

Does God belong in science?

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Our question today is Does God Belong in Science? Some of you in the audience, especially the scientists, may be asking a prior question; namely, Do philosophers belong in science? The answer to that is clearly, No. We don't do science, but we do have some things to say about how science is done. If, as Wilfred Sellars says, philosophy is the study of how things, in the broadest sense of the term, hang together, in the broadest sense of that term, then philosophers are qualified to ask how God and science hang together, or don't.

Why should we care about this question? Here are 37 reasons to care. According to a recent *Newsweek* study, that's the number of U.S. states in which proposals to teach creationism or so-called intelligent design theory have been advanced since 2001. Eighty years after the Scopes Trial, an anti-evolution movement is sweeping the nation, and one of the new rallying cries is that God has been banned from science.

Here is a quote from William Dembski, a leading ID proponent: "The view that science must be restricted solely to undirected natural processes . . . is called *methodological naturalism*. So long as methodological naturalism sets the ground rules for how the game of science is to be played, intelligent design has no chance of success." The ID movement engages the public's sense of fairness by alleging that the rules of the game of science are stacked against the supernatural. This strategy is at work right now in dozens of states.

But is it correct? Are the sciences naturalistic? If so, is there anything wrong with that? Let's clarify what is being asked here. Let's define "supernatural" roughly as things that are not a part of physical universe but can cause changes in the physical universe. In this sense, immaterial souls and transcendent deities are supernatural. Are the sciences precluded by their very nature, in principle, or from postulating such entities or processes? Relatedly, are they barred in principle from using methods of inquiry—like divine revelation—that presuppose the supernatural? The key here is whether precluding the supernatural is a criterion or part of the definition of what counts as scientific.

I work with the Center for Inquiry, which among other things, is the home of *Skeptical Inquirer* magazine. So you won't be surprised to hear that I am a naturalist, in the narrow sense of denying the existence of a transcendent realm, but also in the broader sense of believing that all human knowledge can be harmonized with the natural sciences in some fairly systematic way.

I will argue that the sciences are naturalistic, but not in principle or by definition. Rather I'll argue for a more modest naturalism that is provisional, contingent, and *a posteriori*, or based in experience, according to which there is a powerful presumption in favor of natural explanations over supernatural explanations, justified by an inference from past success of natural explanations, and their consistency with background scientific knowledge.

Dembski and the new anti-evolutionists are wrong. It is not employment discrimination that is keeping God out of work in science, but lack of demand. His services are no longer required. He's not so much underemployed as outsourced.

Modest scientific naturalism

Let's begin with my negative thesis, that the supernatural cannot be precluded from science in principle or by definition. This holds for the general reason there is no way to legislate in advance what may or may not be used in our scientific exploration of the world. The history of science is filled with examples of novel entities, processes, and methods of inquiry that were once unknown or disregarded but came to have important places in science.

For example, from its beginnings in the 16th and 17th centuries, modern science had confined itself to entities that are directly observable by the naked eye or with the aid of instruments such as the telescope. Yet in the 19th century this standard was eventually revised so that by the end of the century, leading researchers found it perfectly acceptable to invoke unobservable entities, most notably in the new field of electromagnetism. Why? Because their hypotheses explained a great many facts, pointed to interesting new insights, and found support in persuasive *indirect* evidence; namely, the observable effects of the unobservables.

Until the 20th century, the concept of causation in science involved a local interaction between entities continuous with one another in space, as one billiard ball bounces off another. With the advent of the weird world of quantum mechanics, however, physicists have been compelled to give up this bedrock notion and admit that *A* can cause *B* even it is not continuous with it. Again, this novel process was accepted because of the extraordinary empirical corroboration, explanatory power, and fruitfulness of the theory in which it is embedded.

