

Truth & Explanation

Summary: The covering-law model of explanation is flawed, and recognized to be so. Nancy Cartwright critiques its emphasis on laws, arguing that laws of nature are exceedingly rare and that even the so-called 'laws' we have discovered are really water-down versions of the real thing. Explanation must therefore march on without laws.

Preamble

¶ 3.0.0, 3.0.1, 3.0.2, 3.0.3, 3.0.4, 3.0.5, 3.0.6

Nancy Cartwright

Why Laws Are Scarce

¶ 3.1.0, 3.1.1, 3.1.2, 3.1.3, 3.1.4, 3.1.5, 3.1.6, 3.1.7, 3.1.8, 3.1.9

Explanation Without Laws

¶ 3.1.10, 3.1.11, 3.1.12, 3.1.13, 3.1.14, 3.1.15, 3.1.16, 3.1.17, 3.1.18

¶ 3.0.0

W. T. Stace memorably—and polemically—remarked that science explains nothing, that it has never—and indeed cannot—answer why anything happens. Science simply uses mathematics to "state, in an abbreviated and generalized form, what happens." [\[bookmark\]](#)

¶ 3.0.1

Stace's uncompromising view stems from his hardline stance on causation, from his phenomenalism, which mandates an unbridgeable chasm between human sense perception and those aspects of the physical world that cannot be experienced. [\[bookmark\]](#)

¶ 3.0.2

Nancy Cartwright advances a more orthodox view about science and explanation, namely, that science does in fact explain how the world works. Her ire is targeted at a particular account of explanation, namely, the covering law model. [\[bookmark\]](#)

Definition

Covering-law model says "that one factor explains another just in case the occurrence of the second can be deduced from the occurrence of the first given the laws of nature." — *Nancy Cartwright*

¶ 3.0.3

The **covering-law model (CLM)** holds that an event or occurrence is explained when we have a law that covers it, e.g., we can explain how babies come to be born when we understand the laws of genetics. Or we can explain how too much exposure to the sun causes cancer when we understand the laws that govern ultraviolet radiation and human tissue. [\[bookmark\]](#)

¶ 3.0.4

But this makes explanation utterly dependent upon laws, because without laws governing events, there can be no explanation. Put another way: laws explain. No laws, no explanation. [\[bookmark\]](#)

¶ 3.0.5

So does that mean we couldn't explain where babies came from before the discovery of genetic material? Or that we can't explain skin cancers in terms of exposure to the sun unless we have knowledge of the appropriate laws? [\[bookmark\]](#)

¶ 3.0.6

What if there are no laws? Does that mean there are no explanations?[\[bookmark\]](#)

3.1 Nancy Cartwright

¶ 3.1.0

In *The Truth Doesn't Explain Much*, Nancy Cartwright highlights an assumption made by covering-law theorists, namely, **that nature is orderly and law governed**. On this view, whatever happens in the universe does so in accordance

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with some law or collection of laws, e.g., gravity determines the movements of planets. [\[bookmark\]](#)

¶ 3.1.1

Cartwright rejects this assumption. She thinks that natural objects, e.g., tables, chairs, genes, atoms, etc., are governed by *some* laws and a "handful of general principles," but the behaviors of these objects are not completely determined. Indeed, "What happens on most occasions is dictated by no law at all."
[\[bookmark\]](#)

¶ 3.1.2

Even if opponents reject what Cartwright admits is an "extreme metaphysical possibility," i.e., that the world is not deterministic, she contends that scientific laws are few and far between. In other words, even if there are *some* scientific laws, there aren't many. [\[bookmark\]](#)

¶ 3.1.3

Thus, if we want to hold on to the commonplace practice of explaining things—and not just describing them, ala Stace—we **must separate the scientific activity of discovering laws** (i.e., finding out what is true) **from explaining how the world works.** [\[bookmark\]](#)

¶ 3.1.4

But why does Cartwright think scientific laws are scarce? Hasn't science discovered scores of laws of nature that explain, e.g., the orbits of planets, the cause of Down Syndrome (an extra copy of chromosome 21), the [cause of earthquakes](#) (underground rock breaking across a fault), etc. [\[bookmark\]](#)

¶ 3.1.5

Cartwright's answer is that **most of what we call laws of nature are no such thing.** They are so-called *ceteris paribus laws*, which Cartwright provocatively tabs as, not merely lacking the status of laws, but as false. [\[bookmark\]](#)

Definitions

Ceteris paribus 'laws' (literally meaning "other things being equal") hold only under special conditions, usually ideal conditions.

