an element of psychopathic personality appear to be ingredients in creative achievement because they reduce anxiety about social disapproval and appear to facilitate the generation of the original ideas that are required for the highest levels of scientific discovery.' So Europe had the optimum mix of intelligence and character.

The next question is why Modernization occurred *when* it did. In essence, this can be put down, as we will see, to the more intelligent and Conscientious half of the population having around 40% more surviving children than the less intelligent and less Conscientious half over many generations, compounded by the latter being disproportionately killed in the Black Death, triggering what Bruce regards as the seeds of Modernization (the Reformation). By contrast, in East Asia, the elite had only moderately more children than the non-elite in this period, leading to the conclusion that modernization would have happened there, only later (Clark, 2007, p.11).

Bruce does not mention that the Renaissance heavily influenced the Reformation and included many of the same principles. So, really we should ask, 'Why did the Renaissance occur when it did?' and answering this may help us further understand the Reformation. Secularization Theory does not answer this question, or might put it down to coincidences, but an evolutionary theory can answer it. In that there was no significant rise in living standards in Western Europe until 1800 (see Clark,

2007),¹⁰ something must have happened to make people less religious, as evidenced in the liberal, questioning, intellectual nature of the Renaissance. In other words, something must have raised intelligence in Western Europe relatively suddenly because even the briefest summary of the Renaissance and Reformation permit us to see that they are intellectual, questioning movements.¹¹ These characteristics are associated with intelligence, as we have discussed. Indeed, all of the markers of modernization positively correlate with national intelligence (see Lynn and Vanhanen, 2012). The most parsimonious explanation, therefore, is that the beginning of modernization is underpinned by Europeans, already having relatively high intelligence which had long been rising due to fertility positively correlating with intelligence in preindustrial societies (see Lynn, 2011a, Ch. 2), experiencing a relatively sharp rise in intelligence. Intelligence then continued to increase, leading to the Industrial Revolution in 1800, after which time, as we have discussed, it went into decline.

It seems probable that the Black Death of 1348-1350, which wiped out as much as 60% of the population of Europe (Zahler, 2009, p.88), eugenically altered the genotype relatively rapidly.¹² It is widely documented that the Black Death disproportionately killed the poorest members of European countries: the serfs and the free laborers. In many areas of England, 85% of laborers died (Byrne, 2012, p.141), leading to a labor shortage and dramatic social change. We would expect these laborers to be, on average, the least intelligent members of Medieval society. Some might be

¹⁰ This was due to the Malthusian Trap which ensured that any rise in living standards was offset by a rise in population. The Industrial Revolution allowed countries to break free of this trap, leading to long-term rising living standards.

¹¹ See Schmitt et al. (1988).

¹² The quickness with which population genetic characteristics can change has been well documented (e.g. Cochran and Harpending, 2009).

intelligent but of poor character and it is true that only particularly intelligent laborers would have been able to socially ascend. But to simply argue that poverty was responsible for high laborer mortality ignores the fact that around 20% of the laborers did survive and there was subsequent rapid social ascent (associated with intelligence).¹³ The Black Death would have been an intellectual challenge and those who were more intelligent (whatever their social position) would have been more likely to survive it, as the research indicating that intelligence correlates with healthiness, longevity, and healthy living attests.¹⁴ The more intelligent would have been more likely to understand that the plague was contagious, less likely to put it solely down to God's wrath (as the Church proclaimed),¹⁵ and more likely to be able to successfully execute strategies to avoid catching it. They would also have been less inclined to simply live for the present, as they would have had lower time preference. In addition, they would have had better health than the less intelligent and been better able to protect their children from the plague.¹⁶

There is some archaeological evidence for this theory. Steen (2009, pp.64-65) notes that 30 skulls from a supposed Black Death burial pit (circa 1350) in Spitalfields in London, 54 skulls

¹³ Coss (2006) notes that the chaos of the Black Death led to rapid social ascent, with serfs rising to Justices of the Peace in one generation. One way of explaining this is that, in general, the most intelligent serfs had survived. This process led to a reaction where parts of the elite began to emphasize their ancestry to a much greater extent, leading to the hierarchy of nobility in England (see Dutton, 2012b, Ch. 2).

¹⁴ See O'Toole and Stankov (1992), Gottfredson (2004), Hemmingsson (2009) and Deary et al. (2009).

¹⁵ Gottfried (2010, p.82).

¹⁶ Studies have show that child mortality is predicted by parental low intelligence, leading parents to being insufficiently cautious. See, Herrnstein and Murray (p.218).

from those killed in the sinking of the *Mary Rose* in 1545 and 31 modern skulls were compared by Rock et al. (2006). The modern skulls were 10mm larger from a point behind the eyes to the curve of the skull, reflecting an area of the brain focused on intellect. It is possible that this reflects a growth in intelligence after 1545. Even if intelligence has declined since 1800 it may not yet have returned to the levels of 1545. There were no 'significant' differences between the skulls from 1350 and 1545. Sampling errors may explain the lack of difference between 1350 and 1545. We might expect the crew of the *Mary Rose* to be below-averagely intelligent for their time. Simonton (1988, p.235) has found that the average IQ of sailors (other than the few officers on a ship) is lower than that of the general population. So, the absence of any significant difference in average cranial capacity between such a group and a putatively representative sample from 1350 might indeed indicate that it was people of lower intelligence who disproportionately died in the Black Death. We might also question the representativeness of the 1350 sample. Research has consistently found that city-dwellers have, on average, higher intelligence than those who live in the countryside (see Lynn and Vanhanen, 2002, p.55).¹⁷ To the extent that we can assume that the burial pit was substantially used to bury London residents, such people would have had above-average intelligence, especially in an overwhelmingly rural society. So, if their skulls are the same size as the skulls of below-averagely intelligent people in 1545, average intelligence is likely to have increased.¹⁸

¹⁷ See also Lynn (1980).

¹⁸ More recently, it has been suggested that the pit skeletons did not die in the Black Death but due to the fallout from a Volcanic eruption in 1258 (Alberge, 5 August 2012). This caused famine in England that, like the Black Death, would have been a selection event. So this would indicate that those who died of this famine in London had skulls of the same size as those low in intelligence by

Rock et al. are more confident in the representative nature of the *Mary Rose* sample, but even so, the above-averagely intelligent of 1350 are the same as the averagely intelligent of 1545.

In addition to the Black Death, many studies have shown that between the sixteenth century (when relevant records began) and the end of the eighteenth century, the socioeconomically higher half of the European population had between a third and 50% more children who survived into adulthood than did those of the lower half (Clark, 2007, p.259). Socioeconomic status is a proxy for intelligence, so this process created a eugenic effect with regard to intelligence. Clark shows, drawing upon 1978 wills mainly from Suffolk in the east of England, that the richer 50% of English testators in the sixteenth and seventeenth centuries had twice as many surviving children as the poorer 50%.¹⁹ Also, around 26% of noble males had died violently between 1330 and 1479, selecting against a militaristic personality trait profile. So, concludes Clark, the modern day English descend from 'the strivers' (those of high intelligence and high Agreeableness and Conscientiousness). In addition, Clark (Ch. 9) observes that leading up to 1800, despite, to a great extent, stasis of living standards and technology for millennia in Europe, interest rates went down (implying lower time preference), literacy and numeracy hugely increased, levels of violence (including judicial violence) decreased and working hours increased. These changes strongly imply rising intelligence.

The Industrial Revolution began in England, he argues, because England's institutional stability rewarded the more intelligent with particularly pronounced reproductive success

1545 standards. However, London-dwellers would have been of above-average intelligence by 1258 standards.

¹⁹ Skipp (1978) reaches similar findings in Warwickshire in the English Midlands, as does Pound (1972) in Norwich, also in the east of the country.

compared to other highly intelligent societies. It occurred when it did because a particular modal intelligence-personality combination had been reached. An evolutionary psychological theory of modernization is not only superior to Secularization Theory because it is consilient, but it also answers more questions. It offers a viable theory of modernization and of why it began when it did and where it did.

9. Conclusion

In this chapter we have shown that levels of religiousness have decreased in Western countries since 1900. This would be congruous with the Flynn Effect which has shown increasing IQ scores in Western countries between 1930 and 1997. However, we have seen that the Flynn Effect is not in fact measuring intelligence and that intelligence has actually declined in Western countries over the period. As such, the likely reason for the decline in religiousness is increasing modernization which leads to a reduction in levels of stress. Alternative theories for this, such as the Secularization Thesis, have been shown to be problematic and not to be consilient.

Chapter Eleven

Gender and Religion

- 1. Introduction.*
- 2. Gender and Intelligence.*
- 3. Intelligence, Maturation, and Gender.*
- 4. Gender and Religiousness.*
- 5. Conclusion.*

1. Introduction

In this chapter we will review the evidence with regard to gender-based differences in intelligence. It will be shown that women have slightly lower intelligence than men, due to there being fewer women at the extremes of the intelligence range. This is congruous with higher levels of religiousness among women than men, the evidence for which we will highlight. It will also be shown that gender-based religious differences amongst adolescents parallel gender-based differences in rate of maturation.

2. Gender and Intelligence

Women, on average, have a lower percentage of very high IQs than men. Lynn and Irwing (2004) conducted a meta-analysis of 57 population studies all of which used the Raven's Progressive Matrices Test. They concluded that male and female IQ is only slightly different up until the age of 15, when boys score around 2 IQ points higher than girls. At 15, an overall 5 point gap in favor of males develops, and this gap seems to remain constant thereafter. Men and women differ with regard specifically to the

upper range of the Bell Curve. Men outnumber women amongst those with an IQ of above 130 at 3:1, and they outnumber them amongst those with an IQ of above 145 at 5.5 to 1. Irwing and Lynn (2005) conducted a meta-analysis of 27 studies of university students and found that males had higher mean intelligence than females. Studies have consistently found that men have more IQ variability than women, outnumbering them both at the top and bottom of the IQ range (e.g. Arden and Plomin, 2006). Broadly, this research accords with research indicating that women have, on average, smaller brains than men, their brains being between 10% and 12% smaller (e.g. Witelson et al., 2006 or Zaidel and Iacoboni, 2003, p.155). As we have seen, there is a weak positive correlation between the size of the brain, relative to the body, and intelligence.

The research of Lynn and Irwing (2004) has been disputed by Flynn (2012) who has reviewed studies to find that women slightly outperform men in Western countries on IQ tests (though they have lower scores than them elsewhere). However, Flynn's analysis of 'Western countries' is actually based on one school and university study in Argentina (N 1695) and a school study in Estonia (N 1250 males, 1240 females), so it is inherently less persuasive than a large-scale meta-analysis of all the studies using a particular *g*-loaded test. It is also incongruous with the research on gender differential brain sizes and reaction times (e.g. Shelton et al., 2010) and leaves so many questions unanswered that it is problematic until replicated to a greater extent. Flynn (p.157) asserts that 'even two nations put a heavy burden on any hypothesis that women have inferior genes for general intelligence.' He provides no further case for this assertion and it can be countered that such a small number of studies are more likely to be outliers when they are compared to a large meta-analysis that shows the opposite. It should be noted that there have

been many fallacious criticisms of Lynn and Irwing's research. Most obviously, Steve Blinkhorn has asserted that 'Sex differences in average IQ, if they exist at all, are too small to be interesting.' This misunderstands statistics. They are interesting if they are statistically significant and we have seen that small differences in IQ can lead to significant effects. He also terms Lynn and Irwing's findings 'utter hogwash' (McKie, 6 November 2005). This kind of intemperate language is fallacious and implies that Blinkhorn cannot suppress his bias, meaning that we should be very suspicious of the quality of his research.

Flynn (p.142) argues that Lynn and Irwing 'lump together' different kinds of samples when they specifically stress that they do not. Flynn also provides evidence that males may begin to overtake females in IQ at slightly older than 15 (at around 16 or 17), though this is really only nuancing a point made by Lynn and Irwing to which we will turn next. But before doing so, it should be noted that Flynn (2012, p.157) makes a very problematic comment with regard to the point at which male IQ overtakes females. He claims that '17' 'edges into the university age range, and university data cannot be taken seriously until we evidence similar or dissimilar (*gender-based*) IQ thresholds (*for entering university*).' Firstly, it is extremely rare for anyone under 18 in these countries to attend university. Secondly, Lynn and Irwing use population samples in one of their studies and Flynn attempts to challenge this using only university and school samples. Thirdly, Flynn is unjustified in speculating that if female students have lower average IQs than male students then this undermines the validity of university samples. Women are higher in Openness, Conscientiousness, Agreeableness and Neuroticism than men and these traits predicts years of education and educational success. This, of course, means that there are more women who will be successful in education because of good character, but potentially

in spite of relatively low IQ. If the female IQ was the same as the male one then women would be substantially over-represented amongst high school and university random samples. However, Flynn's Argentine study finds that the sample is almost exactly 50-50.

3. Intelligence, Maturation, and Gender

So, having found the criticisms of their research wanting, let us return to Lynn and Irwing's analysis. Lynn and Irwing propose that the male-female difference in adult intelligence can be understood in developmental terms. Boys and girls mature at about the same rate until they are 7. At 8, in Western countries, girls begin a growth spurt which slows by the age of 15. This spurt involves a spurt in brain growth and thus cognitive ability, explaining why girls in this age range often outscore boys by around 1 IQ point. The male growth spurt, including with regard to brain growth, starts later (at around 11) and continues until around age 20, when the male IQ is up to 5 points higher than the female one. Irwing and Lynn (2005) confirmed this finding with a similar meta-analysis of studies of university students using the Progressive Matrices.

Based on this research, we would hypothesize that males would be less religious than females up until the age of 8, about the same as females between the ages of 8 and 15 and again less religious than females beyond the age of 15. The problem with this hypothesis is that the IQ advantage for females between 8 and 15 is so small that male-female modal personality differences might interfere with the religious outcome as might environmental issues. Indeed, females are, as we have noted, higher in Agreeableness, Neuroticism, Conscientiousness and Openness than men. These characteristics are important predictors of

religiousness or certain kinds of religiousness. As such, it may be that males in this age range are less religious than females, but that the gap narrows to reflect the rise in female intelligence.

