Simplicity as Evidence of Truth

“I seek in this essay to show that—other things being equal—the simplest hypothesis proposed as an explanation of phenomena is more likely to be the true one than is any other available hypothesis, that its predictions are more likely to be true than are those of any other available hypothesis, and that it is an ultimate a priori epistemic principle that simplicity is evidence of truth.” (p. 1)

In this lecture, *Simplicity as Evidence for Truth*, Richard Swinburne expounds the importance of the criterion of simplicity at great length. He begins by discussing the structure of explanation. He briefly compares scientific explanation with personal explanation. He further delineates between several theories of scientific explanation, contrasting Humean laws-initial conditions (LIC) type of explanations with substances-powers-liabilities (SPL) explanations. Here, as elsewhere, he plumps for the SPL account. For something to truly explain something else, it should be able to ‘license counterfactuals’ and must be an actual cause of the phenomenon in question—not just a correlated effect of a common cause. He further delineates between full causation (deterministic) and partial (statistical) explanation, deep (fundamental laws of nature) and superficial (less fundamental laws).

He then outlines the relationship between explanation and prediction. This revolves around the (unstated, but relevant) dictum that ‘correlation does not necessarily mean causation, but causation does mean correlation’ (see Footnote 2). Further, one can be justified in predicting some phenomenon without any understanding of what causes the phenomenon.

Swinburne then focuses on how one determines the best explanation for some phenomenon. He judges that there are 4 basic criteria for determining the best explanation. Two are a priori (before evidence is considered) and two are a posteriori (after the evidence is taken into consideration). The best explanation will be that hypothesis which best satisfies the four criteria. The two a priori criteria are *scope* and *simplicity*. The former refers to the range of phenomena the hypothesis claims to explain (just our planet, or all planets in the galaxy?) The latter is a multifaceted criterion, which Swinburne will define shortly. The two a posteriori criteria are *explanatory power* and *fit with background knowledge*. The former means that the explanation must yield the data (either deductively or inductively). The latter means that the hypothesis must cohere with other things we know about the world (e.g., the hypothesis “Jones stole the money” is more probable if we know that Jones has stolen before).

Scope is an important criterion, for the simple reason that the greater the scope, and all else being equal, the less likely the theory is to be true. That is, the more claims you make, the greater the probability that one or more of those claims is false. Scope also affects the role of background knowledge. If the scope of a hypothesis is wide enough, there simply is no background knowledge to take into consideration. In any case, the criterion of simplicity is the focus of the essay, and so Swinburne spends a few pages discussing the various subcomponents of it.
In discussing the nature of simplicity, Swinburne lists half a dozen facets of simplicity, the most important of which are: fewer entities (Ockham’s Razor), fewer kinds of things (entities or properties—see Footnote 7), ‘basic’ terms which do not presuppose comprehension of another term8, and number of postulated laws (compare Kepler’s three laws of planetary motion versus Ptolemy’s forty9). He notes again that historically scientists have preferred values of infinity or zero over finite values (as always, unless specific data arrives which leads them to adopt a specific finite value). Comparisons can then be made between competing theories in terms of simplicity (and the other 3 criteria as well, but we are ignoring them here). Simplicity may require iterative sifting. Perhaps there is a cluster of theories which appear equally simple in the first iteration, but nonetheless this initial pass may have successfully ‘down selected’ from a much larger pool of theories.

Swinburne then returns to the role of background knowledge. Some critics allege that this focus on the criterion of simplicity ignores the practical realities of scientific work. Seldom, they say, do we lack background knowledge of a field. Scientists usually know from their prior knowledge of a field what they are looking for. Swinburne replies that while this is true but (1) when pursuing very large scale theories there simply is no background knowledge. Yet “an infinite number of such very large-scale theories could be constructed which yield the data obtained so far. How can we choose between them except on grounds of simplicity?” and (2) when choosing ‘best fit’ with background knowledge, really we want to know which ways of fitting are simpler. Say you are studying the structure of some chemical x. You already know a lot about the properties which exist in other chemical substances. Why would you be looked at askance for invoking truly unique kinds of properties for x?

“Because the supposition that in one substance there exists kinds of atoms formed in kinds of ways and forming kinds of bonds unknown in the rest of the Universe amounts to a supposition that our general chemical and physical laws are vastly less simple than we had otherwise supposed them to be.”

