

Part One

The Principle of Sufficient Reason and the Causal Principle

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Introduction

Nothing happens in vain, but everything for a reason and under necessitation.
— Leucippus (Diels and Kranz, 1985, 67B2)

1.1. THE SIGNIFICANCE OF THE PSR

An airplane crash is investigated thoroughly. No cause for the malfunction is found. The investigative team reports that the plane crashed for no cause. We naturally object: “You mean, it crashed for no *apparent* cause.” But the team insists that in fact there was no cause.¹ Of course we might question the epistemic bona fides of this finding. After all, there could always be some cause beyond our ken. But can we do more? Can we insist that there *must* have been a cause?

The Principle of Sufficient Reason (PSR) claims we can. Everything that is the case must have a reason why it is the case. Necessarily, every true or at least every contingent true proposition has an explanation. Every event has a cause. The PSR in various guises is as old as philosophy. Parmenides used it to argue that there was no such thing as change. St. Thomas proved the existence of God with a version of it apparently based on his distinction between being and essence. Spinoza’s version implied that there is no contingency. Leibniz attacked Newtonian absolute space for violating it and, together with Spinoza, used the PSR as part of an argument against libertarian free will. Kant grounded a phenomenal version of it in the causal nature of time and, arguably, based his transcendental idealism on a noumenal version (cf. Rescher, 2000b).

¹ This example is taken from Rescher (1995, p. 2).

In late-twentieth-century Anglo-American philosophy the PSR was primarily the preserve of the philosopher who, following St. Thomas, came up with increasingly rigorous cosmological arguments for the existence of God. There must be an explanation of why there exist contingent beings at all, and this explanation, at the pain of vicious circularity, cannot itself essentially involve the existence of a contingent being, so there must be a first cause whose existence is itself necessary. Indeed, despite some notable dissent, it now appears generally established that once one grants an appropriate version of the PSR, it follows that there is a necessary first cause of the cosmos, that is, of the aggregate of all contingent beings. This leaves two issues for the cosmological arguer to settle: whether this first cause can be identified with the God of traditional theism and, more basically, whether the PSR is true. And much of the twentieth-century discussion of the formulation and truth of the PSR took place in this context.

But it would be a philosophical mistake to leave the PSR to purely theological uses. Philosophy starts in wonder, and wonder impels us to find reasons for things. As the opening example shows, scientists and ordinary people do presume events to have causes, though they do not always reflect on whether the PSR is exceptionless and necessary. But even a PSR contingently true and only true most of the time calls for reflection. What kind of a reason do we have to believe in the PSR even to this extent? And is it not then a puzzling fact about the universe that the PSR is in fact true in as many cases as it is? Does this fact itself have an explanation, or is this fact itself one of the exceptions to the PSR?

On some accounts of scientific practice, the scientist makes an inference to the best available potential explanation. Philosophy of science has not given us a fully satisfactory account of how we are justified in assuming that the best available potential explanation is in fact true. Does this problem become any more pressing if one allows for the possibility that not only the best available potential explanation is not true, but in fact there is no true explanation?

Quantum mechanical indeterministic transitions are often taken to be reasons to reject the PSR. But at the very same time, the indeterminism, and hence the apparent violation of the PSR, motivates some, perhaps even some as brilliant as Einstein, to prefer deterministic theories.

One of the most powerful arguments against traditional Humean regularity theories of laws of nature is that mere regularities are not

explanatory: that *As* are always followed by *Bs* does not explain why a given token of *A* is followed by a given token of *B*. If the PSR is accepted, one then has reason to reject regularity theories, since then the things that we normally think have causal explanations do not in fact have causal explanations. But if the PSR is false, then the Humean can simply accept the charge that mere regularity is not explanatory, but continue to talk with the vulgar by using a stipulative notion, *explains**, such that a token of *A* being followed by a token of *B* is explained* by *A*'s always being followed by *B*. A decision on the PSR is, thus, *prima facie* most relevant to the debate on laws of nature.

In the philosophy of mind, the PSR would allow the objector to property dualism to make the following opening gambit: The property dualist needs to explain why it is that in fact the beings that have such-and-such physical states – for example, the physical states we have in virtue of having human brains – also have such-and-such mental states. If the PSR were not true, the property dualist could simply insist this is a brute contingent fact about our universe, one not having any explanation.

