

Methodological Naturalism in the Study of Human Behavior

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[[Slide: Sidney Harris cartoon from *Einstein Atomized* — two identical atoms labeled "atom in bird's brain" and "atom in human's brain."]]

This cartoon by Sidney Harris summarizes — somewhat uncomfortably summarizes — why we need to talk about methodological naturalism in the study of human behavior. Human behavior is traditionally studied in the social sciences. In the social sciences, what we call "Christian scholarship" often includes explicit, or identifiably implicit, Christian assumptions. These assumptions sometimes clearly distinguish Christian scholarship from scholarship done by non-Christians. By contrast, when we study atoms, or when we study bird behavior, we're in the natural sciences. In the natural sciences, technical scholarship done by Christians and non-Christians are often indistinguishable. Some folks claim that this is because the natural sciences are "methodologically naturalistic." The methods and results of the natural sciences are increasingly being used to study human behavior. Social scientists and natural scientists are finding common working ground in neuroscience and psychology. So we need to ask: What's right about the term "methodological naturalism"? What's wrong about the term? What contribution can Christian scholarship make in the scientific study of human behavior, ?

Part 1: The natural sciences and "methodological naturalism"

The basic theories and equations of science — the "laws of nature" — don't explicitly refer to God, miracles, or the supernatural. It could be argued, therefore, that scientific equations and theories are *methodologically* naturalistic. You don't have to be an atheist to do science, so the argument goes. You may still believe that God exists. It's just that, whenever you are doing *science*, you must temporarily act "as if God doesn't exist." It is not unusual for atheists and agnostics to make this claim, that science is methodologically naturalistic. In fact, a number of Christian scholars also describe science that way. Two examples:

"... There is what we might call *methodological atheism*, which is by definition common to all natural science. This is simply the principle that scientific explanations are to be in terms of natural (not supernatural)

entities and processes. ... It is a fact of history (perhaps an accident of history) that this is how the institution of natural science is understood in our era. For better or for worse, we have inherited a view of science as methodologically atheistic — meaning that science qua science seeks naturalistic explanations for all natural processes. Christians and atheists alike must pursue scientific questions in our era without invoking a creator. The conflict between Christianity and evolutionary thought only arises when scientists conclude that if the only *scientific* explanation that can be given is a chance happening, then there is no other explanation at all." Murphy, Nancey. "Phillip Johnson on Trial." *Perspectives on Science and Christian Faith* **45**, no. 1, p.33-34.

"Science, fundamentally, is a game. It is a game with one overriding and defining rule: 'Let us see how far and to what extent we can explain the behavior of the physical and material universe in terms of purely physical and material causes, without invoking the supernatural.' Operational science takes no position about the existence or non-existence of the supernatural; only that this factor is not to be invoked in scientific explanations. Calling down special-purpose miracles as explanations constitutes a form of intellectual 'cheating.' ... We do not say, 'Science absolutely and categorically denies the existence and intervention of the supernatural.' Instead, as good game players, we say, 'So far, so good. We haven't needed special miracles yet.' The particular glory of science is that such an attitude has been so successful, over the past four centuries, in explaining so much of the world around us." Dickerson, Richard E. "The Game of Science." *Perspectives on Science and Christian Faith* **44**, no. 2, p.137.

The stress is on the word "methodological." Philosophical naturalism is a worldview which claims that supernatural entities do not exist. Methodological naturalism, by contrast, is a tool for conducting limited investigations and for discovering limited truths. Methodological naturalism is an acceptable tool for Christians to use, the argument goes, so long as she remembers that the discoveries made by using this tool are only partial truths.

There is some merit to this answer. It is worthwhile to distinguish philosophical atheism from methodological atheism. However, I find the term "methodological naturalism" misleading in at least four important respects.

Problem 1: The term "MN" overly restricts the scope of scientific scholarship

Scientific scholarship is more than a search for the "laws of nature." When I think about "Christian" scholarship in the natural sciences, I find it helpful to break up the issue into five parts.

- 1) The basis for science: Is it possible to discover new truths about nature? If so, how and why?
- 2) The process of science: What is an effective scientific method for learning about nature?
- 3) The conclusions of science: What does the scientific method tell us about nature?
- 4) The inferences of science: Do those scientific conclusions have meta-scientific implications?
- 5) The human aspect of science: What are our motives, ethics, and goals for doing science?

The first and fourth category of questions cannot be answered within the natural sciences. The natural sciences produce data and ideas which, for good or ill, can profoundly affect how individuals and societies answer these fundamental questions. However, these questions also draw heavily upon religion, philosophy and other disciplines. Examples of such questions include: "Why does something exist rather than nothing? Is there a creator? What are the fundamental characteristics of the cosmos? What is the significance of life? What is the significance of human beings?" Christian and non-Christian answers to these questions are often fundamentally different, and they often use scientific data in very different ways when addressing these meta-scientific questions.