5. Gender and Religiousness

There is research indicating that adult females are more religious than adult males. Cavan et al. have found, as we have already discussed, that women over the age of 60 consistently are more favorable to religion and they are more certain that there is an afterlife (*see above*). Only over the age of 85 do men and women converge. It has been suggested that women experience faster blood flow to the brain than men and that this explains why they are less susceptible to a reduction in cognitive abilities due to ageing (e.g. Halpern et al., 2007). So it may be, though I am not aware of any research proving it, that male and female intelligence converges in extreme old age. Also, it is widely documented that women live longer than men (e.g. Kronenfeld, 2006, p.464) and, within genders, intelligence positively correlates with longevity so this might partly explain such a convergence.¹ In addition, to the extent that intelligence predicts health, we might expect gender differences in intelligence to flatten out in extreme old age on these grounds as well. Cavan et al. also show clear gender differences in other measures of religion, though these are more proximate for religiousness than belief in the afterlife. For example, this is true of attending church services at least weekly. Of course, the obvious problem here is that women tend to be

¹ It was found, using a Scottish sample, that 11 year olds who scored one SD below average on an IQ test in 1932 were 79% as likely as those who scored average or above to be alive in 1997 (see Deary et al., 2004). Other studies have reached the same conclusion (see Weiten, 2012, p.375, for a summary). See also Gottfredson and Deary (2004).

higher than men on personality traits which might make such activity more attractive.

Table 11.1 - Percent Attending Church Service at Least Weekly (Elderly Adults, USA) (Cavan et al., 1949)

Age	Male	Female
60-64	45	60
65-69	41	53
70-74	46	52
75-79	45	53
80-84	50	56
85-89	55	53
90-94	17	50

These results parallel religious belief in that the women are consistently more religious than men. The single anomaly is that male church attendance between 85 and 89 is higher than female.

More recent research, using a wider age sample, has confirmed that women are more religious than men on all measures. According to a poll (Gallup 2009) of 35,000 US adults, 86% of women are affiliated to a church as opposed to 79% of men, 66% of women pray every day as against 49% of men and, perhaps most importantly, 58% of women are 'are absolutely certain that God exists' as against 45% of men. Similar results were found in Britain by YouGov (2011). 35% of men as against 40% of women believed in God while 14% of men and only 7% of women were firm atheists. Overall, 38% of men and 28% of women did not believe in God. We have previously examined polls looking at religious belief in the UK since 1947. Most of these polls divided between genders when asking about belief in God. All of them find that women are more prone to believing in God than men, with the difference ranging from 15% to 5%. This

can be seen in Table 11.2 (polls that did not distinguish between genders are omitted).

Table 11.2 - Belief in a Personal God by Gender, 1963-2011 (BRIN, 2010)

Year	Agency	Men %	Women %
1963 (March)	Gallup	30	45
1963 (Dec.)	Gallup	37	50
1974	Harris	23	34
1979	Gallup	25	43
1984	Harris	33	46
1990	Gallup	25	39
1993	Gallup	23	36
1999	ORB	25	30
2000	ORB	20	32
2011	YouGov	35	40

So, we can reasonably conclude that women are more religious than men. But, as predicted, we would expect this to be more complicated with regard to childhood and teenage religiousness.

Francis (1989) has observed that this difference can be found amongst teenagers, which is precisely what Lynn and Irwing's (2004) model would predict.

Table 11.3 - Religion amongst English School Children; Percentages Agreeing With Religious Statements (Francis, 1989)

Age	Boys	Girls
5-6	87.9	96.0
11-12	79.6	84.1
15-16	55.7	70.4

Girls aged 5 to 6 are 8% more religious than boys, reflecting their slightly lower IQ and different personality profile. Between 11 and 12, when the female growth spurt is underway and the male one is not (or is not to the same extent) the gap has narrowed to only 4.4%. This would reflect, in part, female intelligence rising at a faster rate than male intelligence. The failure to be less religious than males might be explained by personality characteristics which would make religiousness more attractive. By 15 to 16, when the male growth spurt is underway but the female one has slowed, males are 14.3% less religious than females. This is as our hypothesis would predict. Indeed, boys' extra intelligence would be compounded by characteristics which would make religion less attractive.

6. Conclusion

In this chapter we have looked at the relationship between religion and gender. We have reviewed the evidence with regard to gender-based differences in intelligence. It has been shown that women have slightly lower intelligence than men, due to there being fewer women at the extremes of the intelligence range. This is congruous with higher levels of religiousness among women than men, the evidence for which we have highlighted. Gender-based religious differences amongst adolescents parallel gender-based differences in rate of maturation.

Chapter Twelve

Religion and National Intelligence

- 1. Introduction.*
- 2. Criticisms of Lynn and Vanhanen's National IQs.*
- 3. National Intelligence and Religion.*
- 4. Problems with Researching National Religiousness.*
- 5. Lynn and Vanhanen's (2012) Analysis.*
- 6. Conclusion*

1. Introduction

In this chapter we will demonstrate that there is an inverse correlation between national religiousness and national intelligence. We will begin by looking at the problems with such research and showing that they can be surmounted. We will then set out data which demonstrate this inverse correlation.

2. Criticisms of Lynn and Vanhanen's National IQs

This chapter is based around the national IQs which have been collated, and in some cases researched, by scholars such as Lynn and Vanhanen (2012). They found that there are significant differences in national IQs. This research has been widely criticized, because it implies not just national but racially-based differences in average intelligence. But the criticisms are fallacious. They fall into five main categories: appeal to insult, appeal to motive, appeal to the majority, strawman argument and fallacy of composition. This can be demonstrated with select examples.

The most conspicuous reaction to these findings has simply been a form of denial which has manifested itself in insulting scholars such as Lynn and Vanhanen. For example, Bernahu (2007) calls Lynn and Vanhanen's (2002) *IQ and the Wealth of Nations* 'racist' and 'anti-human.' Clearly, 'racist' is an extremely emotive term. In its original use, 'racist' meant the belief in the superiority of one race over another. If it is being used in this sense against Lynn and Vanhanen (which it cannot be because they do not look into this issue), it is clearly incorrect and a strawman argument. But it would only even be this if Bernahu proceeded to show that it was logically incoherent to be racist.

In that it is not feasible to argue that Lynn and Vanhanen are advocating racial superiority and he does not counter their supposed arguments for it, Bernahu's use of 'racist' is an example both of the moralistic fallacy and of the broadening of the word 'racist' such that its use is an appeal to insult. 'Racist' has become loosened from its original meaning and is, in essence, a highly emotive slur. 'Racist,' in this context, is inherently emotive and condemnatory. It is a way of morally condemning an opponent and has seemingly nothing to do with whether or not they are 'racist' in the objective sense. Accordingly, a 'racist' is a person who says something relating to race, or possibly only very tenuously relating to race in that individualism has been condemned as 'racist,' which the person who calls them 'racist' does not like.¹ It is a way of condemning those who even slightly

¹ Sometimes 'racist' is stretched in order to condemn any disliked perspective. Gabb (2007, p.31) notes that in the USA in 1992 a student was accused of 'racism' for writing in a memo to Pennsylvania University's Diversity Education Committee that she had 'deep regard for the individual.' The memo was returned with 'individual' underlined and the comment, 'this is a red flag phrase today which is considered by many to be racist. Arguments which champion the individual over the group ultimately privileges (*sic*) the "individuals"

depart from the prescribed ideals of Multiculturalism, thus manipulating them into accepting those ideals at least overtly. As such, the word has an indefinite meaning and is highly emotive, meaning that using it is antithetical to reasoned discourse. In this sense, it serves a similar function to that served by 'atheist' or 'papist' in Early Modern England, a point we have already discussed.

However, using 'racist' is a form of fallacious argumentation even if the person accused of it does argue that some races are superior and even if counter-arguments are presented. Some terms are so emotionally charged (and even associated with murder) such as (currently) 'racist,' 'Fascist,' 'Holocaust Denier' or 'pedophile' (and, in the USA more than Western Europe, 'Communist') that almost nobody would self-identify as being one. Using these terms about an intellectual opponent or their arguments is, even if inadvertently, an appeal to emotion (the 'connotation fallacy'); an attempt to win an argument other than through reason, to intimidate people into silence by vociferously morally condemning them.

'Anti-human,' while not as strong as 'racist,' is dehumanizing the work and by implication the author so, again, is fallacious and emotionally manipulative. In addition, it might be argued that, in effect, Bernahu is arguing Lynn and Vanhanen's must be wrong because it is 'racist.' Levin (2005, 8) argues that as a 'racist' is, in current usage, by definition immoral, the use of the term also involves the moralistic fallacy. In that failure to perceive fallacy is, for an intelligent person, a sign of bias (see McCoun, 1998), an outsider, knowing nothing of the technicalities of the debate, should be very suspicious of the arguments of Bernahu.

belonging to the largest or dominant group.' For further analysis of words that have no clear meaning but have a vital social function, see Kneen (2012).

The second fallacious method has been appeal to motive. MackIntosh (2007) asserts that, 'Lynn's preconceptions are so plain, and so pungently expressed, that many readers will be suspicious from the outset.' Lynn's perceived 'preoccupations' and the clarity with which he expresses them are irrelevant. If Lynn had evidenced bias by, for example, insulting his opponents, then we might legitimately wonder about his motives, but in that Mackintosh does not show that Lynn has done so, Mackintosh's criticism is fallacious.

Thirdly, asserting that 'most readers will be suspicious' is just guesswork and the fallacy of 'appeal to the majority.' Claiming that Lynn's views are 'pungently' expressed (associating them with an - implicitly unpleasant - smell) is emotionally manipulative.

Fourthly, strawman arguments are deployed. It is noted, for example, that some national IQ data relies on small samples, or tests of convenience (such as university students), or different kinds of IQ test, or that sometimes, in the absence of a national sample, the IQ is estimated from that of surrounding countries (e.g. Ervik, 2003; Barnett and Williams, 2004 or Hunt, 2011). It is clearly unnecessary to criticize, for example, Lynn and Vanhanen (2002) on these grounds because they pre-empt the criticisms. They are quite open about all of the difficulties with these data and the difficulties inherent in drawing upon them. They emphasize that they have reached their conclusions, accordingly, with a certain degree of caution. Nevertheless, they stress that they are worth presenting because a cautious understanding of the world is better than none and secondly because the results are generally what we would predict in light of other national data, such as with regard to education or crime rates. As such, to criticize Lynn and Vanhanen for these deficiencies is simply a strawman argument.

Some critics have argued, however, that the deficiencies in these data are so severe as to actually render the results 'virtually meaningless' (Barnett and Williams 2004), or 'technically inadequate . . . and meaningless' (Hunt and Sternberg, 2006, pp.133-136). The IQ data drawn upon have been described as 'highly deficient' (Volken, 2003, p.411). Ervik (2003, p.406) asserts, of Lynn and Vanhanen (2002), that 'the authors fail to present convincing evidence and appear to jump to conclusions' while Nechyba (2004, p.1178) has stated that there is 'relatively weak statistical evidence and dubious presumptions.'

Lynn and Vanhanen (2012, p.7) rejoinder that their national IQ scores are highly correlated with national scores in tests of mathematics and science as well as with many other social and economic variables which are predicted to varying degrees, at an individual level, by intelligence.² The validity of an IQ test is the degree to which it measures intelligence and this can be shown by the extent to which its results correlate with other established measures of cognitive ability. Intelligence positively correlates with educational attainment, claim Lynn and Vanhanen (2012, Ch. 1), at between 0.5 and 0.8. Lynn and Vanhanen have shown that their national IQ scores correlate with national mathematics scores at 0.88, and with national science scores at 0.86. They correlate with PISA science scores (obtained by 15 year olds) at 0.83 and subsequent studies using larger data sets have found a correlation of 0.9, with the results independently confirmed (Rindermann, 2007). In one study of 108 nations, Lynn found a correlation of 1 between national IQ scores and scores aggregated from PISA and other national tests (see Lynn and Vanhanen, 2012, pp.33-34). The national IQ scores also correlate with other factors which correlate with intelligence such as health, wealth and (negatively) crime. As we will see in this chapter, religion - which negatively

² These are set out in Lynn and Vanhanen (2012).

correlates with intelligence - also evidences their case. Accordingly, the critics are deliberately exaggerating the deficiencies. This is a straw man argument.

The fifth, and perhaps the most useful method, as it is the least overtly fallacious, is, as Allik (2008, p.707) summarizes, 'to interpret the results as measurement error. A useful strategy is to discover a few small mistakes, declaring that all the results are equally suspicious.'³ MackIntosh (2007) is an example of such a critic. MackIntosh writes, regarding Lynn's (2006) analysis of racial differences in IQ scores, that, 'The errors may not be particularly important, and I do not know how typical they are. But they do not increase my confidence in Lynn's scholarship.' This criticism risks the fallacy of composition. That there is a particular error or relevant omission in one place does not mean that it will be the case throughout the work. Only a detailed analysis of the work can allow a person to argue that there are so many important errors in it that the argument is essentially undermined. Critics of Lynn and Vanhanen have not done this and, as such, they engage in the fallacy of composition.

3. National Intelligence and Religion

We have already observed a large body of evidence that there is an inverse correlation between intelligence and religiousness. We would expect this to be the case at a national level, comparing

³ Academics who are original thinkers have, on average, slightly lower Conscientiousness than most academics (e.g. Feist, 1998), so we might actually expect such minor mistakes of academics who present theories that challenge mainstream thinking. As Clark (2007, p.x) puts it, 'far better such error than the usual dreary academic sins, which seem to define so much writing in the humanities, of willful obfuscation and jargon-laden vacuity.'

national religiousness with IQ. Five studies of this area have shown this to be the case.

Table 12.1 - Correlation between National IQ and Religiousness

Variable	N Countries	R x IQ	Reference
Atheism	137	-0.6	Lynn et al., 2009
Atheism	137	-0.6	Reeve, 2009
Religious Belief	58	-0.58	Kanazawa, 2009
Importance of Religion	60	-0.75	Kanazawa, 2009
% Religious	60	-0.56	Kanazawa, 2009

These studies make the case that we would predict. It is also made by Lynn et al. (2009) with regard to atheism. They explain that they have taken figures for belief in God from Zuckerman (2007) who provided data for 137 countries representing just over 95% of the world's population. These data were collected from surveys mostly conducted in 2004, although in a few countries the surveys were a year or two earlier. Zuckerman collated these data from a number of different surveys in order to provide results that were as current as possible. Where he published more than one survey result for a given country, they took the most recent one where this was indicated, but averaged them out where it was not. Zuckerman's figures, explain Lynn et al. (2009), consisted of the percentages saying that they disbelieved in God, 'rather than the more frequent question asking for belief in God.'