Finally, sometimes science hits upon unanticipated methods of inquiry. A recent colorful example comes from the field of hyperbolic geometry. Hyperbolic geometry, created in the 1820s and 30s, studies certain counterintuitive non-Euclidian objects with constant negative curvature; a surface that curves away from itself at every point. Since the 1950s, geometers had been trying to construct models of hyperbolic spaces, but with limited success. Many believed it impossible, until Daina Taimina came along. Taimina, then a mathematician at Cornell, made a discovery in the handicraft she had learned as a girl in her native Latvia: crocheting. In 1997, she crocheted the first usable model of a hyperbolic space. Together with her Cornell colleague and husband David Henderson, she wrote up the results and submitted them to the journal *Mathematical Intelligencer*. Apparently the editors said, You want us to publish *what*—a sewing pattern? Needless to say it was the first time that crocheting directions had been submitted a peer-reviewed math journal. But after some correspondence with the authors, the editors became convinced that this method of modeling could lead to new developments in the field. And in fact, Taimina's technique has already been applied by researchers in cosmology, for example.

The attempt to preclude these novel approaches via methodological rule would have been futile, because some of them could not have been foreseen. It also would have inhibited scientific progress. A signature strength of scientific inquiry is its open-endedness. It is not defined in advance by a list of the kinds of things it may or may not use in trying to understand the world.

However, while inquiry may be open-ended, time and resources are not endless. So, a rational inquirer will choose those avenues of investigation that look most

promising. Just because it's unreasonable to preclude the supernatural in principle, that doesn't mean it's always reasonable to pursue it. In fact, it would have to pass a very high bar before being worthy of serious consideration by science. While a modest naturalism does not absolutely rule out the transcendent, it presents a powerful presumption in favor of natural causes. This is not an atheist dogma. It is a conclusion made on the basis of cumulative evidence.

This evidence begins in everyday, commonsense reasoning about the world. When you hear a bump in the night, your first thought is probably not ghosts but cats. Why? Because it turned out that there was a natural explanation for the last bump you heard, and the bump before that, and so on. The rational response to this past experience is to assign a far lower likelihood of truth prior to investigation—or a lower prior probability—to a supernatural explanation relative to a natural explanation. Adding to this commonsense experience are over three centuries of progress in modern science in which naturalistic theories have prevailed and in many cases displaced previously accepted supernatural theories, as germs cast out demons, DNA and cellular machinery made obsolete the idea of a mysterious life force. Even in cases where a naturalistic explanation was not obvious, when people looked in the right way in the right place, they found it. By contrast, supernatural explanations have a very bad track record in science.

Furthermore, an important criterion for evaluating a hypothesis is the extent to which it fits with the rest of what we know about the world. If we are considering two alternative explanations for some phenomenon, all else being equal, we should prefer the one that is more consistent with the rest of our well-established theories and observations. Since the existing body of well-established theories and observations are naturalistic, it

stands to reason that a natural explanation will usually produce a better fit with our background knowledge.

How strong is the presumption of naturalism? Strong enough to prevent anyone from crying “God did it” whenever there is a gap in our understanding of natural causes. As the philosopher Paul Draper puts it, “very strong reasons to believe there is no *hidden* naturalistic explanation would be required as well. In other words, the search for natural causes should continue until the best explanation of the failure to find one is that there is none.”

Let’s illustrate these features of modest naturalism with an example. Although there is a growing body of scientific knowledge about autism, the basic nature and root causes of the illness remain largely mysterious. There are significant gaps in the current naturalistic understanding of autism. Yet, you don’t hear anyone calling for a supernatural explanation, the “intelligent design” of autism. Why not?

First, there is the general confidence based on past experience that natural causes will be forthcoming. Second, there is a body of background knowledge concerning the roots of other disorders in genes and environment or some complex mixture of the two. A naturalistic account of autism would fit with this background better than a supernaturalistic account. Finally, the present gap in our understanding of autism is not at all surprising given the relatively immature state of our understanding of the brain, which turns out to be the most complex entity ever encountered. Therefore, the best explanation for the present inability to find the natural causes of autism is not that there are no natural causes, but that we just don’t know enough about the brain yet. Since scientific inquiry is a process that consumes time and resources, which are finite, the rational thing to do is to

refrain from pursuing lines of inquiry that have an antecedently very low likelihood of success. In the present state of knowledge, that means ignoring various non-natural accounts of autism.