The fifth category of questions — about the human aspects of science — has answers which vary with each individual scientist. Scientists do discuss these questions with each other, often informally, often in general trade journals, and occasionally in formal settings. A scientist's religious faith should profoundly influence his or her answers to these questions. As a Christian, I endeavor to bring under the lordship of Christ my personal motives for doing science, my behavior and ethical standards, and my hopes and goals for science.

The second and third categories of questions ("What is an effective scientific method?" and "What does that method actually tell us?") are typically answered within the natural sciences themselves, with very little reference to other disciplines. Nearly everyone agrees that Christians and non-Christians use essentially the same scientific method and, when doing their work properly, reach essentially the same scientific conclusions. It is in this narrower region of scientific scholarship that the term "methodological naturalism" is used.

Problem 2: The term "MN" implies that God is absent from ordinary natural events

When I teach an introductory physics class, whether for science majors or non-science majors, I like to confront them with the following question, often on the first day of class: The Bible speaks about God's governance of everything. Modern science speaks about "natural laws" governing physical events, such as the motion of objects. Is there a conflict here?

At this point, I let my students discuss the issue for a few minutes, and then ask them to volunteer some answers. I think you would be pleased at the sorts of answers I usually get. They understand that there isn't a contradiction here. God can govern through natural laws.

But as I point out to my students, although you and I don't see a contradiction here, a lot of people today do see a contradiction. Some people are so impressed by science's success at describing the motion of apples, planets and stars that they conclude no further explanation is needed. If science can explain something by natural laws, they believe there is no longer a need for God to do anything. Cosmologist Stephen Hawking accurately reports this common belief when he writes, "These laws may have originally been decreed by God, but it appears that he has since left the universe to evolve according to them and does not now intervene in it."

This may be a commonly held picture of how God interacts (or doesn't interact) with the universe, but of course, it is not the biblical picture. The Bible proclaims that God is equally sovereign over all events — ordinary or extraordinary, natural or miraculous. God didn't create the universe like a watch, to be wound up, started and then let go. The biblical picture is that the existence and orderly behavior of the universe depend continually upon God's sustaining action. As it says in Psalm 104:(19-24)

The moon marks off the seasons,
and the sun knows when to go down.
You bring darkness, it becomes night,
and all the beasts of the forest prowl.
The lions roar for their prey
and seek their food from God.
The sun rises, and they steal away;
they return and lie down in their dens.
Then man goes out to his work,
to his labor until evening.
How many are your works, O Lord!
In wisdom you made them all;
the earth is full of your creatures.⁴

Note the parallel levels of description in that passage. The sun goes down (a natural event), and God brings night (divine action). The lions hunt prey (a natural event), and they seek their food from God (divine providence). The biblical perspective is clear. If something happens "naturally," God is still in charge. This psalm was written more than 2000 years before modern science existed, so the psalmist probably wasn't thinking in terms of "natural laws." However, the psalmist certainly knew the difference between the way things usually happen in nature and miracles. The psalms are filled with praise to God for the times in Israel's history when God did something unusual, something miraculous. So the psalmist undoubtedly understood that there is a difference between a miracle and an ordinary event like the sun going down or a lion hunting. Yet the psalmist

insisted that God was in charge of natural events every bit as much as God was in charge of miracles. In fact, God is to be praised and worshipped for those natural events.

With a modern scientific understanding of natural laws, neuroscientist Donald MacKay described the biblical view this way: "...The continuing existence of our world is not something to be taken for granted. Rather it hangs moment by moment on the continuance of the upholding word of power of its creator."

And John Calvin said, "To make God a momentary Creator, who once and for all finished his work, would be cold and barren, and we must differ from profane men especially in that we see the presence of divine power shining as much in the continuing state of the universe as in its inception." (*Institutes*, 1.16.1)

Scientists talk about natural laws "governing" the universe. Christians who are scientists occasionally slip into using that language as well. From a biblical perspective, however, it is incorrect to say that natural laws "govern." God governs. God created natural laws, and God usually governs creation through the natural laws he designed and created. God can do miracles any time he chooses, but most of the time God chooses to work in consistent ways. As we study God's creation scientifically, we build mathematical models and descriptions of those natural laws which God created and uses.