4. Problems with Researching National Religiousness

Before looking at Lynn et al.'s results, it should be noted that there are a number of problems with examining national religiousness.

Firstly, there are relatively low response rates to the surveys. This means that it is difficult to be sure that the samples drawn upon are representative of the countries in which the sample live. It may be, for example, that either the extremely religious or extremely irreligious are more likely to respond than those who are more moderate.

Secondly, many of the samples are non-random, which is an obvious problem even if the response rate is high. It once more means that it is difficult to generalize the results to the entire population.

Thirdly, political or cultural climates may affect the results. As Lynn and Vanhanen (2012, p.283) point out, in totalitarian regimes that promulgate state atheism those who believe in God may be unwilling to admit it in case their identity is revealed. On the other hand, in a totalitarian society which enforces religious adherence those who are atheists may be reluctant to admit that this is the case. Even in liberal democracies, people might say that they are atheist if such a response is considered desirable or, for the same reason, they might falsely claim to believe in God.

Fourthly, the intercultural use of religious terminology raises methodological problems. Terms such as 'religious,' 'religion,' 'believer,' 'atheist' and even 'God' may have very different connotations and historical baggage in different cultures. In particular, the conception of religiousness varies considerably between polytheistic and monotheistic societies, such that in Japan it is quite normal to identify both as being Buddhist and as Shinto. In the first religion, there is no God and in the second, though there are gods, they tend to be more manifestations of fate or a life

force than the personal, unique God of monotheism, with religiousness being marked more by ritual observance than by belief. As such, the very low rates of 'belief in God' in Japan must be interpreted with some caution. One survey in 1993 found that 65% of the Japanese did not believe in God while 55% 'did not believe in Buddha,' which is an important distinction. Around 70% of Japanese tell pollsters that they do not belong to or believe in any religion, yet Shinto, at least in ritual terms, is practiced by 83% of Japanese (see Zuckerman, 2007). This highlights the problem of discerning religiousness in polytheistic cultures in which the religion is held together by ritual and fate but not, to the extent as in the West, by belief in God and belief in certain dogmas about the nature of history and the workings of the world. Polytheism, unlike stereotypical monotheism, is highly tolerant of different beliefs and people may even seem to hold contradictory beliefs or follow different systems for different rites of passage. As such, we would expect a very high rate of disbelief amongst the Japanese, which would not necessarily reflect everyday experience of their religiousness. On the other hand the 3% disbelief in India (in which 80% are polytheistic Hindus) and the 0.5% disbelief in poorer Nepal (81% Hindu) along with 12% disbelief in wealthier, higher IQ, traditionally polytheistic China (where we might actually expect Communism to depress belief), may imply that the results in Japan (approximately the same IQ as China but much higher living standards) are actually relatively sound and that 'God' has simply been interpreted in terms of genuine belief in *Kami*, the Shinto belief that everything contains a spirit.⁴

But, nevertheless, the degree to which the survey data on religiousness in different cultures are comparable is clearly limited for various reasons. Those who employ it, such as Lynn

⁴ See Breen and Teeuwen (2011).

and Vanhanen (2012), emphasize this, but add that it is 'the only available empirical data on religious beliefs. Therefore, we have to use them' (p.284). If data demonstrate that religion and national intelligence inversely correlate, this would not necessarily prove the case in itself, because of the deficiencies highlighted. But in that it reaches this conclusion in the context of much more reliable data on religion and individual differences, there would be sound reasons for accepting its veracity.

Table 12.2 - Country, IQ and Non-Belief (Lynn et al., 2009)

Country	IQ	% Not believing in God
Afghanistan	84	0.5
Albania	90	8
Algeria	83	0.5
Angola	68	1.5
Argentina	93	4
Armenia	94	14
Australia	98	25
Austria	100	18
Azerbaijan	87	0.5
Bangladesh	82	0.5
Belarus	97	17
Belgium	99	43
Benin	70	0.5
Bolivia	87	1
Botswana	70	0.5
Brazil	87	1
Brunei	91	0.5
Bulgaria	93	34

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Country	IQ	% Not believing in God
Burkina Faso	68	0.5
Burundi	69	0.5
Cambodia	91	7
Cameroon	64	0.5
Canada	99	22
Central African Rep.	64	1.5
Chad	68	0.5
Chile	90	2
China	105	12
Colombia	84	1
Congo: Rep of (Brazz)	64	2.7
Costa Rica	89	1
Cote d'Ivoire	69	0.5
Croatia	90	7
Cuba	85	40
Czech Republic	98	61
Denmark	98	48
Dominican Republic	82	7
Ecuador	88	1
Egypt	81	0.5
El Salvador	80	1
Estonia	99	49
Ethiopia	64	0.5
Finland	99	28
France	98	44
Gambia	66	0.5
Georgia	94	4
Germany	99	42

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Country	IQ	% Not believing in God
Ghana	71	0.5
Greece	92	16
Guatemala	79	1
Guinea	67	0.5
Haiti	67	0.5
Honduras	81	1
Hungary	98	32
Iceland	101	16
India	82	3
Indonesia	87	1.5
Iran	84	4.5
Iraq	87	0.5
Ireland	92	5
Israel	95	15
Italy	102	6
Jamaica	71	3
Japan	105	65
Jordan	84	0.5
Kazakhstan	94	12
Kenya	72	0.5
Kuwait	86	0.5
Kyrgyzstan	90	7
Laos	89	5
Latvia	98	20
Lebanon	82	3
Liberia	67	0.5
Libya	83	0.5
Lithuania	91	13

Religion and National Intelligence

Country	IQ	% Not believing in God
Madagascar	82	0.5
Malawi	69	0.5
Malaysia	92	0.5
Mali	69	0.5
Mauritania	76	0.5
Mexico	88	4.5
Moldova	96	6
Mongolia	101	20
Morocco	84	0.5
Mozambique	64	5
Namibia	70	4
Nepal	78	0.5
Netherlands	100	42
New Zealand	99	22
Nicaragua	81	1
Niger	69	0.5
Nigeria	69	0.5
Norway	100	31
Oman	83	0.5
Pakistan	84	0.5
Panama	84	1
Paraguay	84	1
Peru	85	1
Philippines	86	0.5
Poland	99	3
Portugal	95	4
Romania	94	4
Russia	97	27

Religion and Intelligence

Country	IQ	% Not believing in God
Rwanda	70	0.5
Saudi Arabia	84	0.5
Senegal	66	0.5
Sierra Leone	64	0.5
Singapore	108	13
Slovakia	96	17
Slovenia	96	35
Somalia	68	0.5
South Africa	72	1
South Korea	106	30
Spain	98	15
Sri Lanka	79	0.5
Sweden	99	64
Switzerland	101	17
Syria	83	0.5
Taiwan	105	24
Tajikistan	87	2
Tanzania	72	0.5
Thailand	91	0.5
Togo	70	0.5
Trinidad & Tobago	85	9
Tunisia	83	0.5
Turkmenistan	87	2
Uganda	73	0.5
Ukraine	97	20
United Arab Emirates	84	0.5
United Kingdom	100	41.5
United States	98	10.5

Country	IQ	% Not believing in God
Uruguay	96	12
Uzbekistan	87	4
Venezuela	84	1
Vietnam	94	81
Yemen	85	0.5
Zambia	71	0.5
Zimbabwe	66	4

Regarding Table 12.2, Lynn et al. (2009) comment that in only 17% of the countries (23 out of 137) does the proportion of the population who disbelieve in God rise above 20%. These are almost all the higher IQ countries.

Table 12.3 - Non-Belief and National Intelligence (Lynn et al., 2009)

IQs	N.Countries	Non-Believers	Range Non-Believers	R: Non-Belief x IQ
64-108	137	10.69%	<1% to 81%	0.60
64-86	69	1.95%	<1% to 40%	0.16
87-108	68	16.99%	<1% to 81%	0.54

We can see from Table 12.3 above that amongst the highest IQ countries there is a 0.54 correlation between intelligence and non-belief, with a disbelief range of 1% to 81%. In the lower IQ countries, there is only a 0.16 correlation between intelligence and non-belief, with a range of 0.5% to 40%. Overall, there is a 0.6 correlation between national IQ and non-belief. This indicates that in low IQ countries, IQ only weakly predicts non-belief whereas it

more strongly does so in the high IQ countries. This, of course, implies that other factors - probably environmental factors such as lack of modernization level as well as modal personality - play a more significant role in causing religiousness in the low IQ countries. This is as to be expected because, as we have discussed, modernization greatly reduces stress and thus religiousness. Lynn et al.'s findings have been substantially replicated by Cribari-Neto and Souza (2013) who have found that national IQ predicts atheism even when controlling for economic differences. Having done so, they conclude that intelligence differences between countries account for 2/3 of the differences in atheism rates.

In addition, the studies cited in Table 12.1, and so implicitly Lynn et al.'s, have also been criticized because of anomalies in their results and because it is suggested that alternative explanations than intelligence work better in explaining the results. In general, the studies listed above find that the least religious countries are highly developed Western countries with high living standards while the most religious countries are the least developed. Accordingly, it might be argued that it is the stress of living in a poorly developed country, along with the lack of a scientific atmosphere in such places, that explains high religiousness. It is not, in other words, explained by lower intelligence.

The first counter-argument is that intelligence would play a significant part in predicting a country's level of development both in terms of the education level of its population and its degree of modernization (which has been argued to reduce religiousness). Accordingly, we cannot divorce intelligence from modernization. The degree of modernization is, in part, a result of national intelligence. This being the case, this argument can be substantially rejected. A nation's lack of development would generally be explicable in terms of low intelligence and so it

makes sense that poorly developed nations (mainly those with low IQs) would be more religious. They would be more religious, in part, because of their lower intelligence. Their religiousness would decrease as they developed but, mindful of the heritability of religiousness, the extent of its reduction would be limited. Lynn et al.'s (2009) analysis demonstrates this to be correct. In the high IQ, generally developed countries, as they are more modernized, IQ differences are the main predictor of religiousness because modernization reduces the stresses which make religious instincts attractive and spreads the explanations of science. In the low IQ, generally less developed countries, IQ only weakly predicts non-belief, meaning that there are many believing yet relatively intelligent people. This implies that lack of modernization is mediating against higher levels of non-belief, presumably by inducing stress and failing to convey scientific perspectives. But it is nevertheless clear that even in these countries low intelligence significantly predicts the nations' high levels of religious belief. Intelligence can be regarded as causal, even accounting for modernization, because intelligence differences between peoples emerged far earlier than significant differences in living standard (*see below*).

Secondly, Lynn et al. find that, in general, it is only in the developed world that atheism rises above 20%. These are also the countries with the highest IQs. However, there are anomalies. In Cuba around 40% are disbelievers while in Vietnam it is 81%. Such high levels of atheism are not predicted by Cuba's IQ of 85 and Vietnam's IQ of 94. A reasonable explanation is the strong Communist influence on the recent histories of these countries, which is still ongoing in Cuba.⁵ Communist rule led to strongly atheistic propaganda, as part of Marxist dogma, and, as Marxism

⁵ For Communism in Cuba see Horowitz (2011). For Vietnam see Karnaw (1994).

is a replacement religion, we would expect such propaganda to be successful because it essentially appeals to religious instincts. As such, the people of Vietnam and Cuba are actually highly religious, though it is difficult to tease out the atheists in these countries whose atheism is thoughtful and atheists who have simply been indoctrinated with state atheism and who we would expect to have lower intelligence. Many other ex-Communist countries with higher IQs also record very high percentages of disbelief. For example, Finland (IQ: 99) records a 28% atheism rate while neighboring Estonia (IQ: 99) records a 49% atheism rate. Both countries are historically Lutheran, so the obvious variable is that Estonia was part of the Soviet Union leading to widespread inculcation with the replacement religion of Marxism, a crucial part of which was atheism.⁶ So the anomaly of very high atheism rates in certain countries where their IQ would not predict such a rate can be parsimoniously explained by their having been under Communist rule.

Thirdly, the USA has an unusually low percentage of people who do not believe in God - only 10.5%. This is despite its IQ being 98. This contrasts sharply with non-belief rates in Western European countries with an IQ of roughly 100: Belgium, 43%; Netherlands, 42%; Denmark 48%; France, 44%, or UK, 41.5%. Lynn et al. point out that this could be explained by there being large numbers of Catholics in the USA and Catholics typically have lower non-belief rates than Protestants (e.g. Italy, 6%; Ireland, 5%; Poland, 3%; Portugal, 4%; Spain, 15%). Another possible contribution to this has been continued high immigration of those holding religious beliefs. Indeed, research has indicated that immigrants tend to have a distinct personality profile when compared to those who stay. Though there are mixed results it seems to be agreed that high Openness-Intellect is central to

⁶ See Dutton (2009) for a discussion of Finnish culture.

migration. Boneva and Frieze (2011) found that immigrants are more work-oriented, less family-oriented and more ambitious which may imply low Agreeableness and high Conscientiousness. Jokela (2009) found that high Openness-Intellect predicted between-State migration within the USA, though Conscientiousness did not. Paulauskaite et al. (2010) found that Lithuanians who intended to migrate were higher in Conscientiousness and Openness-Intellect. Indeed, in a review of the research in this area, Openness-Intellect is seen to strongly predict migration (see Mak and Tran, 2001). As we have discussed, high Openness-Intellect is a strong predictor of liberal religiousness, assuming the absence of very high intelligence. A further possible factor might be that founding immigrants from Europe went to the United States because of their strong religious beliefs, so it may be that these beliefs have been transmitted as a cultural and even genetic legacy to subsequent generations. This would make sense in that, as we have discussed, adult religiousness is around 0.44 heritable. The USA was founded by Puritan English who would have been extremely religious even by the standards of the time (e.g. Doherty, 1999). This has led to a very strong culture of religiousness which is likely to have a significant genetic component.

A fourth issue is the anomalously high religiousness of highly developed countries that happen to be Catholic or, in the case of Iceland and Finland though not Sweden and Denmark, Lutheran. I do not think that this criticism is particularly strong. We accept that there is a strong environmental dimension to explaining religiousness and as such we would not expect a precise linear relationship whereby national religiousness always increases as national IQ decreases. We would expect a general trend whereby national IQ increases as national religiousness decreases and this is what Lynn et al. prove to be the case.