But there are cases in which bringing in the PSR could conclusively clinch an argument. There is a discussion since the time of Molina, motivated by concerns of providence, grace, and free will, about whether there are any nontrivially true conditionals about what a person would freely do in nonactual circumstances. The question is particularly vexed in the case in which the person in question is herself nonactual. Are there any contingently true conditionals of the form, “Were there to exist a person *x* satisfying *C*, then *x* would freely do *A*,” where *freely* is understood in the libertarian sense and where no person identical with a person satisfying *C* exists? Alvin Plantinga insists that there are. David Manley, in conversation, offered basically the following refutation. By the PSR (perhaps in some limited form), such a conditional would have to have an explanation. But there is nothing in terms of which the conditional could be explained in a world in which the agent does not exist. For instance, there cannot be a nomological explanation, since that would require a law of nature that persons satisfying *C* do *A*, which would vitiate the supposed libertarian freedom of the agent. Nor can there be an explanation in terms of the action of any person, since the only possible candidate for such a person would be the nonexistent *x*, as it is inconceivable how anybody else could bring it about that such a conditional would hold without thereby vitiating the hypothetical freedom of *x*.

This is an instance of a general argument form:

- (1) The proposition F is such that if it were contingent and true, then its obtaining could not be explained.
- (2) But all contingent true propositions have explanations.
- (3) Therefore, F is necessary or false.

For another case, consider the following argument against Hartry Field's view that mathematical objects do not exist but *could* have existed. If the PSR is true, then there must be an explanation of *why* mathematical objects do not in fact exist, and if the PSR is *necessarily* true, then in the possible world at which mathematical objects exist, there must be an explanation of why they exist. On the plausible assumptions that the explanations of the existence or nonexistence of contingent objects are necessarily causal and that mathematical objects cannot stand in causal relations,² we see that Field's philosophy of mathematics is incompatible with the PSR. Similarly, we may argue on the basis of the necessity of the PSR that mathematical truths, including unprovable ones such as the ones Gödel showed to exist, are all necessary. For what could explain, were it a contingent truth, why a mathematical proposition, especially an unprovable one, in fact holds? Descartes did think mathematical truths could be given a causal explanation in terms of divine causality. But the notion of causing a mathematical truth to be the case is most dubious.

Another example would be the following argument for the necessity of moral truths. Specifically, the thesis to be argued for is that there is no world just like ours in its non-moral features but in which there are different deontic truths – say, torturing the innocent is a duty. Therefore, if C is a complete description of the non-moral properties of our cosmos, and p is any true deontic proposition, the proposition $C \supset p$ is a necessary truth. Moreover, this is true in every possible world. Thus, necessarily, any deontic proposition p is a necessary truth when the circumstances of application are sufficiently elaborated. Alternately, this can be put by

2 Field himself holds that mathematical objects cannot be *causes* and therefore would not impinge on our consciousness if they existed. This is in fact a part of his reason for thinking that they do not in fact exist. But it is hard to see what reason there is for thinking that they could not be causes that is not based in general considerations according to which they are the sort of being that simply cannot stand in causal relations at all. Moreover, if in fact mathematical objects could be *caused*, then there would be a possibility that somehow our minds might be capable of causing them to exist, and thus that we could know their existence through our intentional knowledge – our knowledge of that which we intentionally bring about. If this were so, then Field's argument for the nonexistence of mathematical objects would be weakened.

saying that the deontic features of our world supervene on the non-moral ones.³

How to argue for a claim like this? The idea of a possible world just like this one non-morally but where torturing the innocent is a duty seems absurd. One might try to argue by simply saying: “Don’t you see the evil of torture? Once you see it, you will see that torture *couldn’t* be right.” But there is a more metaphysical argument. If the PSR is a necessary truth, we can explain what is absurd about worlds differing in deontic features but not in other features: We simply cannot see what could *explain* such a difference. If contingent truths are ultimately to be explained causally, then this is particularly clear. What could *cause* it to be the case that torturing the innocent is a duty? The very idea of causing a deontic proposition to be the case, other than by causing the non-moral circumstances of its application, seems to be absurd. If we were utilitarians, we might say that if evolution caused it to be the case that somehow torturing the innocent were to cause them extremely intense pleasure ten years later, then torturing the innocent might increase utility. But this difference in deontic features would be achieved precisely through a difference in non-moral features.

We might, of course, admit some cases of noncausal explanation of contingent propositions. Thus, if p and q are contingent propositions with p true and q false and with the disjunction p or q itself contingent, we might want to say that the disjunction is explained by p ’s being true. But ultimately we still will want a causal explanation: for instance, we may want to get to a causal explanation of p ’s being true, unless p is itself disjunctive. Likewise, if p is reductively explained by q , say the metal’s being hot by its molecules moving rapidly, we will still want a causal explanation for q or for something that q is in turn reductively explained by, and it appears that an endless chain of reductive explanations, with nothing ultimate that things are reduced to, is explanatorily unsatisfactory.