I should note here that there is, amongst Christians who are scientists, a diversity of views about the ontological status of natural laws. Some Christians like to say that natural laws don't really exist as entities unto themselves. God governs creation, God does this in an orderly way, and natural laws are merely our descriptions of how God governs. Other Christians would say that natural laws are more than mere descriptions. God has gifted his creation, and everything in it, with certain creaturely capacities. These capacities are designed to interact with each other in regular fashions which we call natural laws. They do not operate independently of God, but are dependent upon God for their creation, design, and continued existence. Although there is a real difference between these views, that's really the subject of a whole different talk, and not worth getting into here. The point for now, and the point I make to my students on the first day of class, is the following.

Does a successful scientific description, in terms of natural laws, mean that God was not involved in these processes — at least not in any significant or creative way? Certainly not. God created those natural laws in the first place. God sustains them and is sovereign over them each and every moment. The biblical view is not that God is absent from events which happen by "natural laws;" rather, natural laws describe how God typically governs His creation.

Problem 3: The term "MN" gives credit where credit is not due

What must a scientist believe in order to do science? What are the fundamental philosophical beliefs underlying scientific investigations into the natural world? Historians and philosophers of science have written entire books in answer to those

questions. I will briefly list six points which I believe summarize their answers, acknowledging that this list of six points is, necessarily, a simplification.

Philosophical beliefs which encourage scientific investigation:

- 1) *Events in the natural world typically have (immediate) causes in the natural world.* For example: if a tree falls and a sound is heard, then the falling tree in some way caused the sound. The sound was not caused by some "sound spirit" or other metaphysical entity.
- 2) *A linear view of time.* The universe is not an endless repeating circle, where every event occurs simply because we happen to be passing that particular point on the circle.
- 3) *These causes and effects in the natural world have some regularity across space and time.*
- 4) *These causes and effects can be — at least in part — rationally understood by us.*
- 5) *We cannot logically deduce, from first principles, nature's fundamental constituents and behaviors.* We must use observations and experiments to augment our logic and intuition.
- 6) *Studying nature in this way is a worthwhile use of time and talent.*

Nearly all scientists today hold these beliefs. These beliefs are not scientific. Scientists assume these beliefs are true for philosophical and religious reasons. The success of science supports their validity. They are, nevertheless, philosophical statements which lie outside of science.

With the hindsight of science's success, these beliefs may seem obvious to us. Throughout most of human history, however, these beliefs were not widely held. Historically, how did they arise? Many ancient cultures held some of these beliefs, but not others. Most of the brilliant philosophers of ancient Greece, for example, disdained observations and experiments. They held beliefs about the natural world which relied heavily on logical deduction from what they thought were self-evident first principles.

These particular philosophical beliefs about nature came together at the time of the scientific revolution. Why did the early leaders of the scientific revolution hold these beliefs? Several historians of science have argued they held these beliefs, at least in part, because they held biblical views of the natural world.

Some biblical beliefs about God and nature:

- 1) *Creation is not pantheistic.* It is not filled with "gods" or "nature spirits."
- 2) *Time is linear, not circular.*
- 3) *God is consistent, not capricious, in His governance of nature.* Therefore, there could be regular patterns that we can discover.
- 4) *We are made in God's image and we are made suitable for this world.* Therefore, we have hope that we can understand at least some of God's creation through the gifts He has given us.

- 5) *God was free to create as he wished. We are limited and fallen people.*** Therefore, our preconceptions about how the world should work may not be the same as God's. We must use observations and experiments to learn what God actually did.
- 6) *Nature is God's creation, so it has value and is worth studying.***

A biblical view of God and the natural world motivates the philosophical beliefs listed earlier. A biblical view of God and nature offers us reasons to expect the scientific method to be successful. God can still do miracles, of course. Miracles are exceptional circumstances, when God has extraordinary reasons for doing something unexpected. Most of the time, God — the God described, praised, and worshipped in the Bible — works in consistent ways.

If you asked me to adjudicate which worldview should get to claim "ownership" of science — methodological or otherwise — then I might be tempted to say that a biblical worldview has the strongest claim to ownership. Historically, amongst all the worldviews, the philosophical views necessary for modern science to flourish found a unified expression from biblical theology. Philosophically, it seems to me that a biblical worldview provides a strong warrant for expecting these six philosophical statements to be true — at least as strong a warrant as any atheist could claim from his worldview. (With the success of modern science, it is tempting to think that atheism naturally and necessarily leads to the philosophical beliefs listed above. Not so. Those beliefs follow naturally from an atheism which is wedded to a mechanistic picture of nature. A mechanistic picture of nature, however, was not a common picture of nature before the rise of modern science. A mechanistic picture of nature is motivated by the success of science. Although some atheists had a mechanistic view of nature before the scientific revolution, it is hardly the case that an atheistic worldview, by itself, necessarily leads to such a picture.)

