

## DETERMINISM

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The abstract noun "Determinism" functions like a family name for a group of philosophical doctrines each of which asserts that, in some sense or other, events occur *of necessity* when and as they do. Different members of the family stake out different doctrinal territories, some construing the necessity involved in purely logical terms, some in causal terms, and still others in terms of predictability. Each has to do with necessary connections between past, present and future.

Much confusion can arise from failing to distinguish one member from another. Much more can arise when they are taken to be identical with, or somehow allied with, other less defensible doctrines: doctrines like fatalism and predestination, for example. And still further confusion can arise when one or the other is taken to imperil such cherished beliefs as that in our own free will. It is important, therefore, to sort out the differences between them. We need to comply with the philosophical maxim: "Be careful with concepts and the words in which we express them." Sadly, there are some who bandy about the terms "determinism" and "deterministic"--often using them as terms of abuse--without saying exactly what they mean by them.

Three main members of the determinist family call for careful attention.

The most basic is Logical Determinism, which asserts that future events (i.e., changes in states of affairs), like past events, are determinate and that statements about them are determinately true or false. It claims that *of logical necessity* if a statement about the future is true, then the events it is about will occur. It claims that the future will be what it will be, just as the past was what it was. These claims are evident tautologies. Yet, despite its evident logical credentials, this version of determinism has been called into question, often on the grounds that it seems to imply fatalism.

The term "Determinism" is usually taken to refer to the doctrine of Causal Determinism. This holds that future events are caused by, determined by, or necessitated by, present ones, and that these in turn are caused by past ones. It holds that nothing happens by "pure" chance. Causal Determinism is an *ontological* doctrine: it makes claims about the contents and character of reality, holding that events that occur within it are connected in a temporal chain of cause and effect.

Unfortunately, Causal Determinism is often confused with Predictive Determinism, the view that if one *knew* in precise detail what events and states of affairs had occurred in the past, one could thereby predict present and future events and states of affairs. The French mathematician and astronomer, Simon-Pierre Laplace, couched his concept of determinism in these terms, envisaging a hypothetical intelligence so vast that its knowledge

of the laws of nature and the precise state of the universe at any given time would enable it to predict any future state of the universe with complete precision. Yet it is clear that this version of determinism adds an *epistemic* claim (a claim about our the knowability of the world) to the ontological claim made by Causal Determinism. They are by no means identical.

Predictive Determinism presupposes the truth of Causal Determinism; and that, in turn, presupposes the truth of Logical Determinism.

## LOGICAL DETERMINISM

Logical determinists are committed to a realist account of truth. A statement is true if and only if reality is as the statement says it is. A statement's truth or falsity, therefore, does not depend on our perceptions or conceptions of reality, let alone on our knowledge (or lack of knowledge) of reality. By definition, there is only one reality (only one world) though there are many different conceptions of it. It is by virtue of this "correspondence" between true statements and the way the world is that logic gets its grip on reality. Hence Ludwig Wittgenstein claimed that logic is not just a body of man-made doctrine but is a "mirror image" of the world.

Logical Determinists insist that the laws of logic apply to *all* statements, including statements about the future: e.g., "A huge asteroid will destroy the earth in the year 2020." Logical Determinists hold that the Law of Identity (If P then P) shows that necessarily if this event is going to occur in 2020 then it will occur at that time; that the Law of Excluded Middle (Either P or not-P) shows that necessarily it will either occur or not occur in 2020; and that the Law of Noncontradiction (Not both P and not-P) shows that it is impossible for it both to occur and not to occur in 2020.

### Objections to Logical Determinism

Some people would object to the claim, on which the realist theory of truth is based, that there is only *one* reality. Such an objection is fostered by postmodernist and relativist claims about each of us having his or her "own" reality, and hence that there are *many* different realities. It is doubtful, however, whether this sort of talk cannot be translated without loss of meaning into talk of many different conceptions or beliefs about the single reality that comprises all that was, is, or will be, the case.

Others would object to the realist account of truth, professing themselves to be deeply puzzled by the notion that true statements "correspond with" reality. But truth need not be explained in terms of correspondence. It suffices to say that a statement has the property of being true just when things are as it says they are. That formulation seems much less mysterious since it focuses on the *conditions* in which a statement is true as opposed to wrestling with the abstract question "What is truth?" It lets us understand what truth is by concentrating on our use of the predicate "is true" rather than on the abstract

noun "truth." The conditions under which a statement has the property of being true are different from the conditions under which we can *know* a statement to be true. Truth is not the same as verification (knowledge of truth). If it were, it would be absurd to suppose that there are undiscovered truths about the universe, awaiting discovery in such realms as the natural sciences, mathematics, or logic. It would be to suppose that we already know all the truths there are to know.

The notion that logic is a reflection of the basic structure of reality has also come under attack by those who suppose logic to be nothing more than a man-made doctrine about relationships between statements in human language. There isn't just one logic, they say, but many. We can invent new logical notations, including ones that abandon such traditional laws as the Law of Excluded Middle. That "law" allows only two truth-values (being determinately true and being determinately false) with no allowance for intermediate truth-values. Hence, in order to escape from the threat of Fatalism that Logical Determinism poses in the minds of many, some logicians have devised three-valued logics, allowing a statement to be neither determinately true nor determinately false but, in some sense or other, "indeterminate."

Formal systems for these and other multi-valued logics can indeed be devised. But the question then arises as to the precise *meaning* to be attached to "indeterminate". In what sense of the word should we describe the statement that an asteroid will destroy the earth in 2020 as indeterminate? Can "indeterminate" coherently be understood as meaning anything other than "not known to be true or known to be false"? If not, then a defender of the Law of Excluded Middle can reply that the proponent of these alternative logics is confusing truth and falsity with our knowledge of truth and falsity.