Historical, local idiosyncrasies are likely to explain what might be called the 'humps and bumps' within this general trend. For example, for both Ireland and Poland their Catholic faith was a significant part of their nation building struggle so this would likely create an environmental pressure to desire to conform and believe in God.⁷ Also, two of the strongly theistic, Western European, Catholic countries - Ireland and Portugal - have IQs significantly below the European average, at 92 and 95 respectively. So this would be congruous with their relatively low levels of disbelief.⁸ Relatively high religiousness in Finland, compared to Scandinavia, might be explained by having been more recently in a highly politically tense situation. It was under constant threat of Soviet invasion until the end of the Cold War and strongly co-operated with the USSR. It had a lower standard of living than the Scandinavian countries until at least the 1970s, and it may be higher in Neuroticism, Conscientiousness and Agreeableness than the Scandinavian countries. Finnish levels of alcoholism, suicide, and social conformity would seem to imply this. Moreover, it is possible that Finland's (relative to Scandinavia) high rates of alcoholism and suicide create stress and thus religiousness. In addition, Lutheranism was a significant part of Finland's nation-building struggle while under Russian rule and the country is considerably more rural than its neighbors. It is 39% rural where Norway is 21% and Sweden is 17%.⁹

⁷ For Ireland, see Larkin (1997). For Poland, see Porter-Szucs (2011).

⁸ Lynn (2006) has argued that low Irish IQ can be significantly explained by very high emigration, as the more intelligent are more likely to emigrate. He explains low Portuguese IQ in terms of particularly high historical immigration from Sub-Saharan Africa during the Slave Trade and subsequent breeding with the Portuguese.

⁹ See Dutton (2009) for a more detailed discussion of all of these issues with regard to Finland.

A fifth problem which has been raised is not so much a problem as an alternative explanation for the findings. One possibility is 'exposure theory.' According to this theory, higher education gives societies greater exposure to, and acceptance of, unconventional views such as atheism. We have already observed that, controlling for intelligence, the influence of education on religiousness is nil.

A sixth problem is that Lynn et al. rely only on one measure of religiousness - religious belief (or lack of it). Likewise, the other studies noted rely on one measure. It would be useful to bring together these measures, show the correlation between them, and accordingly calculate a more nuanced picture of the relationship between national IQ and religion. Lynn and Vanhanen (2012, Ch. 10) have attempted to accomplish precisely this and it is worth examining this attempt in some detail.

5. Lynn and Vanhanen's (2012) Analysis

Different surveys have tested different measures of religiousness in their attempts to understand how religious individual nations are.

One of the significant variables employed by Lynn and Vanhanen (2012) is Religious Affiliation (RA). This was calculated by being clear on the world's main distinct religions. These are Christianity, Islam, Hinduism, Judaism, Chinese Folk Religion, Buddhism, Ethno-religion, New Religion, Sikhism, Bahai, Spiritualism, Confucianism and Jainism. Having established this, the percentage of non-religious people in a population was established by subtracting those who identified as 'non-religious' from 100%. Lynn and Vanhanen (2012) note that in some nations, such as Argentina a distinction was made between 'non-religious' and 'militantly atheist' or 'Marxist.' As I

have argued, I think this a very useful distinction to make but in that Lynn and Vanhanen were focused on understanding religion in the lexical sense, they added Argentina's 'non-religious' to its 'atheists' and 'Marxists' in order to produce their non-religious total. They found that data of this kind were available for 193 countries, much of it gathered in around 2004. One of the difficulties with this measure is the way in which it simplifies different shades of belief and non-belief. It may have been more useful, for example, to focus on atheists in each country or the firmly affiliated.

The second measure employed by Lynn and Vanhanen is Importance of Religion (IR). Data for this was taken from the World Values Survey, conducted in the 1980s. Obviously, one of the difficulties with this is that it is being employed alongside data which is around 20 years more recent. Accordingly, Lynn and Vanhanen also used data from the 1999-2002 World Values Surveys. They focused on six questions on the latter survey: the percentage who regarded religion as 'very important' in their lives, the percentage who belonged to a religious denomination, the percentage who attended religious services once a month or more, the percentage self-identifying as religious, the percentage who believed in God, and the percentage ranking the importance of religion and God in their lives at 7 out of 10 or higher.

Self-identification as religious may raise some difficulties amongst a minority in some countries as we have discussed, but this otherwise appears to be sound. Unfortunately, in some countries information on all six IR measures was not available. They could only use two in Israel, four in China and five in Algeria, South Korea, Singapore and Venezuela. Lynn and Vanhanen's data were available for 80 countries, but unfortunately it was a biased sample because these are mainly countries with relatively high IQs.

The next measure which they employed was Religious Beliefs and Affiliations. This is taken from data in Zuckerman (2007) which states the percentage of people in different countries who do not believe in God. This is itself gathered from other academic sources such as Barrett et al. (2001). This helps to fill in the gap in RA by providing data for most of Sub-Saharan Africa and for other low IQ countries. In some cases, this meant that Lynn and Vanhanen had two or more data sets from the same country, in which case they calculated the mean of the different data sets. One criticism that might be raised here is Lynn and Vanhanen's reliance on secondary sources and, indeed, on secondary sources which themselves rely on secondary sources. But there is a degree to which this is unavoidable when attempting to make such a large, international comparison. It might be argued that from a pragmatic perspective it is better to theorize with the data we have than to simply not do so at all. Doing so means that such a theory can be critiqued and our knowledge and understanding can move on. Lynn and Vanhanen note that there are 'significant errors' in the data presented by Zuckerman (2007) but, nevertheless, they highlight clear international differences in religious belief.

Lynn and Vanhanen's next step is to combine these data sets, arguing that RA, RI and RBA together will provide a useful indication of religiousness in a given country. They calculated the arithmetic mean of the three sets for each country. This represented R (Religiousness) and was available for 147 countries. If only two sets were available then they calculated the mean of two and if only one set was available then they excluded the country from the analysis.

In addition, a further dataset was employed with regard to countries in the Far East, drawing upon Inoguchi et al. (2006). This looked at Japan, Brunei, Cambodia, Indonesia, Laos,

Malaysia, Myanmar, the Philippines, Singapore, Thailand and South Korea. Interestingly, its measures of religiousness were subtly different from those that might be employed in Western countries. It included questions on the frequency of prayers (daily) and participation in the collective rituals: (a) regular meetings for prayers, (b) giving donations to religious institutions, and (c) fasting, attending religious festivals. The mean of the four percentages was calculated for each of these countries (Japan 10.2, Brunei 72.5, Cambodia 33.2, Indonesia 78.5, Laos 60.5, Malaysia 75.7, Myanmar 83.7, the Philippines 68.2, Singapore 51.7, Thailand 67.2 and South Korea 30.5).

Lynn and Vanhanen's correlation analysis demonstrated that each of the measures significantly and strongly positively correlated, implying that they ultimately are underpinned by one factor.

Table 12.4 - Correlation Analysis of Religious Measures (Lynn and Vanhanen, 2012)

Variable	RA	IR	RBA	R
RA	1	0.78	0.56	0.76
IR		1	0.81	0.96
RBA			1	0.9
R				1

Lynn and Vanhanen also showed that almost all of the measures of religiousness were strongly negatively correlated with IQ in each country. The weakest correlation was -0.46 between IQ and religious affiliation, following the Pearson correlation.

We have already examined the argument that modernization might be the main factor explaining religious differences between countries. We have argued that IQ is still a significant predictor,

but this was only in relation to religious belief. Lynn and Vanhanen tested the hypothesis that the correlation between socioeconomic development and 'religion' more broadly would be negative and found that it indeed was.

Table 12.5 - Correlations between National Religiousness and International Education Test Results (Lynn and Vanhanen, 2012)

Variable	RA	IR	RBA	R
PPI-GNI-08	-0.1	-0.46	-0.51	-0.41
ID-08	-0.12	-0.4	-0.49	-0.46
Literacy 08	-0.38	-0.57	-0.46	-0.56
Tertiary 08	-0.45	-0.55	-0.61	-0.67

It is important to contrast the results on religious belief with the overall results on religion. All the correlations here are negative, as we would predict, but they are weak or moderate. Indeed, they are weaker than the negative correlation between religiousness and IQ calculated by Lynn and Vanhanen (2012). This implies that intelligence is not simply a minor factor in developing world religiousness, it is actually a very significant factor when data is employed to gain a fuller understanding of a nation's religiousness. Indeed, in that variables such as education are themselves underpinned by IQ, the negative correlation between education and religiousness can be assumed to be even weaker than indicated, concluding that IQ thence becomes the most significant factor.

This is a measured and careful analysis but I think that one problem is that it does not appear to take modal genotypic personality into account. This will vary phenotypically according to the environment. But, as we will see in Chapter Thirteen, modal personality varies between Africa, Europe and East Asia and may

be expected to play a part in measures of socioeconomic development and religiousness. Accordingly, this may subtract slightly from the significance of IQ. An abridged version of Lynn and Vanhanen's (2012) findings can be seen in Table 12.6:

Table 12.6 - Country, IQ and Religiousness (Lynn and Vanhanen, 2012)

Country	IQ	Religiousness
Afghanistan	75	99.5
Albania	82	75.8
Algeria	84	91.9
Angola	71	98
Argentina	92.8	88.2
Armenia	93	81.6
Australia	99	70.5
Austria	99	77.4
Azerbaijan	85	85.3
Bangladesh	81	96.7
Belarus	95	57.7
Belgium	99	62.3
Benin	71	99.3
Bolivia	87	98.4
Bosnia	93	93
Botswana	76	99.4
Brazil	85	93.5
Brunei	89	90.1
Bulgaria	93	66.6
Burkina Faso	70	99.1
Burundi	72	99.4
Cambodia	92	74.2

Religion and National Intelligence

Country	IQ	Religiousness
Cameroon	64	99.3
Canada	100	74.5
Central African Rep.	64	98.1
Chad	66	99.1
Chile	90	85
China	106	48.6
Colombia	83	92.9
Congo: Rep of (Brazz)	73	97.4
Costa Rica	86	98.4
Cote d'Ivoire	71	99.3
Croatia	98	86.6
Cuba	85	64
Cyprus	91.8	95.6
Czech Republic	99	43.6
Denmark	97	62
Dominican Republic	82	87
Ecuador	88	98.5
Egypt	82	95.4
El Salvador	78	93.8
Estonia	100	47.1
Ethiopia	68.5	99.4
Finland	101	68.4
France	98	56.4
Gambia	62	99.2
Georgia	87	82.9
Germany	99	58.4
Ghana	70	99.3
Greece	93	83
Guatemala	79	98.3
Guinea	66.5	99.3

Religion and Intelligence

Country	IQ	Religiousness
Haiti	67	98.8
Honduras	81	98.7
Hungary	98	64.7
Iceland	97	78.2
India	82	90.4
Indonesia	85	91.9
Iran	85	94.3
Iraq	87	99.3
Ireland	94	88
Israel	95	84.2
Italy	96	79.5
Jamaica	71	96.4
Japan	104	41
Jordan	87	94.4
Kazakhstan	85	69.9
Kenya	74	99.4
Korea (North)	105	43.6
Korea (South)	105	56.4
Kuwait	86	98.7
Kyrgyzstan	74.8	77.3
Laos	89	84
Latvia	96	63.6
Lebanon	85	96.2
Liberia	68	98.7
Libya	85	99.3
Lithuania	94	78.1
Madagascar	82	99.3
Malawi	69	99.3
Malaysia	92	91.3
Mali	69	99.4

Religion and National Intelligence

Country	IQ	Religiousness
Malta	95	92.8
Mauritania	74	99.4
Mexico	88	91.5
Moldova	92	71.8
Mongolia	100	72.9
Morocco	82	95.8
Mozambique	69.5	97.2
Myanmar	85	91.5
Namibia	70	97.4
Nepal	78	99.3
Netherlands	100	61.5
New Zealand	99	71.4
Nicaragua	84	98.5
Niger	70	99.4
Nigeria	71	98.5
Norway	97	64.1
Oman	84	99.1
Pakistan	84	96
Panama	80	97.7
Paraguay	84	98.6
Peru	84	93.4
Philippines	86	88.6
Poland	96	91.7
Puerto Rico	83.5	91.6
Portugal	94	85.9
Romania	94	87.4
Russia	97	58.1
Rwanda	76	99.1
Saudi Arabia	80	98.9
Senegal	70	99.3

Religion and Intelligence

Country	IQ	Religiousness
Sierra Leone	64	98.5
Singapore	107	74
Slovakia	98	76.5
Slovenia	98	67.6
Somalia	72	99.4
South Africa	72	91.1
Spain	97	76.8
Sri Lanka	79	98.3
Sudan	77.5	98.9
Sweden	99	45.3
Switzerland	100	74.9
Syria	82	97.8
Taiwan	105	73.3
Tajikistan	87	89.3
Tanzania	73	97.3
Thailand	90	88
Togo	70	99.4
Trinidad & Tobago	86	94.4
Tunisia	85	99.3
Turkmenistan	80	89.8
Uganda	72	96.5
Ukraine	94	67.1
United Arab Emirates	87	98.9
United Kingdom	99	64.7
United States	98	86.8
Uruguay	90	68.2
Uzbekistan	80	81.7
Venezuela	84	89.4
Vietnam	94	42.4
Yemen	80	99.2

Country	IQ	Religiousness
Zambia	74	99.3
Zimbabwe	72	96.1

As with Lynn et al. (2009), there are a number of exceptions to the general rule that national IQ is inversely correlated with national religiousness. Lynn and Vanhanen noted that a number of countries are outliers at more than 12 points from the level of religiousness that should be predicted by their IQs. These sixteen countries are Bolivia, Costa Rica, Croatia, Cyprus, Ecuador, Iraq, Ireland, Kuwait, Libya, Malaysia, Malta, Oman, Poland, Tunisia, the United Arab Emirates and the United States. Clearly, there is a pattern that can be discerned. Six of these countries are Muslim, both in North Africa and the Middle East. In addition, Malaysia is Muslim as are a number of countries that are slight outliers, by less than 12 points out, such as Pakistan and Bangladesh. In all Muslim countries the level of religiousness is higher than IQ would predict, which may be due to the fundamentalist reaction to recent and rapid modernization in the Muslim world (see Armstrong, 2001). Seven of the outliers are Catholic, religiousness in Cyprus is likely to reflect the war with Muslim Turkey in the 1960s,¹⁰ and we have discussed why the USA would be an outlier.