I would not claim that biblical beliefs about God and nature caused the development of science. Historians and philosophers of science are still debating which ideological, social, political, historical, and other factors were most important in bringing about the scientific revolution. Nor would I claim that biblical beliefs inevitably lead the scientific method. It's not that simple. Scholars are still debating which theological beliefs helped and which hindered the development of modern science.

And for ourselves, today, it's not simply the case that a biblical view of God and creation inevitably leads us to believing that science ought to work. The importance of our experience can't be overlooked. Our everyday experience, as individuals and as a community, our education, AND our biblical view of God and creation, all working together in a complex way, give us good reason to expect that the scientific method is the right method for investigating nature.

So I will not claim that Christians "own" the scientific method. No single philosophical or religious worldview can claim primary ownership of the scientific method. The limited set of philosophical beliefs necessary for science (such as those listed above) are

compatible with many (though not all) religious worldviews. People of different worldviews may disagree about why those philosophical beliefs are true. Atheists and Christians, for example, will give very different answers as to why those philosophical beliefs are true. However, by agreeing that they are, in fact, true, scientists of a wide variety of religious worldviews can work side-by-side and reach consensus on scientific questions. That, I believe, is why atheists, Christians, and scientists from many religious worldviews generally reach consensus about scientific methods and scientific results. They agree on a limited set of philosophical beliefs about nature. They disagree about why these beliefs are true, but they agree that they are, in fact, true.

When a Christian employs the scientific method to investigate nature, a biblical understanding of God and nature motivates her belief that she is using the right method. She is not acting "as if God doesn't exist.". She is acting like there is a God—not a capricious God, but the God of the Bible, who made an orderly world and who still governs it in an orderly fashion.

If I need a name for the methods by which scientists seek to understand how creation functions, I prefer the term, "scientific method." I find the term "methodological naturalism" to be misleading theologically, philosophically, and historically. Theologically, it implies God's absence from natural events, which is false. Philosophically and historically, it implies that the scientific method follows more naturally from the worldview of Naturalism than from other worldviews, which is false.

Problem 4: The term "MN" implies that science must necessarily deny miracles

When you start talking about science and God, sooner or later you have to address the issue of miracles. Given that miracles can happen, how should we do science? Should we do science expecting to find evidence of ongoing miracles everywhere we look? Or should we utterly exclude the possibility of miracles when we study creation, always looking for explanations exclusively in terms of natural laws? A biblically informed view of God should warn us against either extreme. Ordinarily, God governs his creation in consistent ways. God's consistency gives us hope and confidence in our search for universal natural laws. But God is sovereign over those laws. God can also surprise us with unusual, unexpected events.

Is it possible to scientifically prove that a miracle happened? Or does science rule out any possibility of miracles? In various discussions I have had, with Christians and non-Christians—especially on the issue of origins of life on earth—I given some thought to this question. As a Christian, I believe that God can perform miracles, and that if you put such an event under scientific scrutiny, a miracle might appear to be a scientifically unexplainable. But while I accept the possibility of such miracles, an atheist will reject the possibility of miracles. Yet we have to work together as scientific colleagues, analyzing the same data. So how would that work? What happens when scientists of different religious worldviews encounter a puzzling event? Here is the answer I have come up with:

Is it possible to scientifically prove that a miracle happened? Or does science rule out any possibility of miracles? A practical understanding of what science can and cannot do should warn us against either extreme. When faced with a puzzling event, science can neither prove nor disprove that a miracle occurred. What science can do is this: it can try to understand the physical conditions before, during, and after the event, and it can try to determine what effect known natural laws could have had. Based upon that knowledge, science can attempt to build an empirical model, using known natural laws, for how the event could have happened.

Attempts to build empirical models of puzzling events meets with varying kinds of success. As scientists study the initial conditions, final conditions, and relevant natural laws, they could reach three general types of conclusions:

1) Explained event. Sound empirical models predict that known natural laws can account for the event. (There might still be some puzzling features, but the majority of the event is well understood.)

It is worth mentioning again the biblical view that scientifically explained events are just as much dependent upon God's governance as scientifically unexplained events. In addition, even when empirical models successfully explain how an event could happen, that does not necessarily mean that the model correctly describes how the event actually happened.

Sometimes, "explainable" events occur at special times and places, in ways that have special religious significance to a person or a group of people. The argument can be made that such "coincidental" events must have some "unexplainable" (supernatural) component. Science cannot answer that question positively or negatively. The most that science can do is attempt to determine the relative probability (infrequency) of the event, possibly taking into account known initial conditions. In determining whether or not a "coincidental" event had a supernatural component, one must go beyond science to consider historical, philosophical, and religious questions. (*e.g.* Was the event's timing and location predicted beforehand? How soundly does the event fit within an established theological framework? Was there a special revelation accompanying the event?)