Similar questions can be asked about the proposal that we should adopt some non-classical logic in order to handle problems in quantum theory. Is quantum "indeterminacy" to be construed in terms of anything more than a failure of our attempts to ascertain what the *determinate* state of a quantum system happens to be at a single point of time?

## CAUSAL DETERMINISM

Logical Determinists stake their ground on the truths of logic: truths that are said to be truths of reason, truths that we can come to know *a priori*, i.e., without needing to appeal to experience. By way of contrast, Causal Determinism--roughly, the claim that the Causal Principle "Every event has a cause"--makes a claim that we can certify, if at all, only *empirically*, i.e., only by appeal to experience.

But is Causal Determinism in fact true? Certainly, our everyday experience suggests so. "Things don't just happen", we say, meaning that things don't happen by so-called "pure chance". Science, as commonly conceived, tries to

investigate the unknown causes of various kinds of phenomena: the causes of asteroid collisions, the causes of global warming, the causes of physical and mental illnesses, and so on. That is to say, science tries to discover hitherto unknown general truths (laws of nature) about how the universe works.

In principle the laws of nature seem to apply universally: not just to inanimate objects but to animate ones as well. Including human beings. The more we discover about the mechanisms that make our bodies and minds work as they do, the more our behaviour yields to explanation in terms of the interplay of a complex network of causes. Can *all* our behaviour, mental as well as physical, be so explained? Are we just a product of nature and nurture? What are we to make of free will?

Belief in the universal reign of causality came under threat during the early 1900s with the development of quantum mechanics, the study of the behaviour of the elementary constituents of the physical universe. Niels Bohr had conceived of atoms as being like miniature solar systems each with electrons spinning around a central nucleus in much the same way as the planets and asteroids revolve around the sun. But whereas in the case of the planets and asteroids we have been able, ever since Johannes Kepler and Isaac Newton, to formulate causal laws governing their behaviour, in the case of electrons supposedly "spinning" around the atomic nucleus, we have not. Quantum theory, it turns out, doesn't yield strict causal laws about the behaviour of the "ultimate" constituents of the universe. At best it yields only probabilistic estimates of how they will behave. Does this show that Causal Determinism is false? Or doesn't it?

### **Objections to Causal Determinism**

Many thinkers think that the doctrine of Causal Determinism imperils the idea that we have free will. Indeed, it is often simply taken for granted, by those who haven't thought carefully about what "free will" means, that the two are logically incompatible. How can one be free, it is asked, if everything one does is determined by causes lying in the past? We cannot make the past other than it is. So if our present and future actions are necessitated by past causes, we can't be free to do anything other than what those causes dictate that we will do. But we *are* free. Therefore, our free actions can't be caused. So goes the argument of those subscribing to the Libertarian's so-called "contra-causal" account of free will.

Some determinists agree with the Libertarians that the ideas of free will and Causal Determinism are incompatible. But far from concluding that the doctrine of Causal Determinism must give way, they conclude that it is our beliefs in free will and responsibility that have to be abandoned. No-one is ever *really* free or *really* responsible, they say. On their account, criminals deserve therapy and treatment, not blame and punishment. Such determinists are known as Hard Determinists.

Many philosophers, however, say that both the Libertarians and the Hard Determinists have given a mistaken account of the conditions in which we are held to be free and responsible. On an alternative account, a person is free to act (roughly speaking) if he or she acts as he or she chooses, and does so without constraint or impediment. Only in those conditions can we properly hold people responsible. Such philosophers are known as Compatibilists. Many well-known philosophers--Locke, Hume, J. S. Mill, F. H. Bradley, Bertrand Russell, Moritz Schlick, and A. J. Ayer, for example--have taken this position. A Compatibilist can regard the question whether Causal Determinism is true or false as an open one, one that may yet be settled by further empirical inquiry. Some compatibilists, however, stick to their belief in universal causality. They are known as Soft Determinists.

Given this range of well-argued positions taken by philosophers on the issue of free will, it is naive to simply assume--as so many people do--that there are only two alternatives in the dispute: belief in Causal Determinism, on the one hand, and belief in free will, on the other.

Sadly, even sophisticated thinkers from disciplines outside Philosophy may share this simplistic assumption. One of the founders of quantum physics, Werner Heisenberg, claimed that his newly discovered Principle of Indeterminacy opened the door for a belief in free will. How a lack of causality at the quantum level could be identified with responsibility-conferring freedom, he didn't explain. Nor did he explain how we can be responsible for choices that occur, not from causal necessity, but just by *sheer chance*. The notions of freedom and responsibility seem as out of place in a wholly indeterministic universe as they seem to be in a deterministic one. Little wonder that Compatibilists insist that these notions, when carefully analysed, turn out to be compatible with both.

### **PREDICTIVE DETERMINISM**

Whether or not Causal Determinism is true, and whether its truth or falsity can in principle be established by quantum physics, one thing is clear. Current quantum theory does not enable us to make precise predictions about what is going on at the quantum level of reality.

What, if anything, does this imply about the belief in universal causality? Remember that Predictive Determinism adds an epistemic thesis to the ontological thesis of Causal Determinism. This means that Predictive Determinism could prove to be false without Causal Determinism also being false. Einstein's life-long critique of quantum theory capitalized on this purely logical point. From our inability to measure the precise states of elementary particles, he argued, it does not follow either that they don't *have* determinate states or that those states are not *determined by* previous states.

Will physicists who are as philosophically well-read and conceptually astute as Einstein eventually conclude that quantum physics provides a conclusive

refutation of the ordinary belief in causality? Or will some future theory find a way of reinstating it? Perhaps time will tell.