

SCIENCE AND RELIGION GRADED PAPER 2

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The thesis and arguments

Your topic is well chosen, clearly stated, and remains the clear focus of your arguments throughout the paper. The greatest weakness of your arguments is that they suffer from overstatement. Parsimony is not as essential and binding as you suggest. Falsifiability is a critical characteristic of scientific hypotheses, but that is part of the structure of science, and not necessarily (or, at least, not clearly) an essential element of any theory of knowledge. You come close to making a good case that it is unjustifiable for a scientist to believe in supernatural causes, but you take it too far in trying to claim that such beliefs are illogical or irrational, and then failing to justify that claim.

You also avoid the most critical question: What is a *scientist*? What if someone who disbelieves that parsimony and falsifiability are essential or even valuable ideas nonetheless carries out illuminating, influential, and proper scientific experiments? Is the work any less scientific? If the person carries out scientific work, doesn't that do more to make him a *scientist* than any set of internally held beliefs? Is science a belief system? Or is it a collection of observations and theories that have been gathered and tested under a particular set of rules?

Overall, however, the arguments are well structured and flow from one into the other to form a coherent approach. At a more superficial level, you employ mildly inflammatory language and examples that undermine your attempts to persuade, distracting the reader from the real content of your claims.

The writing

The mechanics of your writing are good, but you employ some excess verbosity. A bit of extra editing could have trimmed this paper noticeably. Otherwise, the writing errors were minor, infrequent, and easily fixed.

You also failed to submit a PDF, instead submitting a Word document that, when I opened it, was over the four page limit.

Items marked on the paper

(1) This seems a bit strong of a statement. You can claim that religious belief is inconsistent with scientific principles or philosophy, but it's another to suggest that education in science change how the mind/brain operate in a way that should prevent religious belief. This phrase reaches a little too far in suggesting a consistency in how scientists think that does not, I think, exist.

(2) This summary of the Law of Parsimony contains at least two problematic components. The first is your use of the word "reasonably." There is nothing in this law to suggest that it is *unreasonable* to permit other explanations, but only that it is undesirable to do so. Second, and more

critically, is that the “simplest explanation” is not at all what Occam’s Razor recommends. Newton’s statement suggests that explanations contain only elements that are “true and sufficient”—that is, that they do not contain superfluous (or false) elements. *Simplicity* and *necessary and sufficient* may not be identical, and the difference here is critical.

(3) Careful with your terminology. It is not upon intuition that we should rely here, and it is not intuition that guides us to a case of unsound reasoning. An application of the Law of Parsimony does suggest that one set of rules is more appropriate than the other, but there is no **logical** basis to choose one over the other.

Again, in the following paragraph, is another misuse of *logic*. It is not a logical matter that prevented Newton from proposing restrictions on gravity. He could have done so, and while those proposals would have been (before any empirical evaluation) odd and seemingly superfluous, there would be no logical error in asserting them. Occam’s Razon is **not** a matter of logic.

(4) Suggesting a supernatural cause need not be a suggestion of an intelligent or omnipotent God. One can imagine a much weaker, less “perfect” form of God that participated in creation. Moreover, “almost certainly” is a weak claim, especially without justification. Must an entity be more complex than what it creates? Why?

(5) First, the phrase “intellectually dishonest” is unnecessarily inflammatory. Worse, you use it sloppily. People mean many different things by the term “God,” and so it’s an oversimplification to assume that using “God” in relation supernatural acts of creation must also be an underhanded attempt to sneak in support for any set of traditional religious beliefs or customs. Your job, as academician, is not to conflate these separable concerns about notions of god.

(6) How are these two “closely related”? Falsifiability is an essential property for any scientific theory, while parsimony is merely an informal guide. The two aren’t conceptually related, either. An assertion could pass or fail either test independently.

Again, you are overusing notions of what is “logical.” A statement is simply *not a scientific hypothesis* if it is not falsifiable. It is not logic that determines its status as an hypothesis, but mere definitions. There is no logical rule that one applies here.

(7) This claim is the heart of your paper, and its has no justification. It is not enough for you to claim that parsimony and falsifiability must apply pervasively; clearly a number of scientists would disagree, and claim that those laws apply only to their scientific endeavors. You’ve presented no argument as to why they would be wrong, and I believe that devising such an argument would be difficult. Parsimony is a guide, not a logical or rational rule. Falsifiability is a property that helps to define *scientific* hypotheses. Nothing about either one implies, on their, own universality. The philosophical step of asserting that scientific knowledge is really the **only** knowledge requires additional justification.