2) Partially explained event. Our empirical models are not sufficiently thorough to explain the event entirely. However, based upon what we have done so far, we believe that known natural mechanisms are sufficient to account for the event. We believe that future improvements in knowledge, more elegant models, and more computing power will eventually allow us to prove that the event is "explainable."

3) Unexplained event. No known natural laws can account for this event. In fact, there are empirically sound reasons for ruling out any models in terms of known natural laws.

(Some objects or events indicate intelligent crafting. The categories "explained" and "unexplained" become problematic in such cases. For example, a paleontologist might determine that the breakage patterns on the edges of some stones are unexplainable in terms of ordinary natural laws (at least, not with any significant probability). However, if hominid bones are found in the same area, the paleontologist might reasonably conclude that the stones were crafted to be tools. In this model, the intelligent activity of hominids acts as a special kind of "natural mechanism." A similar argument is made in the search for extraterrestrial intelligence. If a sufficiently complex repeating radio signal is discovered, the case can be made that no natural mechanism could produce the complex pattern except for the special type of natural mechanism of intelligent activity. In the debate over biological evolution, some people have pointed to the analogous features between biological life and intelligently crafted objects, thereby arguing that biological life was crafted and assembled by an intelligent agent. This argument is not strictly speaking scientific. It is a philosophical argument. Philosophical arguments have a legitimate role, and sometimes a positive role, in science. They can be used to persuade, as a starting point for marshaling scientific arguments, and a starting point for formulate testable hypotheses. The extent to which this philosophical argument is convincing is, obviously, a point of ongoing debate.)

For any particular event, there may be some debates in the scientific community as to whether it is explained, partially explained, or unexplained. Even when there are debates, however, it is common for a great majority of scientists to agree. For example, most scientists would agree that supernovas are "explained" events. Most would agree that the development of animals from single-celled zygotes into mature adults falls into the category of "partially explained." A small number scientists argue that the origin of first life on earth is unexplainable in terms of known natural laws; but most scientists argue that it should be considered partially explained. Most agree that the source of the "Big Bang" is unexplained in terms of known natural laws.

How do scientists deal with "unexplained" events? There is usually no consensus. Individual scientists could reach (at least) five different conclusions about the cause of a scientifically unexplainable event:

- A) An as-yet **unknown natural law** is responsible for the event.
- B) A **supernatural** event occurred. (The event was caused by an intelligent being of an entirely different "reality" than our universe.)
- C) **Super-human technology** brought about the event. (The event was caused by intelligent beings who are contained in and limited by our universe, but with superior technology.)
- D) A very **improbable** event simply happened.
- E) A very improbably event simply happened, but this isn't so surprising because there are **many universes** and we just happen to live in the one where it happened.

A search through popular books and articles written by scientists will turn up examples of each of these five types of conclusions.

Although these five conclusions are, philosophically and religiously, very different from each other, they play virtually identical roles in scientific studies. Empirical science cannot distinguish between these five possibilities. Historical, philosophical, and religious arguments are the decisive factors in each scientist's conclusion.

Although science cannot decide on the best philosophical conclusion for a scientifically "unexplained" event, science *does* play a vital role in deciding whether an event belongs in the category "partially explained" or "unexplained." Philosophical and religious arguments can also properly play some role in these debates. In the boundary areas between "partially explained" and "unexplained" events, scientific data, scientific intuition, philosophical and religious expectations can meet in the same arena. For example, an atheistic scientist might be motivated to work hard to push an "unexplained" events into the "explained" or "partially explained" category. This effort might lead her to uncover new natural laws, sooner than scientists who don't share her atheistic philosophy. Alternatively, a scientist with strong religious reasons for believing that certain events are supernatural can marshal scientific data to show that some events are truly "unexplained" rather than merely "partially explained." This effort might lead her to uncover flaws in currently-accepted empirical models sooner than scientists who don't share her religious beliefs.

(Both of these biases could be pushed to the extreme, to the detriment of science. One could imagine a scientific community so obsessed with finding naturalistic explanations for unexplained events that it wastes vast resources on unproductive pursuits which yield no secondary benefits. One could also imagine a scientific community so complacent about supernatural explanations (or, for that matter, super-human or many-universes explanations) that it makes virtually no effort to search for new natural explanations for puzzling events. Fortunately, the present-day scientific community does not seem to fit either extreme. Moreover, it should be noted that scientists from every philosophical and religious persuasion spend most of their time trying to push events from the "partially explained" category into the "explained" category.)