The idea of something’s directly *causing* a moral truth, without causing some set of non-moral circumstances to be actualized, seems absurd. Moral truths, properly qualified in the form $C \supset p$ where C is a sufficiently precise description of the non-moral circumstances, just do not seem to be the sort of thing one can cause. The one example on the books of such causal interaction is a divine voluntarism: God directly brings it

3 This claim is quite close to that which occurs at the *locus classicus* of the notion of supervenience, which is the claim that goodness supervenes on non-moral properties (Hare, 1964, p. 80ff).

about that some actions are duties, some are impermissible, and some are neither, even though he could have brought it about differently. He does not do this by engaging in some speech act such as engraving “Thou shalt not murder” on a clay tablet, but by directly bringing about some moral propositions. One is likely to be puzzled by this kind of a view precisely because deontic properties just do not seem to be the sorts of properties that can be caused except by causing the non-moral circumstances of application of a moral truth. Once we admit that the deontic properties of this world if not supervenient on the non-moral properties could not be explained, then, given the PSR, we have good reason to hold to the thesis that deontic truths, when properly qualified in terms of non-moral circumstances, are necessary truths. This is not a knock-down argument. But it shows where the discussion should be focused: What would deontic facts have to be like if they were contingent and capable of being brought about not through bringing about non-moral facts? It at least seems likely that something like divine voluntarism would have to be true were moral facts to be contingent.⁴

Neither does it really help here to note that causal explanations need not have the state of affairs reported in the explanans causing the state of affairs in the explanandum: the relationship can be more complicated. For instance, that *E* caused *F* is a paradigmatic explanation of why *F* occurred. But *E*’s causing *F* does not cause *F*. This is a case of a causal explanation, but for categorial reasons we do not want to say that the state of affairs reported by the explanans causes that reported by the explanandum. Similarly, an agent- or substance-causation account can provide an explanation, but there is no state of affairs causing anything at all there. When we say that some event happened because Fred, a substance, caused it, there is no causal relation, except perhaps as a *façon de parler*, between any state of affairs or event and an event: the whole point of the theory is that the relation is between a substance and an event. There may be more complicated relations. For instance, I will argue in Chapter 7 for the *prima facie* strange claim that it makes sense to say that in

4 Observe that social constructivism would not be a counterexample here. Either social constructivism is an error theory about morality that says that there are no moral truths but only moral “truths,” or else social constructivism thinks that there are moral facts but they are produced by society. The first view does not provide a counterexample. But on the second view, the social constructivist does not hold that society *directly* brings about certain moral truths. Rather, society brings about moral truths, given social constructivism, through engaging in certain speech acts. The occurrence or nonoccurrence of such speech acts can be thought of as part of the circumstances.

some cases it could be self-explanatory that an agent freely chose something. This is a causal explanation in the sense that causation is invoked – the agent freely chose something. But since nothing can be *causa sui*, this is another case in which what is reported in the explanans does not cause what is reported in the explanandum. Nonetheless, none of these other kinds of causal explanations seems to help us explain an allegedly contingent moral claim.

Similar things could be said in favor of other supervenience claims, such as that of the aesthetic on the nonaesthetic or of epistemic statuses on things other than epistemic statuses. Consider the latter case. If the PSR were false, we could give a very simple epistemology, which the attentive reader will notice is a straw-man version of Plantinga's Reformed epistemology. Some belief-forming processes just happen to be “properly functioning” and “truth directed.” There is no explanation as to which processes have one or both of these properties – this is just a brute, unexplained contingent fact. Any true proposition delivered by properly functioning truth-directed belief-forming processes is knowledge. No counterexample can be given to this theory. Suppose you give me some case where it seems that knowledge arose not from a truth-directed belief-forming properly functioning process. Then I can just say that the process in these particular circumstances *happens* to be truth directed and properly functioning. Or if you give me a Gettier-type case where a truth-directed properly functioning process delivers a true belief that is not a case of knowledge, I can say that appearances notwithstanding, in these circumstances the process *happened* not to be truth directed and properly functioning.