There are 17 countries that are residual by 12 points or higher; less religious than their IQs would predict. These are Albania, Belarus, China, Cuba, the Czech Republic, Estonia, France, Germany, Japan, Kazakhstan, North Korea, Kyrgyzstan, Russia, Sweden, Uruguay and Vietnam. Eleven of these states are formerly or currently Communist and we have discussed the reasons for their high atheism rates. In addition, Eastern Germany

¹⁰ For a discussion of the place of Turkey's invasion in Cyprus' 'ethno-religious' identity see Constantinou (2006).

was formerly Communist and France's high level of irreligiousness can be traced back to the long influence of Enlightenment ideals.¹¹ But the crucial point is that we would expect humps and bumps because IQ is not the only factor which predicts religiousness. Modal personality, modernization, and other environmental pressures are also germane. Lynn and Vanhanen have shown that, when we bring together different measures of religiousness to account for cultural differences in the nature of religiousness then, in general, national intelligence is a strong predictor of low religiousness.

6. Conclusion

We have shown in this chapter that the average intelligence of a nation predicts how religious it will be. The outliers in this respect can be explained by Catholicism, a history of Communism, Islamic influence, and other local peculiarities, but the general trend is for higher IQ countries to be less religious. This chapter has further demonstrated that though IQ predicts irreligiousness less in less developed countries than in more developed ones, it still significantly predicts it and is, anyway, behind a country's degree of development.

¹¹ Bernand (2006) discusses the strong 'Republican heritage' in France, which can be traced back to the atheistic French Revolution.

Chapter Thirteen

Race and Religion in the USA

- 1. Introduction.*
- 2. Defining 'Race' and Refuting Criticisms of the Concept.*
- 3. From Within Groups to Between Them.*
- 4. Evidence for Racial Differences in Intelligence.*
- 5. Race and Personality Differences.*
- 6. Racial-Religious Differences in the USA.*
- 7. Conclusion.*

1. Introduction

This chapter will look at the limited number of studies which indicate that, even within countries, there are racially-based differences in religiousness. Focusing on the USA, it will show that these religious differences research can be explained by racially-based differences in average intelligence.

2. Defining 'Race' and Refuting Criticisms of the Concept

The inverse relationship between religiousness and intelligence can be observed not only between nations but within nations and specifically within those which are multiracial. There is a strong body of evidence indicating that there are robust IQ differences between the main races. These differences appear to parallel the levels of religiousness felt and expressed by samples of these races. There are a number of potential problems with this area of

research, the most obvious being the controversy over the 'race' category and so this will be addressed first.¹

'Race' is employed, in effect, to refer to what in the animal world would be a subspecies. A race is a breeding population that genetically differs from other such populations (with which it can generally produce fertile offspring) as a result of geographical isolation, cultural separation and endogamy, and which shows patterns of genotypic frequency for a number of inter-correlated characteristics compared with other breeding populations. It has been demonstrated, using 120 alleles drawing upon 42 populations, that genetic clusters parallel the racial taxonomies of classical anthropology (see Cavalli-Sforza et al., 1994) and that important issues such as blood type or disease frequency vary along racial lines (see Lynn, 2006).

The first criticism is that race has a history, problematic conceptual borders, and is a Western concept (e.g. Diamond, 1994). The same argument could be made about any concept in the English language. The central question is whether it is a predictive category.

Secondly, it has been noted that the word 'race' can mean different things. Historically, it has been used as 'culture' or 'nation' is now used. This is irrelevant. We are clear that by 'race' we mean breeding populations separated in pre-history and adapted to different environments. Accordingly, in categorizing an individual into a particular race, we must remember that as in all taxonomies there will be those who are borderline, but it is clear that by 'race' we are referring to the birthplace of the majority of a person's ancestors within certain time constraints, based on the widely accepted theories of human origins (e.g. Wilson, 1978, pp. 48-49).

¹ See Montagu (1945) for perhaps the best-known critique of the concept of 'race.' One of the most systematic defenses of it is Levin (2005).

According to our current chronology (e.g. Stringer and Andrews, 1988), Man evolved in Africa. He came to Europe about 110,000 years ago and to North Asia about 70,000 years later. Africa ceased to be isolated about 2000 years ago. Assuming about 25 years to a generation, a black African (or 'negroid') is a person most of whose ancestors, 40 to 4400 generations removed, were born in sub-Saharan Africa. In that African Americans are, on average, about 25% European, an African American would be a person about 75% of whose ancestors 40 to 4400 generations removed were born in sub-Saharan Africa. It has been demonstrated that numerous physical traits such as skin color, lip eversion, hair texture, facial bone structure and voice timbre (e.g. Putnam, 1975) are shared, to varying degrees, by Africans.² This creates an African stereotype but it is meaningful because all of the significant traits correlate, they are adaptations to the same environment and, as such, they permit meaningful predictions to be made. The fact that these correlations can be ascribed to most people whose ancestors were born in Africa mean that the 'African' group is meaningful, can be compared to different groups and the average member of the group will react differently from members of other groups in set circumstances because they are adapted to a specific environment. At an obvious level, being dark skinned is useful for avoiding skin cancer. This is what we mean by race and why it is useful and meaningful, at least in terms of physical predictions. If anyone uses 'race' to mean anything else then our use of 'race' and his are merely homonyms.

Equally, as noted, we could divide races, or even nations, in accordance with the percentage of genes the members share in comparison to outsiders. Populations that look physically different are evolved to different environments. As such, they are separate

² For a comprehensive examination of physical racial differences, see Baker (1974).

breeding populations, and thus have more genes in common with each other than with outsiders. In this sense, they are an extended family and a different race is a different extended family. Salter's (2007) analysis showed that if the world population were just English then the kinship between any random pair of Englishmen would be zero. But if the world population consisted of both English people and Germans, then two random English people would have a kinship of 0.0044. This would make them 1/32 of a cousin when compared to a German. As genetic distances between populations become larger, the kinship coefficient between random co-ethnics within a population gets larger. But this again shows that the racial division is meaningful and has a clear statistical basis: members of a race have more genetically in common with co-ethnics than with members of any other race. What it also means, and this should be emphasized, is that races are constantly evolving as different groups within the broader category breed according to different patterns.³

The third supposed problem with 'race' is that deploying it leads to bad consequences. It legitimizes 'racist groups' and so forth. That it does this is clearly of no relevance to whether or not it is a philosophically justifiable and predictive category. This argument commits the fallacy of 'appeal to consequences' and, depending on how the consequences are described, appeal to emotion. The fourth criticism is that there are more differences within races than there are between them. Likewise, you could argue that there are more differences within humanity than there are between humans and chimpanzees. There is, after all, only a 1.5% difference between humans and chimpanzees (Caccone and Powell, 1989). I don't think many people would argue that the

³ For example, there is a strong evidence of an inverse relationship, at an in-group level, between intelligence and fertility. See Lynn and Vanhanen (2012, Ch. 7) for further discussion.

distinction between humans and chimpanzees is meaningless. We are talking about comparative differences. Dividing between two racial categories, for example, permits accurate predictions to be made about each, even if the differences are very small (e.g. Hoffman, 1994). The genetic differences (in terms of heritable musical ability) between a standard musician and Mozart are probably rather small but these differences have clear and important consequences. We have already seen that, putting race aside, tiny genetic differences (humans only differ by 0.0012%) can have significant consequences in terms of differences in religiousness and thus life history. As we will see, it is possible to extend this understanding of within-group differences to between-group differences.

In addition, as Cochran and Harpending (2009, p.15) have noted, there are more genetic differences within breeds of dog than between breeds of dog but nobody would dismiss as insignificant the differences between a Great Dane and Chihuahua. In addition, they note that 'information about the distribution of genetic variation tells you essentially nothing about the size or significance of trait differences . . . If between-group genetic differences tend to push in a particular direction - tend to favor a certain trend - they can add up and have large effects.'

3. From Within Groups to Between Them

Accordingly, it seems that race is, at least in theory, a reasonable, predictive, scientific category. Once we accept that humans are animals, 98.5% the same as chimpanzees, then what is true of chimpanzees will, to a great extent, be true of humans. Primates differ physically according to their ecology and so do humans and as personality is strongly genetic, and races are simply breeding populations, there would have to be genetically based personality

and intelligence differences between races. To accept that there are personality and intelligence differences within races but not between them is drawing an essentialist border, reifying races as though God created them separately. There is no essentialist border between races from a scientific perspective and no border between within-group and between-group differences. 'Between-group differences' are simply lots of in-group differences which are permitted to increase through environmental separation to point where it is useful, for scientific purposes, to divide between two separate groups because such a division allows successful predictions to be made. So, if there are differences within races there must be differences 'between them' because, ultimately, they are all just humans and there are genetic personality and intelligence differences between humans, predicted by selection to different ecologies and races are inherently adapted to different ecologies.

Racial categorization simply involves dividing up these groups of humans into, as Salter (2007) argues, highly extended families that are more related to each other, on average, than to the other extended families and there would obviously be average genetic personality and intelligence differences between families. We are comparing groups of humans so if ecological variations in European history have led to a modal 'European' personality mix, which is the case as we will see, then there would have to be a slightly different personality mix for a different ecology because it is ecology which leads to genetic differences in personality. The erroneous assumption appears to be that the mix of different personality types is exactly the same within each race. As we will see, not only is this very unlikely but it is inconsistent. If we accept that personality differences and intelligence are partly genetic and are responses to different ecologies and that the physical dimensions of race betoken adaptation to different

ecologies, then there will be average differences of modal personality type, and intelligence, between groups evolved to different ecologies.

Indeed, to argue that there are within group differences but not between group differences is a bit like arguing that you accept within species evolution but not between species evolution. This commits a clear essentialist error. There is no such thing as separate species. All species ultimately merge into one another. We could trace our ancestors back to the apes and the differences between each evolving generation would be so tiny as to be hardly perceptible. To divide up into 'species' is useful as a method of understanding, but we cannot fundamentally separate species from subspecies. Likewise, races do not 'exist' in an essentialist sense. All races are related and ultimately simply the manifestation, over time and with separation from other races, of within group differences. But, nevertheless, some argue that, though this is so, differences in intelligence or personality are specifically entirely explained by environmental difference.

For those who accept the presuppositions of evolution and yet argue that there is no genetically-based racial variation in personality (or intelligence), the fundamental question is: How probable is this hypothesis? As we will see below, when looking at black-white differences in the USA, race differences in IQ show up early, cannot be blamed on cultural differences, correlate with measures that cannot be blamed on culture (such as RT and brain size) and are reflected in adoption studies where environment is controlled for. This all strongly implies that the differences are genetic. Levin (2005, Ch. 4, part 17) has demonstrated that the hypothesis that they are not genetic is highly improbable. Let us assume, he argues, that between-group differences (H_2) cannot be deduced from within-group differences (h_2). The first problem is that it is almost certain that some between group differences are

heritable as differences. Tutsis are above-averagely tall while Inuit are short. Not even the most fervent environmentalist believes that a Tutsi raised in Alaska will grow up to be squat. Neither will an Inuit raised in Rwanda grow up tall. These are two very different environments but it is nevertheless clear that height is heritable within groups and also between groups. Accordingly, as h^2 (group difference) grows between groups it becomes increasingly less likely that phenotypic differences can be entirely explained by environment. As we know that intelligence, for example, differs within groups and is, Levin estimates, 70% inherited, the probability that difference in intelligence observed between sub-Saharan Africans and East Asians is completely explained by environment becomes rather low. It is not impossible that environment completely explains the difference but it is very improbable: roughly 1 in 10.

4. Evidence for Racial Differences in Intelligence

There is a body of evidence demonstrating racial differences in intelligence and personality.

Let us begin with intelligence. Levin (2005, Ch. 3) observes that some people have a particular problem with discussing racial differences in intelligence, even more so than personality. This may be because, quite clearly, different personality characteristics are useful in different circumstances and to different degrees. A person, for example, who is extremely high in Conscientiousness may be less useful, because they are a perfectionist, than a person who is actually slightly less so, in a given set of circumstances. Accordingly, noting racial differences in personality characteristics does not necessarily lead to the creation of a hierarchy and so it is, it seems, less problematic for believers in Multiculturalism. Levin argues that it is more difficult to think of

a set of circumstances in which it is useful to be less intelligent than somebody else. However, Kanazawa (2012) has offered the rejoinder that the highly intelligent tend to be deficient in common sense and the more intelligent they are, the less common sense they are likely to have. He adds that there are genetically based racial differences in an assortment of other measured characteristics - such as blood pressure - and raising these is not a problem, so there is no reason why raising race differences in intelligence should be either.

As we have seen, environment is a significant factor in understanding intelligence. Intelligence is less genetically predicted in a poor environment in which people are prone to serious childhood illnesses. Accordingly, if we are going to use race as a means of testing the relationship between intelligence and religiousness than we need to compare racial differences in religiousness in a relatively controlled environment and the USA would be useful in this regard. Many studies over many years have found that the average black male IQ in the USA is 85 compared to white one of 100, a difference first noted in military testing in World War I (see Sternberg, 1985, pp.899-907). Shuey (1966) found the same difference. 50% of whites but 88% of blacks score below the white mean. Coleman (1966) found that there is a standard deviation (15 IQ points) between average white and black IQ in the USA. Scar (1981) noted that white, American Indian, East Asian and Eskimo children had significantly higher IQs than African or Australian Aboriginal children. There are many studies that estimate the black IQ in the USA to range from about 77 (Baughrom and Dahlson, 1968) to about 91 (Jensen and Johnson 1993). The average of these many studies comes out at around 85. Bodman and Cavalli-Sforza (1970) put it at 80.7, Brody (1992) puts it at one SD below whites, Broman (1997)

finds it is 90, Gottfredson (1986) 83.4, Jensen (1981) 85 and Lynn (1996) one SD below whites.

These differences accord with what our model would predict and we would further predict that they would be substantially, if not completely, genetic because the environmental factor is so strongly controlled for. The counter-arguments take two forms. (1) IQ tests are biased against blacks. (2) The tests are reasonable but the reasons for the differences are not genetic.

1. IQ Tests are biased against blacks.

Firstly, as we have discussed, blacks perform better on traditional IQ tests than on culture free ones and people much more separated from white cultural norms than American blacks, such as Eskimos, perform better on the tests.

Secondly racial differences in IQ scores are paralleled by differences in RT, which positively correlates with intelligence. RT cannot be regarded as culturally influenced.