Scientific conclusions are tentative. Events which are deemed "explained" or "unexplained" today could change their status with the discovery of new natural laws or better empirical models. Ultimately, the development of new empirical models plays a decisive role in determining whether a "partially explained" event is "explained" (if the improved empirical models are successful) or "unexplained" (if the improved empirical models argue convincingly against scenarios involving known natural laws). While these new empirical models are still being developed, philosophical and religious arguments can play a legitimate role in persuasion and, to some extent, in formulating testable hypotheses.

Over the centuries, we have seen many examples of science attempting to construct ever-better empirical models of partially explained events. In many cases (*e.g.* supernovas), decades of scientific work have resulted in fairly complete and detailed explanations in terms of known natural laws. Occasionally science has come to the opposite conclusion

— that although some event definitely happened, no known natural laws can account for it (e.g. the cause of the "Big Bang.") Most of the time, modern science gives us incomplete answers. Most of the time, scientific investigation tells us that some aspects of an event can be understood in terms of known natural laws while other aspects are still puzzling — puzzling, but showing great promise for future discoveries.

So to those who are eager for science to find evidence for God's miraculous actions in nature, I would say the following: Scientists make progress by building empirical models and by looking for natural laws and natural mechanisms to explain as many aspects as possible of the system they are studying. Scientists seek to determine precisely which aspects of a system can be explained in terms of known natural mechanisms and which aspects cannot. By this process, new natural mechanisms are sometimes discovered; old models are refined and sometimes discarded as being inconsistent with the data.

A great many scientific puzzles remain. There are many scientific questions, such as the development of the first life on earth, where scientists cannot yet build a model, using known natural mechanisms, which plausibly explains many features of the data. It can be tempting for Christians to see these scientific puzzles as potential evidence for God's existence and miraculous intervention in the history of the universe. God is free to act miraculously, free to act in ways different from his ordinary governance of creation. If God so choose, God could perform miracles which appear to us to be scientifically puzzling or unexplained events. However, a biblical understanding of God's governance should also warn us from too quickly embracing any particular scientific puzzle as potential evidence of miracles.

A biblical picture assures us that God governs creation in consistent and orderly ways, and God gives us the gifts we need to study his creation and partially understand it. Scientists of many religious worldviews can work side-by-side and reach consensus about the natural mechanisms at work in the history and the present functioning of the world. The fact that Christians and non-Christians can work side-by-side in science should give Christians, not a sense of fear, but a sense of joy and gratitude. As John Calvin said, "If the Lord has willed that we be helped in physics, dialectic, mathematics, and other like disciplines, by the work and ministry of the ungodly, let us use this assistance. For if we neglect God's gift freely offered in these arts, we ought to suffer just punishment for our sloth." (*Institutes of Christian Religion* 1.16.1)

Science, by itself, does not require one to expect to find natural explanations for every event. Scientific progress is made by studying puzzling events and attempting to explain them in terms of known natural laws (or sometimes, in terms of new natural laws which are compatible with older, well-established laws). When these scientific models are successful, their success does not exclude God. Instead, it illuminates God's governance of creation. But science also makes progress when the best possible scientific models, employing known natural mechanisms, are shown to fail — when an event is shown to be unexplained in terms of known natural laws. Science can do this, and it does do this occasionally. When this happens, it might indicate that God performed a miracle during

that event — but not necessarily. It might also mean that God brought about that event by some unknown natural laws or processes which we might yet discover.

It is tempting to think that we are more faithful to God if we look for evidence of miracles in every scientific puzzle. But hunting for miracles is not necessarily the most faithful approach to studying God's creation. Hunting for new scientific explanations, in terms of natural laws which God created and sustains, can be equally God-glorifying — and in many cases may be theologically more defensible. Every time we solve a new scientific puzzle, we are not taking territory away from God's control; rather, we are learning more about how God typically governs his creation. Every time we learn a new scientific truth about God's creation and the gifts which He gave it, it should prompt us all the more to worship the Creator.

Part 2: The scientific study of human behavior

The methods and the results of the natural sciences are increasingly being incorporated into the study of the most complex things in creation — human brains and human behavior. As Sidney Harris reminds us in his cartoon, the same atoms and the same natural laws at work everywhere else in creation are also at work in human brains. So we should expect the scientific study of human behavior to be a fruitful, but also a very complex, area of scholarship.

Neuroscientists today are not just interested in the brain, they are interested in the mind. Neuroscientists want to discover the physical, biological and neurological events in the brain which correspond to mental events such as emotional states, storing and retrieving memories, decision-making, consciousness, and even religious experience. For example: in 1997, V.S. Ramachandran and other scientists at UC San Diego reported that one part of the human brain is especially active during intense religious experiences. It is hardly considered news anymore when scientists locate specific brain regions that are especially active when we read words, or solve equations, or listen to music. Finding a "religion region" in the brain, however, caught the media's attention. Experiments were performed on three patients suffering from a type of temporal lobe epilepsy in which seizures are often accompanied by intense mystical or religious experiences. Patients were sometimes preoccupied with mystical thoughts between seizures as well. The scientists found that increased activity in a particular brain circuit was associated with a heightened involuntary response to religious symbols and words.