So not only is the criterion of simplicity indispensible in selecting among ‘theories of everything’—kinds of theories to which the criterion of background knowledge cannot, by definition, apply—the criterion of background knowledge itself presupposes the criterion of simplicity.

Next, Swinburne rebuts attempts to explain simplicity away. There are three criticisms which he addresses—(1) We choose simplicity on other grounds than it being a priori—for example, that simpler theories are easier for us to handle. (2) We can give an a posteriori justification for using the criterion of simplicity. Namely, the history of science shows that simpler theories have, in the past, tended to be borne out. (3) That the criterion of simplicity is not itself an a priori criterion, but rather can be justified on the basis of obvious truths of logic or the probability calculus. 10 In addressing (1) Swinburne simply points out that even in the age of computer statistical programs we still prefer simpler theories—but calculating one or the other theory is no more onerous. For (2) Swinburne notes with detectable glee that stating the criticism reveals that simplicity is being presupposed.11 The same rebuttal applies to (3).12
In discussing the ubiquity of the simplicity principle, Swinburne notes that the same four criteria apply to personal explanations. When finding coins in an archaeological dig, one supposes one person, one chisel, normal bodily human powers, and a desire to make coins. Many other possible explanations would lead to the same data—different persons making different marks at different periods of time. Fit with background data (again, implicitly presupposing simplicity) would come into play—what we know about how many people, where, and when are involved in making coins.

Finally, Swinburne demonstrates how the structure of probability theory (as codified in Bayes’s Theorem) maps onto the criterion of simplicity. Swinburne ends the essay with the following words:

“To summarize the claims in a nutshell: either science is irrational in the way it judges theories and predictions probable, or the principle of simplicity is a fundamental synthetic a priori truth.”

This review first appeared here.

1 The LIC approach posits that the laws of nature are ontologically concrete and distinct from the physical objects that conform to them. Swinburne rejects this as Platonistic and hence improbable (see his article “Relations between universals, or divine laws?”). On the other hand, on the SPL account “…laws of nature are not then themselves causally efficacious factors; they are just contingent regularities in the causal powers and liabilities of substances”. The SPL account has the added advantage that it can encompass both scientific and personal explanations. God, on the SPL account, is the ultimate substance from which explanations for all else are derived.

2 If A causes B and C, we might be unaware of A and assume that B is the cause of C because of temporal contiguity.

3 For Swinburne when a causal attribution is made is irrelevant. Logical relationships between evidence and hypotheses, he notes, hold in either case.

4 What exactly is meant by a priori is not always clear—at least to me. What Swinburne means by it will become clearer as this summary proceeds. One rough but approximately correct way of putting it: the criterion of simplicity seems to be a presupposition, either implicit or explicit, of most human reasoners.

6 Theism and naturalism are theories of ‘everything’. They claim to be able to explain all known phenomenon, and therefore those phenomena are evidence to be explained, not information from nearby fields. This rebuts a common criticism of Swinburne’s argument from consciousness, which assumes he is extrapolating from embodied minds (ourselves) to a disembodied mind.

7 I ignore the lengthy discussion regarding the ways in which theories can be mathematically expressed.

8 ‘Grue’ requires that you comprehend green and blue, but green and blue can be comprehended
on their own.

9 Again, remember that this is an ‘all other things equal’ criterion—all of the four are. A simpler theory that lacks explanatory power is useless. If the data force one to adopt a more complicated hypothesis, then so be it. The dictum is ‘as simple as possible—but no simpler’.

10 An interesting area that of which I am pitifully ignorant. A great resource is the Facebook group ‘Christian Apologetics’. I’ve asked for some references, and had helpful replies from published scholars in the field.

11 CTo the critic who says that we can justify the use of simplicity inductively—that is, that in the past simpler theories have been those borne out by the data—he notes that this interpretation of the past data implicitly invokes the criterion of simplicity. For example, there are two interpretations of the past data. One is ‘Simpler theories are more likely to be true’. Equally supported by the data is that ‘Theories proposed by Greeks in tubs, Englishmen watching apples fall, and Germans working in patent offices have been borne out’. Arguably the choice to go with the first interpretation rather than the second is guided by the principle of simplicity.

12 This is a more convoluted discussion. The essence is that a mathematical function can be used to judge between ‘curves’ and choose more probably true ones. But it turns out a preference for simplicity must be built into the algorithm for this procedure to work.