Thirdly, Lynn (2006) observes that brain size, to the extent that we have data, tends to correlate with IQ in racial terms. East Asians have the largest cranial capacity and the largest relative brains. They are followed by whites and then blacks (Lynn and Vanhanen, 2012, pp.381-382). He observes that a meta-analysis indicates that relative brain size positively correlates with intelligence at 0.4 (Vernon et al., 2000). Again, there can be no cultural influence here.

Fourthly, there is evidence, independent of IQ tests, of black high time preference, which significantly correlates with low intelligence. Lefcourt (1965) found that US blacks were more likely than whites to take risks even if the pay off was the same. Banfield (1974) found that black children have a much higher time preference than white ones, being focused on the near time. In other words, a black child (compared to a white one of similar

background) is overwhelmingly more likely to accept a smaller reward now than a larger reward in the far future. Holly (1996) found that blacks, whose average income is 2/3 that of whites, spend twice as much on going to the movies, for example. This further evidences high time preference.

Fifthly, it cannot be argued that low self-esteem somehow de-motivates blacks in IQ tests. As we will see in our discussion of race and personality, they have higher self-esteem than whites even with regard to their academic ability (Levin, 2005, pp.74-75).

Sixthly, the specific supposed form of bias known as 'stereotype threat' is not persuasive. The argument runs that blacks are stereotyped to do worse than whites on IQ tests, so they do worse solely because this expectation creates stress. However, this argument is a misunderstanding of Steele and Aronson (1995). Statistical significance was achieved, on a very small sample, when Steele and Aronson gave parts of the Graduate Record Examination (GRE, an exam which strongly correlates with the SAT) to 40 USA black and white female students and noted their SAT scores. They controlled for SAT scores in presenting their results. When the GRE was presented as 'a tool for testing problem solving' ('non-diagnostic'), whites performed only fractionally better than blacks (an SD higher when unadjusted for SATs). When it was described as 'diagnostic of intelligence' (introducing stereotype threat) blacks performed worse than whites and also significantly worse than they had done on their SATs. This demonstrates that the SAT, which garners the same result as the 'non-diagnostic' test, effectively controls for stereotype threat. So, the 1 SD racial difference occurs when controlling for stereotype threat. In addition, large scale, strongly controlled attempts to replicate stereotype threat, for example in

relation to females and mathematics, have consistently failed (see Ganley et al., 2013).

2. IQ Tests are Accurate Measures but black white differences are not genetic.

Firstly, as already noted, blacks score worse on IQ tests than groups which can be understood to be more impoverished and more distant from white norms than them, such as Eskimos.

Secondly, the one SD difference between white and black intelligence in the USA is evident by the age of three. The earlier a difference becomes evident, it is argued, the more likely it is to be genetic (Broman et al., 1987).⁴

Thirdly, the most compelling evidence is interracial adoption studies. Weinberg et al. (1992) show that the average IQ of black children adopted, usually by educated white families, is 96.8. This is significantly below the average white IQ of 100 and, crucially, even further below the IQ of the adoptive parents, which is in the region of 110. The fact that it is higher than the average black IQ may reflect a much more stimulating environment from a very young age, but it is clearly closer to the average black IQ in the USA than that of the adopted parents. This would seem to indicate, argues Lynn (2006), that the racial difference in IQ is genetic.

Studies of East Asian children adopted by white families demonstrate something similar. There have been six such studies. Winick et al., (1975) investigated Koreans aged between 6 and 14

⁴ Some researchers still cite the 1960s Milwaukee project as evidence that race differences in IQ are not genetic. This project, which purported to show that environmental intervention could radically improve black IQ, was exposed as fraudulent, the results were never published in a refereed journal, the improvements were found to be temporary, requests for the raw data were refused and the lead researcher was jailed for fraud (see Jensen, 1998).

adopted by white families in the USA. Those who were severely undernourished as infants had an IQ of 102, those who were poorly nourished had an IQ of 106 while those who were well nourished had an IQ of 112. Another USA study (Clark and Hanisee, 1982) gave Koreans adopted by whites an IQ of 105, a study in Belgium (Frydman and Lynn, 1989) was 110 while a Dutch study (Stams et al., 2000) was 108. We have noted that intelligence is substantially heritable so it makes sense that these children's IQs are higher than the white IQ despite their having been adopted by white people.⁵

A useful summary of the counter-arguments to research on race and intelligence has been presented by Gottfredson (26 November 2007). Gottfredson argues that the hypothesis that intelligence is partly genetic is only plausible 'if intelligence differences among members of the *same* race are demonstrated to be real, important, and at least partly genetic.' It becomes even more plausible if differences in intelligence between two races are evident, genetic and not easy to change. 'The longer and stronger this chain of evidence for both blacks and whites, the more scientifically *plausible* a genetic component to their average IQ difference becomes.'

Gottfredson notes that each link in the chain of evidence has been tested many times, because they were all once 'controversial' hypotheses amongst scientists. Each link has proven 'robust' which is why critics are forced to concede at least some of them. Gottfredson highlights seven 'yes-but' gambits employed in this regard. 'The first five deny the validity of basic facts about

⁵ One point that Lynn (2006) does not look at is that children given up for adoption are often born to single mothers (United Nations 2009, p.126), who tend to have below average intelligence (see Herrnstein and Murray, 1994). So, we would expect, on average, adopted Koreans to have a lower IQ than is average for a Korean.

intelligence: the existence of intelligence (*g*), its fair measurement, practical importance, stability (lack of malleability), and high heritability.' The final two concede these facts but argue either that racial differences in IQ are not genetic or must not be.

Gottfredson observes that as the evidence has become more and more difficult to dispute, critics have moved their critique along the chain, all the way up to Gambit 6 and even Gambit 7. These final gambits broaden the attack as far as possible by denying the existence of race or simply abandoning science completely and arguing that the research should be suppressed even if true. They simply arouse 'fear and disgust.' Gottfredson notes that: 'Scientific truth is no defense in the moral realm and, indeed, an unwelcome idea may be attacked all the more fiercely for possibly having truth on its side. By this code, moral duty requires suppressing and censoring evil speech and mandating good speech, whether true or false.' Gottfredson adds that critics, as we have seen with regard to Lewontin (1978), sometimes apply moral standards when they demand that conclusions they dislike be proved 'beyond all possible doubt.' This shifts the scientific standard from the best case based on the evidence to the emotionally desired case remaining true until the undesired one can answer a series of doubts which would be leveled against no other case. This method can be seen, as we have discussed, in suggesting that very minor mistakes in an undesired conclusion undermine all the evidence. As we have seen, this is a criticism leveled against Lynn and Vanhanen (2002).

5. Race and Personality Differences

Differences in black-white American religiousness, which we will note, may also be partly explained by modal personal differences and so it is worth examining these. Herrnstein and Murray (1994,

pp.329-338) point out that blacks and whites in the USA do not simply differ in intelligence. They differ, even when IQ is controlled for, in marital habits, illegitimacy, welfare dependency and incarceration levels. Dahlstrom et al. (1986) administered the Minnesota Multiphasic Personality Inventory and found that blacks, when compared to whites, were higher in terms of psychopathy (low Agreeableness), schizophrenia (related to Openness) and hyperactivity (related to low Conscientiousness). Sharpley and Peters (1999) found that blacks were higher than whites in unusual thought patterns. The research indicates that they are actually only highest on a certain aspect of schizotypy – this is 'unusual experiences' and, in particular, delusions. According to Sharpley and Peters' (1999) survey, middle-class whites score the highest, when compared to blacks and other whites, on 'impulsive non-conformity,' which, as already noted, might explain some of Deary et al.'s (2008) findings in relation to intelligence and political protest. East Asians score the highest on introverted anhedonia - an inability to feel pleasure from social and physical stimulation. Nevertheless, they do score the lowest in terms of delusions.

Dreger and Miller (1966) found that US blacks were higher than whites in hypermania and impulsivity while Schuey (1978) found that US black self-esteem was higher than white. There is some evidence that high self-esteem correlates with dominance and, accordingly, relatively low Agreeableness (e.g. Fournier et al., 2009). As noted, Lefcourt (1965) found that US blacks were more likely than whites to take risks even if the pay off was the same. Hare (1984) found that US black students estimate their own mental abilities as higher than whites would estimate theirs. Dahlstrom et al. (1986) found that US blacks are much more likely than whites to agree with statements indicating that they are important, that they make friends because they're useful, that they

avoid doing bad things solely for fear of being caught, and that it's not hard to ask for a favor that they can't return.

In comparison to whites, blacks appear to be the highest in Openness (hence schizophrenia and unusual thought patterns), the lowest in Neuroticism (hence willingness to take risks and high self-esteem), the lowest in Conscientiousness (seen in impulsivity and risk-taking), the lowest in Agreeableness (taking advantage of friends and high self esteem) and the highest in Extraversion (also seen in willingness to take risks, because the result will be enjoyed more, and spending more on social activities, like cinema attendance). East Asians are very different: highest in Agreeableness, lowest in Extraversion, highest in Neuroticism, highest in Conscientiousness and lowest in Openness-Intellect.

This point has been noted by Rushton (1995), who collated the various studies and found that East Asians were high in Conscientiousness, Agreeableness and Neuroticism and low in Extraversion and Openness and blacks were the opposite. Whites were in the middle but closer to East Asians. This has also been found comparing white and East Asian American males by Eap et al. (2008). However, Eap et al. also note that more acculturated East Asian Americans are closer in their personality to whites. Foldes et al. (2008) compare all the main races within the USA and their findings are also similar, placing East Asians at one end of the spectrum (low Extraversion, high Neuroticism, low Openness-Intellect, high Agreeableness and high Conscientiousness) and African Americans at the other. They also caution against overestimating genetic influence on the differences. This is understandable and everything argued here assumes this caution.⁶ The high Openness-Intellect of blacks and the low Openness-Intellect of East Asians may seem odd in that

⁶ Schmitt et al. (2007) find very different results. But this seems to be due to very small and incomparable samples.

Openness-Intellect correlates with intelligence at 0.3. But it must be remembered that the Openness and Intellect dimensions are relatively distinct and only weakly correlate, and only Intellect significantly correlates with intelligence. In addition, the subcategories of the Openness dimension often weakly correlate with each other. This would explain, therefore, why Africans have the highest Openness-Intellect (as we have seen they are simply very high in 'delusions') overall and East Asians the lowest.

So, the modal black personality profile would predict that blacks would be less religious than whites and liberal if they were religious at all. The fact that they are much more religious implies that lower intelligence and higher stress (presumably caused by poverty which is turn predicted by low intelligence) is the explanation for the difference. But, as we will see, blacks are more religious than whites even when controlling for poverty and education, demonstrating the relevance of intelligence.

6. Racial-Religious Differences in the USA

There are a small number of studies which look at the relationship between race and religion in the USA and they all reach similar conclusions.⁷ Kanazawa et al. (2007) drew upon the GSS questionnaire as a way of measuring religiousness. Belief in God was assessed thus: (1 = do not believe in God; 2 = no way to find out; 3 = believe in some higher power; 4 = believe in God sometimes; 5 = believe in God but have some doubts; 6 = know that God exists and have no doubts); and strength of religiousness thus: (1 = no religion; 2 = somewhat strong; 3 = not very strong; 4 = very strong). On both measures, blacks were far more religious

⁷ In addition, a number of researchers appear to assume that race predicts religious differences. These include, in addition to those already discussed, Gunther (1927, p.62), Gayre of Gayre (1972, p.96) and Avdeyev (2011, p.55).

than whites or other races. 80% of blacks asserted that they 'know God exists' compared to 61.7% of whites and 67.9% of others. 49.3% of blacks reported 'very strong' religiousness, compared to 37% of whites and 34.2% of other races.

Kanazawa et al. (2007) conducted a regression analysis in which they controlled for verbal IQ, age, sex, education, earnings, religion and survey year and found that, even so, blacks were significantly more religious on both measures than non-blacks. It may be that even highly intelligent blacks tend to be so high in aspects of Openness (such as proneness to religious experience) that they are persuaded of liberal religiousness in a way that others of similar intelligence might not be.

Chatters et al. (2009) compared atheism amongst black Americans, white Americans and Caribbean blacks while also controlling for earnings (a sound if imperfect proxy for issues such as education and intelligence) and found that 15.5% of the white sample had no religious belief compared to 12.7% of the American Caribbean blacks and 10.51% of the African Americans. This would again indicate that something other than intelligence and environment is explaining at least part of the difference. Certainly, it is unlikely to be just environment because blacks are relatively highly religious across social strata.

The Pew Forum (30 January 2009) have also reported that African Americans are above averagely religious. 79% of blacks say religion is 'very important in their lives' compared to a 56% average. Whereas 16% of the US population was religiously unaffiliated in 2009, this was only 12% amongst blacks. However, the Pew Forum found that religiously unaffiliated blacks were mostly 'religious' (as religious as mainline Protestants or Catholics) in contrast to atheistic or agnostic religiously unaffiliated whites:

'In fact, even a large majority (72%) of African-Americans who are unaffiliated with any particular faith say religion plays at least a somewhat important role in their lives; nearly half (45%) of unaffiliated African-Americans say religion is very important in their lives, roughly three times the percentage who say this among the religiously unaffiliated population overall (16%). Indeed, on this measure, unaffiliated African-Americans more closely resemble the overall population of Catholics (56% say religion is very important) and mainline Protestants (52%).'

In addition, black membership of 'mainline Protestant churches' (which tend to be the most liberal) was 4%, compared to a national average of 15%.

The survey additionally found that 53% of blacks attend religious services at least once a week (against a 39% average), 76% say they pray on at least a daily basis (58% average) and 88% indicate they are absolutely certain that God exists (71% average). 'On each of these measures,' notes the Pew Forum, 'African-Americans stand out as the most religiously committed racial or ethnic group in the nation.' Even blacks who are unaffiliated with any religious group pray nearly as often as the overall population of mainline Protestants (48% of unaffiliated African-Americans pray daily as against 53% of all mainline Protestants). Unaffiliated African-Americans are about as likely to believe in God with absolute certainty (70%) as are mainline Protestants (73%) and Catholics (72%) overall. Specific religious belief amongst American blacks also follows the pattern which we would expect. 88% of blacks are 'absolutely certain' God exists compared to 71% of all Americans, 55% of blacks 'interpret scripture literally' compared to 33% of the USA, and 83% are convinced of the existence of 'Angels' and 'Demons' compared to

68% of Americans. In addition, 23% of unaffiliated blacks believe in 'Biblical literalism' compared to just 11% of the broader unaffiliated population.