You might criticize my naive epistemology on the grounds that the contingency involved is contrary to our modal intuitions. We have the modal intuition that there is no world like ours in terms of features other than epistemic statuses but in which peering into a crystal ball on some particular occasion, and only on that occasion, delivers knowledge of the distant future. But I can explain your intuition as simply based on our firm knowledge – that is, the deliverance of a truth-directed properly functioning process – that *in our world* crystal-ball peering is not a properly functioning truth-directed process. And if you do not accept this, then I can just make a modal move. Yes, indeed, crystal ball peering is *necessarily* not a properly functioning truth-directed process in a world with laws of nature like those of our world. But I refuse to give you a criterion for which processes are necessarily like this – there just is no explanation for the fact that some processes are necessarily properly functioning and

truth directed and others are not. Given a sufficiently strong PSR, one can reject this whole line of reasoning. If there is no explanation as to why some processes have this epistemic status (contingently or necessarily) and others do not, then it cannot be a fact that some have it and others do not. However, the version of the PSR invoked here is stronger than the one defended in this book – a PSR for necessary truths would be required to make this argument go through, while I will defend one only for contingent truths. Nonetheless, this should motivate us to investigate the PSR in general.

Finally, observe that while the PSR does not solve the problem of skepticism, it may let one at least infer that if one's perceptions are contingent, then they have causes, and this at least takes us to some extent beyond our perceptions. If the PSR is true, and if our perceptions are contingent, then they cannot be all there is. There must be an explanation of why we have these perceptions and not others. Thus, were the PSR self-evident, it could be the start of a climb out of skepticism.

1.2. A RESTRICTION TO CONTINGENT TRUTHS

The PSR that I will defend will not be general enough for *all* of the preceding applications. I will only defend the claim that, necessarily, every contingently true proposition has an explanation. The restriction to contingent propositions is natural and forced by the current state of the art. We simply do not have a good handle on the nature of explanations of necessary propositions.

Aristotle's account of science supposes there are such. In Aristotelian scientific explanations we start with propositions that are "in themselves" more understandable and proceed to propositions that are less understandable in themselves, though of course in the order of knowledge we first know these less understandable propositions, say, that there are rainbows, and proceed from them to the more understandable ones, say, the laws of optics, to give a contemporary example. Thus, if we could identify which *necessary* propositions are "more understandable" or "objectively more basic," for instance which mathematical propositions are more properly considered as axiomatic, then we might have hope of an Aristotelian account of mathematical explanation.

Unfortunately, given the plethora of different logically equivalent axiomatizations for a single mathematical theory, it is not clear which axiomatization counts as objectively more basic, and the PSR is, after all, concerned with *objective* explanations. We could include among the

other axioms of Euclidean geometry the parallel postulate that given a line and a point not on the line there is a unique parallel line through the point and derive the Pythagorean theorem. Or we could instead make the Pythagorean theorem among the other axioms and derive the parallel postulate. Which is the genuine explanation? Traditional geometry used the former approach, but a mathematician accustomed to thinking in Cartesian ways might start with the Pythagorean theorem, which lays down a Euclidean metric on the plane, and proceed from there.

While the mathematician Paul Erdős talked of some “proofs from the Book,” where the Book was the imaginary heavenly book of the optimal proofs for each theorem, no one knows exactly what it means for a proof to be “from the book.” At the same time, we know that some proofs are more explanatory than others. A proof of a geometrical fact that is done in a Cartesian algebraic fashion will sometimes quite “obscure” the geometrical issues, while a different such proof will, the mathematician may say, “clarify” the issues where a “geometrical” proof would obscure them beneath the complexities of a diagram covered with myriad lines. The Four Color Theorem, that every map can be colored by using only four colors without countries that share a border ever having the same color, was proved by a computer checking over a thousand different cases (Appel and Haken, 1989). The proof could in principle be written out, but the proof thus written out would no doubt be quite unenlightening to us. It is not an *explanatory* proof to us. For all we know, the proof might be quite enlightening to a smarter being who could understand all the cases at once. What counts as an explanation in the sphere of mathematical necessary propositions, thus, may paradoxically be quite contingent and mind dependent, in a way in which the explanation of contingent propositions is not. On the other hand, Thomas Sullivan (conversation, 2002) might be right in thinking that when we subsume a number of mathematical theorems under a single more general theorem, we *do* explain things, by showing how such-and-such results follow from such-and-such general properties of mathematics.

Perhaps more worrying is that given Gödelian unprovable mathematical truths, it is not clear what could explain *those* truths,⁵ whereas it seems unlikely that they are self-explanatory. Thus, the PSR extended to them might be false, unless of course mathematical truths are grounded in something deeper yet, say, the nature of modality itself (i.e., whatever

5 This argument is due to the father of Joanna Tamburino, an undergraduate student of Richard M. Gale.