Law: A descriptive principle of nature that holds in all circumstances covered by the wording of the law. There are no loopholes in the laws of nature and any exceptional event that did not comply with the law would require the existing law to be discarded or would have to be described as a miracle.

¶ 3.1.6

The covering-law model of explanation requires that laws be exceptionless. Indeed, that is just what the term law means. [\[bookmark\]](#)

¶ 3.1.7

For a law of nature to be able to explain a new case, we must know that the law is always true. If the law sometimes holds and sometimes doesn't, then whether it applies to the new case will be uncertain. [\[bookmark\]](#)

¶ 3.1.8

For example, if the laws of evolution state that species evolve when natural selection acts on variations within populations—e.g., fast gazelles out reproduce slow gazelles—then when we come across a new animal species, we can explain its evolution in terms of these laws. If evolution sometimes acts via natural selection and sometimes not, then its explanatory usefulness is suspect.

[\[bookmark\]](#)

¶ 3.1.9

Cartwright's point about ceteris paribus 'laws' is that they are either (1) known to have exceptions, which means that, as laws, they are false; or (2) the range of cases that they do cover is very, very narrow, so they can't do much explaining outside of this narrow range. [\[bookmark\]](#)

Explanation Without Laws

¶ 3.1.10

So why don't we get rid of ceteris paribus laws if they are so flawed? [\[bookmark\]](#)

¶ 3.1.11

The covering-law theorists think that the ceteris paribus laws will be replaced by genuine laws as science progresses. So even though all our laws of gravity are ceteris paribus laws because no single version of the law holds in all domains, i.e., at quantum and non-quantum scales, we still speak of the law of gravity as a way to indicate that we think there is such an exceptionless law (and that we will discover it). [\[bookmark\]](#)

¶ 3.1.12

Cartwright thinks this is, in general, a bad bet because even when we have fairly reliable laws about particular domains, e.g., the relationship between DNA and heritable traits such as eye color, we don't have reliable laws that cover the intersections of domains, e.g., ones that describe the relationship among DNA, the prenatal environment, brain chemistry, and psychological traits such as introversion and extroversion (or tendency toward criminality). [\[bookmark\]](#)

¶ 3.1.13

Whatever ceteris paribus laws we have for intersecting domains will never achieve genuine law status, argues Cartwright, because untangling all the causes is just too complicated. There are bound to be exceptions. [\[bookmark\]](#)

¶ 3.1.14

For Cartwright, the benefit of ceteris paribus laws is that they guide us toward understanding the world by demonstrating fruitful patterns of explanation in simplified ideal cases that can then be applied to more complicated ones. [\[bookmark\]](#)

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¶ 3.1.15

For example, if we learn that exposure to *specific levels* of lead-based paint during a *specific time-frame* within a pregnancy results in a *specific quantifiable increase* in the likelihood of the child developing *specific behavioral problems* (which is a *ceteris paribus law*), then we can use this pattern of explanation—i.e., seeking the cause of developmental difficulties in children by looking at exposure to noxious chemicals during pregnancy—to explain why some populations of children are more likely to have problems with aggression, attention, etc. [[bookmark](#)]

¶ 3.1.16

If we are covering-law theorists, we will never be able to explain the higher incidence of behavioral problems among children whose mothers lived in apartments coated in lead-based paint—even when confronted with overwhelming evidence—because the likelihood of discovering exceptionless laws that describe the phenomena are minuscule. [[bookmark](#)]

¶ 3.1.17

Thus, when Cartwright contends that "the truth doesn't explain much," she is pointing out that laws can't explain the example above, or explain why people who live in urban areas have higher asthma rates, etc., because laws covering those domains don't exist. [[bookmark](#)]

¶ 3.1.18

But just because laws are rare doesn't mean that explanations should be, too. [[bookmark](#)]