A number of other studies are congruous with these findings. Most notably, research by Levin et al. (1994) has found that even when controlling for education, marital status, income, region, urbanicity and subjective health, older African Americans (aged at least over 55), on almost every measure, are simply more religious than older White Americans, even when factoring in the greater religiousness of women. In addition, MacDonald (1994) notes that blacks, in the USA, are more likely to report paranormal experiences than whites. He puts this down to blacks experiencing more stressful lives because they are poorer on average and this may be part of it, but it would also fit with the higher level of black Openness. And as far back as 1925, Murchison and Gilbert (1925) compared black and white (253 whites and 250 blacks), male prisoners in their 20s who were similar on important variables (such as IQ, literacy and parental occupation) and found that the blacks were invariably more religious than the whites. 10% of the blacks were 'agnostic' compared to 14% of the whites.

There are a number of issues which might be raised about these studies and the relationship between religion and intelligence. Most importantly, Kanazawa et al. (2007) control for verbal IQ and for a number of intelligence proxies but they do not control for IQ itself. Accordingly, IQ may be playing a more significant role, when compared to simply being black, than Kanazawa et al. (2007) indicate. Chatters et al.'s (2009) research does not specifically control for intelligence but only a correlate and the same is true of Levin et al.'s (1994) research, though the samples are considerable. Murchison and Gilbert's (1925) research is based, obviously, on relatively small samples. Even so, the black-white difference in religiousness within the USA is as we

would predict based on modal intelligence differences. Black religiousness is more fundamentalist than broader US religiousness. As already noted, fundamentalism negatively correlates with Openness (-0.14), which blacks are higher in than whites, and weakly negatively correlates with Neuroticism (-0.12), in which blacks are lower. However, low Neuroticism predicts intrinsic religiousness. Nevertheless, overall, the only personality factors which predict religiousness are Agreeableness and Conscientiousness and blacks are lower in these than whites. So, with Openness and Neuroticism effectively cancelling each other out, black personality would predict low levels of religiousness. In addition, blacks are more religious than whites even when income, education and other significant environmental variables (though not specifically IQ) are controlled for. As such, we might reasonably argue that intelligence is the significant predictive factor, with high Openness explaining high religiousness even amongst highly intelligent blacks.

Unfortunately, research on East Asian Americans which might indicate the relationship between their superior intelligence and religiousness is very limited.⁸ The Pew Forum (19 July 2012) tends to conflate East Asians with all other 'Asians' (such as Indians) into one category. But where it makes a distinction, the results are as we would expect. Chinese and Japanese immigrants and their descendents do affiliate to churches as well as Buddhist and other temples. For example, 15% of Chinese Americans are affiliated to a Buddhist temple as are 25% of Japanese Americans. We have already discussed differences between Eastern and Western religions and the degree to which polytheistic religions

⁸ Sasaki and Kim (2011) and Min (2010) have both found, at least by implication, that Korean evangelical Christians in the USA reflect higher Agreeableness than white ones, being focused more on the social side of church membership.

tend to be ritual-based, rather than communities in the sense that many Christian churches are. But, even within the Asian category, lack of religious affiliation positively correlates with intelligence.

Table 13.1 - Ethnic Background, Average Ethnic IQ and Religious Non-Affiliation among Asian Americans (Pew Forum and Lynn and Vanhanen, 2012).

Ethnic Background	Average IQ (of nationality)	Religiously Unaffiliated
Chinese	105	52%
Filipino	86	8%
Indian	82	10%
Japanese	105	32%
Korean	105	23%
Vietnamese	94	20%

We can see from Table 13.1 a strong positive correlation, of 0.8, between average ethnic intelligence and religious non-affiliation. China and Vietnam are outliers, probably because of Communist influence, but the table shows that, amongst Asian Americans, as intelligence increases so does religious non-affiliation. We might also note that the average for non-affiliation in the USA, according to the Pew Forum, is 16% and, as we would predict, East Asians significantly exceed this average (with 35.6% being religiously unaffiliated). In addition, 79% of 'Asian Americans' believe in God, compared to a national average of 92% and 40% pray daily, compared to a national average of 56% (Pew Forum, 30th January 2009). The modal personality profile of East Asians would predict the highest religiousness, so the fact that they have the lowest is likely to be explicable in terms of their having the highest average intelligence.

11. Conclusion

In this chapter we have demonstrated that there are robust racial differences in religiousness in the USA. These differences parallel racial differences in intelligence in the USA. The research we have examined controls, in many cases, for sociological factors that might predict religiousness. In addition, racial modal personalities would predict the opposite of the findings presented. As such, it is differences in average intelligence which mainly explain racial differences in religiousness in the USA.

Chapter Fourteen

Conclusion: The Future of Religion

- 1. Introduction.*
- 2. Intelligence Inversely Correlates with Religiousness.*
- 3. The Future of Religion.*
- 4. How Religion Might Rise.*
- 5. Conclusion.*

1. Introduction

So far we looked at the evidence for the inverse relationship between religion and intelligence. In this final chapter we will summarize our findings and turn to the future of religion, especially in the West. We will argue that, overall, the West is likely to become increasingly religious over the next century.

2. Intelligence Inversely Correlates With Religiousness

Our essential conclusion is that intelligence inversely correlates with religiousness and that, when controlling for personality and other factors, the more intelligent a person is then the less religious they are likely to be. In addition, the more intelligent people are, the less likely they are to be adherents to replacement religion. We have proven this case in a number of ways.

Firstly, we have noted that historical comment from Classical times to the beginning of the twentieth century seems to imply an anecdotal awareness that religious skeptics or heretics tended to be of relatively high intelligence.

Secondly, a large number of general intelligence studies have consistently concluded that the most religious have the

lowest IQs, followed by the liberal religious, followed, finally, by the irreligious, who have the highest IQs. In addition, studies concur that university students are less religious than average and that students at elite universities are less religious than students at ordinary universities, with educational success being a proxy for intelligence. We have also found that those with the lowest intelligence are the most likely to vote for political parties with implicitly religious elements while those with the highest intelligence are the most likely to vote for centrist, moderate parties. We have suggested that this relationship between irreligiousness and intelligence may be neatly explained by the more intelligent being better able to see through the fallacies of religion.

Thirdly, we have demonstrated that those who are highly educated - the intelligence elite, such as academics - are even more prone to atheism than university students, as predicted by their higher IQs. Highly elite academics are more likely to be atheist than less elite ones and we have cautiously argued that interdisciplinary differences in IQ amongst academics also predict rates of atheism, at least amongst elite academics where personality factors seem to be controlled for to a greater extent. Indeed, we found that average interdisciplinary intelligence differences amongst academics were a stronger predictor of religiousness than childhood religiousness. We also found that the more elite academics were less conservative than the less elite ones and that academics from the disciplines with the highest intelligence were the most politically moderate.

The discussion presented the anomaly of religious academics and we argued that this could be explained by personality factors which are academically beneficial but which, when sufficiently potent, might overwhelm intelligence and lead to religiousness. However, we added that such a mix would be an

academic drawback when compared to those with a similar personality mix and even higher intelligence or the same intelligence and a slightly less religiously-inclining character. This is congruous with the almost complete absence of theism amongst the most distinguished scientists.

Fourthly, we have shown that religiousness parallels the rise and fall of intelligence with age. Children, studies indicate, are extremely religious. They become less religious as they get older and people are the least religious aged around 35 when they reach their cognitive peak. Thereafter, their intelligence declines and they become more and more religious.

Fifthly, we have demonstrated that since 1900 people in Western countries have become less religious and we have shown that this parallels secular IQ test score increases summarized as the Flynn Effect (though this seems to involve an increase in specific intelligence sub-abilities rather than in intelligence itself). However, we have argued that a combination of reduced stress due to modernization and an anti-traditionalism replacement religion is the most plausible explanation for this decline in religiousness. We have demonstrated that this offers a more parsimonious and less question-begging explanation of the decline of religion witnessed in 'modernized' countries than does the sociological Secularization Thesis. We have also argued that modernization is underpinned by intelligence changes and demonstrated that this is the most parsimonious and consistent theory.

Sixthly, we have proved that cross-culturally, across age cohorts and across sixty years, females are more religious than males and this would be predicted by their slightly lower average IQs. As we have discussed, amongst males, there are higher numbers both with extremely high IQs and with extremely low IQs whereas female IQ is bunched closer to the mean.

Seventhly, we have shown that national IQ inversely correlates with national religiousness and we have defended the veracity of the studies which demonstrate this.

And, finally, we have shown that within the USA apparent racial differences in IQ are reflected in racial differences in religiousness in the manner that the research into this area would predict and that modal racial intelligence, rather than modal racial personality, is the reason for the religious differences.

In reaching these conclusions, it has been necessary to take a stance on a number of issues which have provoked debate in psychology and Religious Studies. For example, we have argued that an operational definition of religion - centered around an agent behind the universe and fervent belief in dogmas and rituals - is superior to the lexical definition because it explains more, is less culturally and historically limited and is consilient with science. We have defended evolutionary psychology and understanding religion through evolutionary psychology, we have defended the lexical definition of 'intelligence' and we have argued that there is a sound case for integrating 'intelligence' with Openness-Intellect as a single factor. We have also highlighted problems with the Savanna-IQ Interaction Hypothesis and the Cultural Mediation Hypothesis. In addition, we have highlighted a number of areas where more research is needed such as with regard to interdisciplinary intelligence differences between academics and the relationship between adherence to replacement religiousness and intelligence and with regard to the causes of the Flynn Effect.

3. The Future of Religion

The main aim of this study has been to conduct a comprehensive analysis of the relationship between religion and intelligence.

However, the practical benefit of such a study is that, by understanding the nature of the relationship, we can make reasonable predictions about the future of religion. Based on the evidence that we have, it is likely that the West will become *more* religious than it is now over the coming century, whether in terms of lexical or replacement religion. There are a number of factors behind this hypothesis.

Religious people have more children than less religious people and adult religiousness has been shown to be around 0.44 heritable. As such, based on analyses of breeding patterns alone, we would expect the percentage of people with the intelligence-personality genetic mix which would incline them towards religiousness to increase. That said, as religiousness is only 0.44 heritable, it will not necessarily increase precisely in line with these patterns if society continues to modernize, reducing stress and thus reducing the attractiveness of religion. In other words, it is possible that the effects of modernization, up to a point, could, by reducing insecurity, outpace the relatively high fertility of the religious, meaning that it would be some time before this fertility pattern became noticeable in increased religiousness. However, there is another far more secure argument in favor of the hypothesis that the West will become more religious over the next hundred years.

Perhaps more significantly for the implications of this study, we have shown that religiousness consistently inversely correlates with intelligence and a large body of data indicates that less intelligent women have long been having more children and having them younger than more intelligent women. Sibling studies consistently indicate that more intelligent people have fewer siblings than the less intelligent and we have noted evidence, independent of this, that intelligence (*g* rather than certain narrow intelligence abilities) has long been in decline in Western

countries. As such, we would expect both replacement religion and, eventually, religion more narrowly to grow. Before looking at how, let us look at the data for declining intelligence in more depth.

Table 14.1 - Negative Correlations between IQ and Number of Siblings (Lynn, 2011a, pp. 89-90).

Country	N	Age	IQ x N Siblings	Reference
USA	629	12-14	- 0.33	Chapman and Wiggins, 1925
USA	4330	6-20	-0.30	Lentz, 1927
USA	554	5-23	-0.19	Thurstone and Jenkins, 1931
USA	1140	14	-0.22	Burks and Jones, 1925
USA	156	13-18	-0.31	Damrin, 1949
USA	979	Adults	-0.26	Bejama, 1963
USA	12120	Adults	-0.29	Van Court and Bean, 1985
Britain	393	10	-0.25	Bradford, 1925
Britain	1084	10-11	-0.22	Sutherland and Thomson, 1926
Britain	581	11-13	-0.23	Sutherland, 1930
Britain	3305	9-13	-0.22	Roberts et al., 1938
Britain	10159	9-12	-0.23	Moshinsky, 1939
Britain	70200	11	-0.28	Thomson, 1949
Britain	9183	18	-0.34	Vernon, 1951
Britain	7416	11	-0.32	Nisbet, 1958
New Zealand	849	11-12	-0.16	Giles-Benardelli, 1950

The major studies on the decline of IQ in the UK between the 1920s and 1940s (Roberts et al., 1948; Thomson, 1949 or Sutherland and Thomson, 1926) concluded that genotypic IQ, on the basis of these breeding patterns, would decline by around 2 points per generation. In 1993, Lynn (2011a, pp.98-99) conducted a study of 517 secondary school children in England with an average age of 13. He found that the correlation between IQ and number of siblings was -0.18. He estimated that the IQ decline per generation was 0.8 of an IQ point. This is congruous with a decline of 0.81 per generation estimated in the USA (Retherford and Sewell, 1988).

Table 14.2 - Mean IQs of British Children in 1993 Analyzed by their Number of Siblings (Lynn 2011a, p.99)

	0	1	2	3	4	5+	Total
N	23	228	171	59	25	11	517
Mean IQ	98.9	97.4	95.5	95.7	95.7	87.7	96.0

It might be argued that family size is skewing the above results. This is known as Confluence Theory and it is the argument that large family size negatively affects intelligence (e.g. Blake, 1989), but this cannot be accepted. Firstly, a number of studies have shown that 'only children' are no more intelligent than children in two child families (e.g. Vallot, 1973) or even that they are less intelligent (Belmont and Marolla, 1973 or Breland, 1974). This may reflect the fact that a proportion of 'only children' are unplanned children by single mothers who, in general, have low IQs (see Herrnstein and Murray, 1994). The failure of this model suggests that a significant aspect of the negative relationship between family size and intelligence is genetic. Secondly, in economically less developed countries there is no relationship

between IQ and the number of siblings (e.g. Ho 1979) and, thirdly, the negative relationship between intelligence and sibling number does not hold for adopted children. Scarr and Weinberg (1978) found that with 237 children raised by their biological parents the correlation between family size and IQ was -0.21. However, their study of 150 adopted children found a correlation of -0.05; not statistically significant. So confluence theory can be confidently rejected. Those with lower IQs have more children in developed countries. However, the problem with these studies is that they do not factor in the intelligence of those who do not have any children. Studies indicate that those with higher IQs are more likely to be childless at 32 than are those with lower IQs.