It should not surprise us that our brains show specific activity during religious experiences. Christians do not (or should not) believe that our religious experiences occur entirely within immaterial souls, of which our bodies are mere vessels. Our whole being — soul and body, mind and brain — should respond to God. Nor do our brains have a singular "God module" as the site of all religious activity. Our relationship to God is personal and complex, not limited to just one kind of experience. No doubt many parts of our brain participate in many kinds of religious experiences. The temporal lobe, for example, is known to be important for intense emotional experiences. We should expect

it to participate in intense religious experiences. It is certainly intriguing that a particular sub-region is rather specialized, at least in these patients, for religious imagery.

The scientific conclusions from this experiment are interesting, but somewhat limited. The religious conclusions we can draw are almost non-existent. This experiment did not prove that God exists and communicates with us. Neither did it prove that God doesn't exist, and that religious experiences are reducible to nothing but brain chemistry. The scientists themselves cautioned against any such sweeping conclusions. After all, our experience of sunlight causes electrical and chemical changes in our brains, but it does not follow that the sun is reducible to nothing but brain chemistry. The same is true of religious experiences.

One thing this experiment showed very clearly is that the media and the general public are very interested in scientific studies of human behavior. We can expect that people will use the results of these experiments, and others like them, as arguments in favor of their worldview. This is all the more reasons why Christians must be involved in this field of scholarship.

Christian beliefs and scientific study: dealing with apparent conflicts

Scientific study of human behavior is a good thing. It's something in which Christians ought to participate. However, we can also expect there will be many occasions in which someone claims, on the basis of science, to have discovered something about human nature which appears to conflict with Christian beliefs about human nature. We have to be ready for these apparent conflicts. These apparent conflicts will arise in a variety of ways.

Sometimes, **good science gets appropriated by bad philosophy.** For example, the study about religious experiences and the brain, which I just cited, is some pretty good science. Someone could easily take that science, and then add the philosophical claim that these studies prove that religion is "nothing but" brain activity and that, therefore, God doesn't exist. In situations like this, Christian scholars need to separate the good science from the flawed philosophical attachments.

Sometimes, **good science conflicts with bad theology.** In those cases, Christian scholars must work to correct theological mistakes.

Sometimes, **bad science conflicts with good theology.** Here's a cartoon to illustrate what I mean.

[[*Calvin and Hobbes* cartoon by Bill Waterson:

Calvin: "I've concluded that nothing bad I do is my fault. Being young and impressionable,

I'm the helpless victim of countless bad influences! An unwholesome culture panders to my

undeveloped values and pushes me to maleficence. I take no responsibility for my behavior!

I'm an innocent pawn! It's society's fault!"

Dad: "Then you need to build more character. Go shovel the walk."

Calvin: "These discussions never go where they're supposed to."]]

In this cartoon, Calvin notes that societal influences often push young people to do bad things. This is common sense. It's also a well-established scientific fact. Sociologists and psychologists have gathered lots of data on how society influences behavior. But Calvin is only quoting part of the story. His dad adds the other half of the story. Good character, developed through good habits, make it possible for people to resist, to some degree, society's bad influences. This, too, is well-known.

So in a situation like this cartoon, when people draw conclusions upon flawed or partial science, perhaps the best thing that Christian scholars can do is to call it what it is — bad science. You could tell a person like young Calvin in this cartoon that his conclusions conflict with Christian theology. That won't do much good if your audience isn't a Christian audience. Rather than attack bad science with good theology, it would be more effective, it seems to me, to attack bad science with good science.

I want to discuss one more source of apparent conflict — good science with ambiguous implications. In other words, while the scientific work appears to be sound, the implications of the scientific work might or might not be in conflict with Christian theology, depending upon certain other untested assumptions. I think it would be helpful if I give an example of what I mean.

David Sloan Wilson studies sociobiology and evolutionary psychology. Lately, he has been working on the evolutionary psychology of religion. In July of 2001, he spoke at a conference which I attended and presented an early draft of his work, which I will summarize here.