So, according to this form of naturalism, there is an overwhelming presumption in favor of natural explanations in the sciences, in light of their past success in other cases and their coherence with the rest of what we know about the world. Appeal to the supernatural would be acceptable only if we can think of no other way to account for our failure to discover natural causes. Although it is modest, it is still sufficiently strong; a naturalism with teeth, if not an overbite.

Immodest naturalism in practice?

I've been arguing for *modest* naturalism as a philosophical ideal. What about real scientists and their actual practices? Could it be the mainstream scientific community in its practice is *immodestly* naturalistic? If that were true, then Dembski's complaint that their work is unfairly shut out might still stick. This is a complex sociological question. However, we can make a first approximation

Incentives for contrarians

Science is a social enterprise and as in all such endeavors there are entrenched interests, institutionalized orthodoxies, and personal biases. However, it also has built in enticing incentives to defy orthodoxy and question conventional wisdom with new discoveries. That is if you like The Nobel Prize. The Nobel Prize for Medicine last year went to two Australian researchers (Robin Warren and Barry Marshall) whose work overturned the

established view that lifestyle and stress are the main causes of stomach and intestinal ulcers. They helped show that a kind of bacteria is responsible for 80 to 90 percent of cases. The self-critical attitude of science is embodied in the mechanisms of open publication of results, blind peer-review, and attempts to replicate findings.

Norms of scientific publishing

The point of the scientific literature is not to publish only true claims. It is to expose claims to rigorous scrutiny. Thus, the standards of scientific publishing tend to err on the side of inclusiveness. Case in point: the infamous study of the so-called “memory of water.” French epidemiologist Jacques Benveniste claimed to experimentally demonstrate when a substance is highly diluted, the molecules may be gone, but the water remembers their effect in some mystical way. In 1998 the editor of *Nature* at the time, John Maddox, pointed out that Benveniste had to be wrong, but because the reviewer could not point to any actual mistake, *Nature* agreed to publish the article in the spirit of open scientific exchange. Subsequent attempts to replicate his results failed.

Religion and health

Perhaps the best counterexample to the claim that science as practiced is biased against the supernatural is the booming field of religion and health studies. Academic research centers in this area are springing up like mushrooms. Respected journals such as the *Annals of Internal Medicine* have published studies on the medical value of prayer. The NIH, through its National Center for Complementary and Alternative Medicine gave the parapsychologist Elizabeth Targ \$1.5 million to try praying for HIV treatment. This

evidence at least suggests that far from stacking the rules against the supernatural, contemporary science seems eager, perhaps overeager, to embrace it.

Conclusion

I want to emphasize that I haven't said anything about the scientific merits of the intelligent design case against neo-Darwinian evolution. Here's what can be said about the scientific merits of ID So, even if everything I've said about the naturalism of the scientific process were wrong, that wouldn't help the ID case one bit. If you're worried about ID in biology, you don't need naturalism to keep it out. Ordinary standards of evidence and rigor will do that. Naturalism is about what it takes to get in the game, not about how well you do once you're in.

I've argued for a modest naturalism on philosophical grounds: God has no role in science today, not because he is excluded in principle but because his promoters haven't overcome the powerful presumption in favor natural causes for natural events. And the search for natural causes should continue until the best explanation for the failure to find one is that there isn't one. I've also given some reasons to think that as a sociological matter, the practice of science is not dogmatically naturalistic. In fact, some areas can be criticized for not being nearly naturalistic enough. Dembski is wrong. If God were to show up at the NSF with a research grant proposal, the proper response would not be *What are you doing here?* but *Impressive CV, but what have you done for us lately?*