Grade: B+

Faith and Epistemic Principles: Why Religious Belief Should Seem Unreasonable to Scientists

Many scientists believe in God, and some are ^{unnecessary} even practicing Christians. Yet being a ^{superfluous} scientist and having religious beliefs is ~~fundamentally~~ ^{redundant} inconsistent because of how scientists are taught to think and form beliefs. Science is founded on certain ~~fundamental~~ ^{redundant} epistemic principles ^{that} governing what we can claim to know about the universe. In affirming the existence of God, a scientist is proposing a ~~theory or hypothesis of a sort~~ ^{that} that these principles forbid. ^{namely,} one ^{that} which posits more than the simplest explanation ^{of} necessary to explain observed phenomena and ^{that} which is unfalsifiable in principle. It is therefore not reasonable for a scientist to be religious, because, as a scientist, he must accept these epistemic principles—parsimony and falsifiability—^{that} which religious beliefs violate. | Don't use "which" in contexts where "that" is equally correct. *Italics, not guides*

A ~~fundamental~~ ^{italics} principle in the philosophy of science is the "Law of Parsimony," often referred to as Occam's Razor because of its frequent use by William of Ockham. Ockham stated it as: "Nunquam ponenda est pluralitas sine necessitate (Pluralities ought not be posited without necessity),"¹ but perhaps a clearer statement of the principle as it applies to science was given by Sir Isaac Newton in ~~his~~ *Principia Mathematica*: "We are to admit no more causes of natural things than such as are both true and sufficient to explain their appearances."² The Law of Parsimony, therefore, is the principle that we cannot reasonably conclude any more than the simplest explanation that completely accounts for observed phenomena. This principle follows directly from the fact that science is an *inductive* discipline. Inductive reasoning is the process of drawing general conclusions from observed patterns of phenomena. For example, suppose you observe someone drawing cards bearing the numbers 1 through 10 and sorting them into two

¹ "Occam's Razor," [h2g2](http://www.bbc.co.uk/dna/h2g2/A21648783), 2007, BBC, 25 September 2008 <<http://www.bbc.co.uk/dna/h2g2/A21648783>>.

² "Occam's Razor."

different stacks. After 10 draws, these stacks contain {1, 7, 3, 5, 3} and {2, 4, 4, 8, 6}, respectively. You are then asked to come up with a theory of what rules determine in which stack each number goes. The simplest explanation, of course, would be: "odd numbers go in the first stack and even numbers in the second." That is inductive reasoning. Now, you could say: "odd numbers go in the first stack and even numbers in the second, except for 9, which goes in the second." Notice that, upon further draws, this theory could prove to be correct, but intuition tells us that, at this point, it would be unsound reasoning to draw this conclusion, because the simpler explanation fully accounts for what has so far been observed. As another example:

When Isaac Newton proposed his Law of Gravity, he did not add clauses such as 'except when applied to objects of a certain shade of purple,' despite (presumably) not having tested objects of every colour. Nor did he add in a clause saying, 'until 3rd April 2032, when all gravity will cease.' Clearly, no experiment Newton could have performed would have differentiated his 'plain' version from one with a time-limit. However, the colour-dependence or time limit would be extra layers of complexity for which Newton had no evidence. Since there are an infinite number of possible time limits, to propose any one of them would be senseless. Newton's only logical course of action was not to include any reference to a time limit in his law.³

Here we see the logical justification for parsimony: "It is possible to conceive of a vast—possibly infinite—variation of ideas, the majority of which are mutually exclusive and have no possibility of evidence either for or against them...Occam proposed that it is both illogical and irrational to react with anything but disbelief to such ideas."⁴ ~~As applied to religious beliefs,~~

Some scientists believe that there are aspects of the natural world, such as certain complex parts of certain organisms, that defy scientific explanation and therefore must be the product of ~~some~~ supernatural intervention. They point to these gaps in scientific understanding as evidence of the existence of God. Indeed, sometimes invoking God might seem "simpler" than competing

³ "Occam's Razor."

⁴ "Occam's Razor."