In the field of evolutionary psychology, there are several competing hypotheses for why human beings are religious. One hypothesis is that religion is purely a cultural phenomenon, with no meaningful genetic basis. A second hypothesis is that our genes do tend to make us religious, but merely as a byproduct of genes for other mental attributes such as intelligence, creativity, etc. A third hypothesis is that, back in humanity's evolutionary past, individuals with genes which made them religious actually produced more offspring than individuals without those genes, because religious dispositions somehow made them more successful than individuals without religious dispositions. A fourth hypothesis is that genes for "religion" don't make individuals more competitive, but rather make groups of individuals more competitive. So back in humanity's evolutionary past, groups of humans who are religious will out-competed and out-reproduced groups of humans who were not religious.

David Sloan Wilson favors the fourth hypothesis. In order to look for evidence in favor of that fourth hypothesis, he studies modern religions. Lately, he has concentrated on the city of Geneva at the time of John Calvin. Wilson gathers historical evidence that John Calvin's teachings did much to turn the troublesome, quarrelsome city of Geneva into a smoothly functioning, successful city. The teachings of Calvinism did this by instituting

an effective system of group control over individual selfish behavior and by motivating its adherents to subordinate their selfish goals to the common good.

For the purposes of this talk, I'm not so much interested in Wilson's hypothesis that human beings evolved to become religious because of group competition effects. Rather, I'm interested in his analysis of the city of Geneva in John Calvin's time. Let's assume, for the moment, that Wilson's historical analysis is essentially correct. Wilson's analysis suggests that Calvinism was successful in Geneva, and spread beyond Geneva, largely because Calvinism was so good at uniting the city socially. Admittedly, Wilson's work is preliminary. It needs further analysis and further evidence to support it. But let's assume for the moment that he did a good job, and that his analysis is essentially correct.

I can think of at least two ways of interpreting Wilson's results. One interpretation is a strong claim that Calvinism's success as coordinating collective action in Geneva is what caused many of its citizens to come to believe that Calvinism was true. In other words, the success of Calvinism at promoting social order is sufficient, at a neuro-psychological level, to cause many individuals to believe the truth of Calvinism irrespective of whether or not Calvinism is actually true. This interpretation seems to conflict with Christian theological beliefs that the work of the Holy Spirit is necessary if someone is to become a believing and faithful Christian. This strong claim might not necessarily be in conflict with Christian theology if we remember that the Holy Spirit can work through natural mechanisms as well as through miraculous mechanisms. In order to sort out this difficult issue, we would need to do a lot of careful thinking about what we mean, theologically, when we say that the Holy Spirit's work is necessary if someone is to become a believing and faithful Christian, and we would need to think about the various ways in which the Holy Spirit could accomplish this.

There is, however, another way to interpret Wilson's results. A weaker claim compatible with Wilson's results is that when Calvinism (or any religion) functions well at coordinating group action, then we would expect, in general, more individuals to come to believe that this religion is true. In other words, there is simply a correlation between the success of a religion at promoting collective action and numbers of individual people coming to believe that religion is true. This second interpretation, it seems to me, is easily compatible with Christian theology. Indeed, St. Paul writes that when Christians love each other, this is a powerful witness which the Holy Spirit can use to convince people of the truth of the gospel.

So we have two ways to interpret Wilson's scientific work. One is a strong claim that a religion's success at coordinating group activity causes individuals to come to believe that religion regardless of its truth. Second is a weaker claim that there is simply a correlation between a religion's success at coordinating group activity and the number of individuals who come to believe that religion. The stronger claim seems difficult Christian theology, though perhaps not insurmountable, while the weaker claim is easily reconcilable with Christian theology. Both claims are valid interpretations of Wilson's work, given the present level of scientific knowledge. What should a Christian scholar do in such a situation? First of all, simply realizing that there are these alternative interpretations of

the scientific data is an important scholarly contribution in itself. Secondly, it could be pointed out that the strong claim makes certain scientific claims which are, as yet, unsupported by any scientific evidence. The stronger claim is that a religion's social success causes, at a neuro-psychological level, individuals to come to believe that religion regardless of the religion's actual truth. It is a scientific claim which would need to be tested at the neuro-psychological level. At the moment, there is no evidence to support the one claim over the other. In a situation like this, it seems to me that the best thing that Christian scholars can do is to point out to the scholarly community that further scientific work is needed to support one interpretation over another, while at the same time working out the theological implications of both interpretations.

Conclusion:

The term "methodological naturalism" is a poor term for describing the scientific method. The truth lurking behind the term methodological naturalism is this: Christians ought to investigate creation expecting to find regular patterns of cause and effect within the created order — patterns which are, at least in part, discoverable through observation and experimentation. This scientific work is helping us gain insights into the most complex parts of creation: human brains and human behavior. It is inevitable that people will use and misuse the results of this science to argue for their worldview beliefs. Christian scholars will need to help separate the good science from the bad science, help separate good science from bad philosophical attachments, and point out when good science is open to multiple interpretations requiring further investigation.