Table 14.3 - Percentage of British males and females childless at 32 by IQ group (Kiernon and Diamond, 1989)

	Low IQ	Average IQ	High IQ
Females	11	16	18
Males	24	24	28

Table 14.3 indicates that more intelligent women are even less likely to have children than more intelligent men. A similar pattern regarding intelligence and child-bearing has been found in the USA (Van Court, 1985) based on samples of 12,000 adults. Dysgenic fertility can also be seen in Table 14.4. This draws upon data from the UK, using 9534 adults aged 47 (and thus, amongst the women at least, being, in general, unable to have any more children naturally).

Table 14.4 - Fertility and Average IQ among 47 year old adults in the UK (Kanazawa, 2011).

	With Children	Without Children
Men	102.2	103.0
Women	101.7	105.3

We can see that dysgenic fertility is stronger among women than men. A similar pattern can be seen Table 14.5, drawing upon research in the USA amongst the white population. The correlations were both statistically significant.

Table 14.5 - Correlation between Fertility and IQ in the USA

	Women	Men
Correlation between fertility and IQ	-0.162	-0.089

And in addition to having more children, the less intelligent have children younger than the more intelligent, further increasing the speed, in Western countries, of declining intelligence. For example, drawing on a 12,686 sample, Herrnstein and Murray (p.352) observe this pattern in the USA.

Table 14.6 - Age at First Child Bearing and IQ (Herrnstein and Murray, p.352).

IQ	Mean Age at First Birth
Over 125	27.2
110-125	25.5
90-110	23.4

IQ	Mean Age at First Birth
75-90	21
Under 75	19.8
Average	23.1

4. How Religion Might Rise

One possible model for the rise of religion, based on these data, is that rising intelligence until the end of the eighteenth century or middle of the nineteenth century led to an increasing number of people who were highly intelligent and high in intellect and so inclined to reject traditional religious belief. Some of these simply rejected religiousness completely, but those with slightly lower intelligence or a certain personality mix replaced it with ideologies which merely replaced God with a very similar implicit agent, such as fate. These replacement religions would appeal, to a greater extent than traditional religion, to those relatively high in intelligence and Openness-Intellect but also high in some of personality factors predicting religiousness, and they would be appealing at times of stress. Accordingly, as already suggested, belief in God is being rejected *both* due to lower stress *and* as part of a religion of anti-religion. However, in the latter case, God has merely been replaced by forms of implicit religiousness which surveys do not necessarily test for. Fieldwork analyses, however, seem to uncover this implicit belief in fate and eternal meaning amongst some of those who overtly do not believe in these things, as well as evidence that such people have religious experiences (e.g. Bailey, 1997 or Hay, 1990), so God has been replaced by something relatively close to it. As long as the less stressful environment caused by modernization outpaces the concomitant decline in intelligence, we would expect religion and even replacement religion to, broadly speaking, fall; but they would rise

at times of distress. In this regard, there is evidence of religiousness increasing in the wake of World War II before continuing its decline (see Brown, 2012, p.53) and the rise of extremist ideologies at times of distress would also fit into this model (e.g. Sternhell, 2007). In addition, we would expect other more instinctive perspectives, such as conservative ('dominance') attitudes, to decline in tandem because the standard of security would be so high that it would mean people would be decreasingly instinctive and increasingly concerned about inequality.¹

However, actual intelligence would still be declining so we would expect scientific innovation to slow (as proven by Woodley, 2012). Nevertheless, the society would still progress towards focusing on jobs of increasing cognitive complexity through successfully competing against less modernized societies. This success would require greater literacy and increasing levels of specialized education (e.g. Fuse, 1975, p.27) and would render education more significant to socioeconomic status, further incentivizing increasing levels of education (e.g. Allen and Ainley, 2010). However, despite being more and more educated, people would be less and less intellectually able. As such, we would expect to find school educational standards falling and grade inflation (see Green et al., 2005), higher education standards falling and grade inflation (see Alderman, 10 March 2010 or House of Commons, 2009), a rise in people being effectively over-educated in relation to their employment (e.g. Allen and

¹ Cofnas (2012, p.434) makes the suggestion that as scientific knowledge becomes more in-depth, there will be fewer and fewer people who can understand it, meaning that they are more likely to reject science in favor of religion so that they can have a comprehensive worldview. One might counter that many adherents to science might not understand the nuances of theoretical physics but, if they were reasonably intelligent, it would not follow that they would reject science.

Ainley, 2010, p.75), and a rise in pseudoscientific or academically weak subjects with little objective criteria to accommodate these people's attraction to education and society's desire for education (e.g. O'Leary, 2007, p.481).² In a highly specialized society with falling IQ, there would be a large, and ever-growing, unemployable underclass with very high time preference and relatively poor health. If modernization led to calorie-intense food being the easiest and cheapest option, a society with declining intelligence would witness an obesity epidemic (e.g. Krebs et al., 2007).

This summary is uncannily close to what was predicted by psychologist Raymond Cattell (1905-1998) (Cattell, 1938 or 1991) if an advanced society had a falling IQ and seems to be what is now happening in the West. Cattell felt that democracy would be placed under strain because of the obviously intellectually inferior underclass who would have a significant say in running society while being entirely parasitic upon it. But we might add that democracy might also be placed under strain simply by falling intelligence because this would mean that people would be 'less able to organize themselves, to take part in national politics or defend their rights against those in power' (Vanhanen, 2009, p.270). As such, we might expect a replacement religion to take hold. It would be likely to appeal to liberalism (anti-dominance), reflecting the general reduction in instinctive desires (such as genetic preservation) due to reduced stress and a high material standard of living. We would also expect less intelligent

² As Medawar (1967, p.79) summarizes, 'We must not underestimate the size of the market . . . for philosophy-fiction. Just as compulsory primary education created a market catered for by cheap dailies and weeklies, so the spread of secondary and latterly tertiary education has created a large population of people, often with well-developed literary and scholarly tastes, who have been educated far beyond their capacity to undertake analytical thought.'

people to be less able to see through the fallacious arguments presented by such a religious coalition and less able and less willing to organize against the new elite that would develop from it, leading to a decline in democracy and equality. Politics, and life in general, would become increasingly corrupt because 'intelligent people have longer time horizons' and can better understand the long-term negative consequences of corruption (Potrafke, 2012, p.109). Cattell (1938) also argued that 'moral standards' would probably become more relaxed as increasing numbers of people were insufficiently intelligent to foresee the consequences of their actions and simply lived for the present.

But, in that stress-reducing modernization is ultimately underpinned by intelligence and in that declining national intelligence is anyway likely to raise stress (due to increased corruption, for example),³ there would come a tipping a point where declining intelligence (and the rising stress caused by it) would outpace the declining stress permitted by modernization. Once this was reached not only would religiousness rise but there would be an even more noticeable decline in assorted correlates of national intelligence such as law and order, healthcare, education levels, life expectancy, health, political stability and democracy, and sanitation (see Lynn and Vanhanen, 2012). This will lead to further increased stress which will in turn render religion more attractive to Western people.

³ Also, Herrnstein and Murray (1994) note that Western societies have become more cognitively stratified since 1950 because they are more meritocratic. The consequent less even IQ distribution could lead to more things going wrong in everyday life if there were ever an unpredicted, cognitively demanding problem at, for example, a postal sorting office, because it would be much less likely than in 1950 that anybody of high intelligence would be working there. Conversely, those of high socio-economic status would decreasingly share the perspectives of those they ruled.

One slight caveat to this is evidence of differential breeding rates between social classes and those of different education levels. Lynn (2011a, Ch. 12) argues that socio-economic status is not solely a reflection of intelligence, though it significantly is. As we have already discussed, certain personality characteristics predict success. The highest socio-economic status is attained through a combination of intelligence and character, with high intelligence and good character independently only able to take people so far. Accordingly, membership of the highest socioeconomic group is likely to at the very least reflect not just relatively high intelligence but relatively high Conscientiousness, Agreeableness, Openness-Intellect and, within certain limitations, Neuroticism, though, as we have discussed, Agreeableness and Conscientiousness tend to be slightly reduced when comparing geniuses to ordinary people of high socio-economic status. Membership of the lowest social group, therefore, would reflect not just low intelligence but also poor character. In addition, high levels of education are predicted by the same personality profile that would predict socio-economic success. Intelligence predicts low fertility but so does high socio-economic status and high levels of education (see Table 14.7).

Table 14.7 - Number of children of women aged 35-44 in relation to their years in education and IQs (Herrnstein and Murray, 1994, p.349).

Years of Education	IQ	Number of Children
16+	111	1.6
13-15	103	1.9
12	95	2
0-11	81	2.6
Average	98	2

Lynn (2011a, p.170) observes, drawing on the average of 17 studies, that educational attainment is 0.51 heritable. As we have discussed, socio-economic status is significantly predicted by IQ. In addition, Lynn (2011a, p.196) found, summarizing a series of adoption studies, that socioeconomic status is around 0.25 heritable. Research attests to a general, if less uniform, dysgenic trend in this regard.

Table 14.8 - Fertility and Socioeconomic Status in England (Coleman and Salt, 1992).

Age	Professional	Managerial	Minor Non-Manual	Manual Skilled	Semi-Skilled	Unskilled
1926-1935	2.2	2.1	1.9	2.3	2.3	2.6
1936-1940	2.2	2	2	2.3	2.3	2.6

From Table 14.8 we can see that the 'unskilled' are significantly more fertile than the classes above them. As such, we would expect a decline in the personality profile that predicts high levels of education and high socio-economic status. As we have discussed, high Openness-Intellect, Agreeableness, Conscientiousness and Neuroticism predict educational success. Conscientiousness, in particular, is correlated with success in the world of work: at 0.82 (Barrick and Mount 1991). Lynn (2011a, Ch. 12) argues that there is clear evidence that different social classes differ in Conscientiousness in the positive relationship between income and a desire for 'Pleasure' over 'A Sense of Accomplishment' (Rokeach, 1973), a positive relationship between socioeconomic status and work ethic (e.g. Abrams, 1985), and a negative relationship between high socioeconomic status and smoking (e.g. Conrad et al., 1992), alcoholism (e.g.

Coleman and Salt, 1992), sexual restraint (e.g. Gorer, 1971) and criminal conviction (e.g. Douglas et al., 1966). Those of the lowest status - who we would expect to have the lowest intelligence and worst character (for achieving high socioeconomic status) - evidence the highest levels in these regards.

Table 14.9 - Socioeconomic status and markers of low Conscientiousness in Britain

	Professional	Managerial	Minor Non-Manual	Skilled Manual	Semi-Skilled	Unskilled	Ref.
Smoking %	Male: 23 Female: 21	26 26	- -	38 35	45 37	50 45	Blaxter, 1990
Alcoholism %	Male: 9 Female: 0	15 1	- -	33 2	32 3	34 2	Coleman and Salt, 1992
Age of first intercourse (25-34 year olds)	Male: 18 Female: 19	17 18	17 18	16 17	16 17	16 17	Lynn 2011a, p.211
Criminal Record	5.5 ('Middle Class')	-	-	9.7	-	18.7	Douglas et al., 1966
Conviction for Serious Crime	2.5 ('Middle Class')	-	-	6.1	-	13.8	Douglas et al., 1966

As discussed, poor health is also a marker of low intelligence as is criminality and sexual activity in early adolescence. Nettle (2009) suggests that these working class behavior patterns are explained by the working class living, relative to other classes, in a more dangerous ecology and they adapt to this by living for the moment. The problem with this argument is that it leaves us asking how they ended-up at their socioeconomic status in the first place and why some people born into such a status socially ascend but they do not. The most parsimonious explanation is that genetic intelligence and character plays a significant part in their

behavior. As we have discussed, socioeconomic status is predicted by intelligence at 0.4. In addition, as we have seen, Conscientiousness, which is around 0.5 heritable, plays a highly significant part in educational success and thus socioeconomic status. Nettle's argument ignores this. Nettle's argument also ignores the research indicating that poor health, poor sexual restraint and criminality are predicted by low intelligence (see Lynn and Vanhanen, 2012), which is 0.83 heritable, as well as by low Conscientiousness.⁴ Though the supposedly more dangerous ecology of those of low socioeconomic status may incline them to live for the moment to a greater extent, this would be an exacerbation of something underpinned by genetic differences in intelligence and Conscientiousness. As we have noted, beyond adolescence people strongly create their own environment based around their intelligence and personality. It is also worth adding that some of the characteristics which Lynn puts down to low Conscientiousness could also be explained by, in addition to low intelligence, low Agreeableness (not caring about the negative consequences for others of your crimes or poor health) and low Neuroticism (not being scared of criminal conviction or worried about future poor health).

Potentially, low fertility amongst the highly educated and amongst those of high socioeconomic status could lead to a decline in religiousness because it would lead to a reduction in the levels of Conscientiousness and Agreeableness and these predict religiousness. However, these characteristics have a heritability of around 0.5, with even the highest estimate being 0.66 (see Lynn, 2011a), which is significantly lower than the heritability of intelligence at 0.83. Thus, while this trend may ameliorate the predicted increase in religiousness in the West, it will not prevent it. Falling intelligence will lead to a more religious future in

⁴ For low Conscientiousness and addiction, see Slutske (2005).

Western countries and this would be compounded by immigration into Western countries by those from countries with average IQs below 100 (see Lynn, 2011a, Ch. 16).

5. Conclusion

St. Anselm of Canterbury and the Psalmist stated the polar opposite of what appears to be the case. 'The intelligent person says in his heart there is *no* God' and a very large body of studies attest that the more intelligent - whether the academic elite or the more intelligent amongst this elite in relation to other academics, ordinary academics in comparison to students, students in comparison to the general population, those at their cognitive peak in comparison to those rising or falling, men in comparison to women, or members of high IQ nations or human subpopulations - are the least religiously believing and the least religious. In addition, intelligence predicts the lowest adherence to replacement religions such as nationalism or Marxist-inspired ideologies. An extreme personality type explains the presence of the highly intelligent yet highly religious. Current breeding patterns seem to predict that the future of the West will be more religious than it is now due to declining intelligence. The New International Version of the Bible has the Prophet Isaiah make a prediction about the collapse of civilization in Israel, that may well come to pass in the West: 'Therefore once more I will astound these people with wonder upon wonder! The wisdom of the wise will perish; the intelligence of the intelligent will vanish' (Isaiah 29: 14).⁵

⁵ In earlier versions, 'intelligence' is translated as 'discernment' or 'prudence.' See Cook (2011).

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