→ Unless you are quoting his writing, invoking his name is out of place. In fact, doing so obliges you to cite his writing so that a reader can verify your interpretation of his perspective.

naturalistic explanations and thus compliant with the Law of Parsimony. There are, however, at

least two problems with such arguments. Firstly, such explanations are in fact rarely "simple,"

because, as Richard Dawkins frequently points out, an intelligent, omnipotent God would almost

certainly be vastly more complex than anything we know of in the natural world. Secondly,

assigning the label "God" to some "supernatural intervention" is intellectually dishonest, because

doing so often serves as an excuse to hold a vast array of other cultural beliefs associated with

the word "God" (e.g. God listens to our prayers; Jesus was born of a virgin, died on the cross for

our sins, and if you believe this you will go to heaven when you die). Such beliefs can never

follow by induction from ~~the "need" for some~~ supernatural intervention to explain an observed

phenomenon, and there are infinite possible versions of such beliefs. Was such intervention the

Superfluous work of Yahweh, Zeus, or the Flying Spaghetti Monster? Given these infinite options, and

without any evidence to prefer one over the others, "the chances of [any one] being correct are

infinity to one against (i.e. zero)."⁵ The only reasonable response, therefore, is to hold no belief.

A scientific principle closely related to parsimony is the falsifiability criterion. This

principle says that a statement is not a logically valid hypothesis if it cannot ever be proven false.

too much Bertrand Russell sublimely illustrated this principle with his famous "Celestial Teapot" analogy:

If I were to suggest that between the Earth and Mars there is a china teapot revolving about the sun in an elliptical orbit, nobody would be able to disprove my assertion provided I were careful to add that the teapot is too small to be revealed even by our most powerful telescopes. But if I were to go on to say that, since my assertion cannot be disproved, it is intolerable presumption on the part of human reason to doubt it, I should rightly be thought to be talking nonsense.⁶

⁵ "Occam's Razor."

⁶ Bertrand Russell, "Is there a God?," 1952, quoted in Richard Dawkins, The God Delusion, (New York: Houghton Mifflin, 2006) 52.

Russell argues that such Christian concepts as God, the immortal soul, and free will are unfalsifiable.⁷ No observation or experiment could ever demonstrate that there *could not* exist an ~~all-knowing~~ ^{superfluous} metaphysical being called God. However, the same thing could be said of invisible, intangible leprechauns, yet no one believes in those. Such things are principally unfalsifiable; like the teapot, they are conceived of as having properties (invisible/intangible, outside of nature, etc.) that prevent any evidence from ever disproving them. Notice that the same would be true even if one claimed that God ^{unnecessary} (or the invisible leprechauns) occasionally interacted with and influenced the physical world, because still no amount of observation could ever prove that such interaction had never occurred unobserved at some time and place. However, again, intuition ^{So?} tells us that, in the absence of positive evidence of such occurrences, it is only reasonable to assume that they have never occurred. Note, also, that even if such interactions with the physical world were observed, we are simply back to the situation discussed in the previous section, where we cannot conclude from such observations whether God, leprechauns, or something else is responsible for such events, and therefore the only rational response is agnosticism.

It may be argued that it is not unreasonable or ~~in any way~~ a contradiction for a scientist to hold metaphysical beliefs that do not comply with these laws of scientific inquiry. After all (~~it may be said~~), ^{Which? Parsimony & falsifiability?} the fact that these laws limit what may be considered scientific beliefs does not bear on whether a scientist can hold other types of beliefs. But ~~such an argument misses the~~ point ⁷ these laws do not merely limit what may be called "scientific" claims. They are philosophical principles that set the boundaries of what we can claim to know, and that are part of the scientific method for that reason. Notice that, in discussing theories like Russell's teapot ~~that~~ ^{that} these principles preclude, this paper does not merely argue that to believe such claims would

⁷ Bertrand Russell, Science and Religion, (New York: Oxford University Press, 1997) 145.

be unscientific, but rather that our intuition tells us that it would be unreasonable to hold these beliefs at all. Thus, it is inconsistent for a scientist to hold unparsimonious and/or unfalsifiable beliefs, because the philosophical principles on which science is founded (and therefore which a scientist ought to accept) tell us that to do so is not just unscientific, but unreasonable.

Bibliography:

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