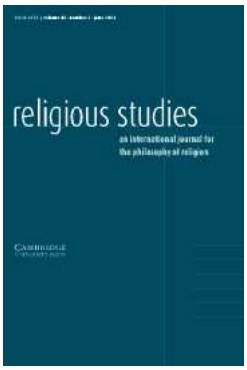
Religious Studies
http://journals.cambridge.org/RES

Additional services for ***Religious Studies:***

Email alerts: Click here
Subscriptions: Click here
Commercial reprints: Click here
Terms of use : Click here



A restricted Principle of Sufficient Reason and the cosmological argument

ALEXANDER R. PRUSS

Religious Studies / Volume 40 / Issue 02 / June 2004, pp 165 - 179
DOI: 10.1017/S003441250300684X, Published online: 21 April 2004

Link to this article: http://journals.cambridge.org/abstract_S003441250300684X

How to cite this article:
ALEXANDER R. PRUSS (2004). A restricted Principle of Sufficient Reason and the cosmological argument. Religious Studies, 40, pp 165-179 doi:10.1017/S003441250300684X

Request Permissions : Click here

CAMBRIDGE JOURNALS

Downloaded from http://journals.cambridge.org/RES, IP address: 128.84.126.78 on 01 Feb 2013

Religious Studies **40**, 165–179 © 2004 Cambridge University Press
DOI: 10.1017/S003441250300684X Printed in the United Kingdom

A restricted Principle of Sufficient Reason and the cosmological argument

ALEXANDER R. PRUSS

Department of Philosophy, Georgetown University, Washington, DC 20057

Abstract: **The Principle of Sufficient Reason (PSR) says that, necessarily, every contingently true proposition has an explanation. The PSR is the most controversial premise in the cosmological argument for the existence of God. It is likely that one reason why a number of philosophers reject the PSR is that they think there are conceptual counter-examples to it. For instance, they may think, with Peter van Inwagen, that the conjunction of all contingent propositions cannot have an explanation, or they may believe that quantum mechanical phenomena cannot be explained. It may, however, be that these philosophers would be open to accepting a restricted version of the PSR as long as it was not ad hoc. I present a natural restricted version of the PSR that avoids all conceptual counter-examples, and yet that is strong enough to ground a cosmological argument. The restricted PSR says that all explainable true propositions have explanations.**

Introduction

The Principle of Sufficient Reason (PSR) in its strongest form says that, necessarily, every true proposition, or at least every contingently true proposition, has an explanation. The cosmological argument argues that some very general feature of our world, such as that there exist contingent beings or that there is motion, can only be explained in terms of the activity of a first cause, and hence such a first cause exists, and often the argument goes on to show that the first cause is at least somewhat recognizable as a God. Thus, the cosmological argument requires an appropriate version of the PSR to ensure that the general feature that can only be explained in terms of a first cause in fact *does* have an explanation.

It appears that in the cosmological argument it is the invocation of the PSR that gives the most difficulty to the contemporary philosophical atheist. Thus, the theist would do well either to try to justify the PSR[1] or to make do with a weakened version of the PSR. As an example of the latter strategy, Richard Gale and I[2] have constructed a cosmological argument that needs only the weak PSR that every contingently true proposition possibly has an explanation. The weak PSR is

CAMBRIDGE JOURNALS
http://journals.cambridge.org Downloaded: 01 Feb 2013 IP address: 128.84.126.78

intended to appeal to an atheist who is willing to accept that even if there were a brute fact, i.e. a true but unexplained contingent proposition, the brute fact would be something that *could* have an explanation.

In this paper, I will court a different audience, namely an interlocutor who finds the PSR very plausible, but who is unable to consent to the PSR because she thinks there are serious counter-examples to it. For instance, she might think that random quantum mechanical phenomena cannot be explained. Or she might be a libertarian who thinks that, although one might explain why Smith died by saying that Jones freely chose to kill Smith, one cannot in turn give an explanation for why Jones freely chose to kill Smith: the availability of an explanation would undermine the freedom. Or else, more grandly, she might accept Peter van Inwagen's argument[3] that the conjunction of all contingent true propositions is a counter-example to the PSR. Such an interlocutor would accept the PSR either if the apparent counter-examples could be taken care of, or if there were some way of restricting the PSR in a way that is not ad hoc and that would move the apparent counter-examples beyond its scope.

The position I am imagining is quite a reasonable one if there are counter-examples to the PSR. The PSR *does* very much appeal to us. The ordinary person has a very strong intuition that it is true. In the case of a principle like this, when faced with counter-examples that one cannot refute, one would like to restrict the principle in some plausible way to get around the counter-examples. It would be irrational to dismiss the principle entirely.

There are two ways that such an interlocutor could be answered. First, one might refute the apparent counter-examples. I have attempted to do this elsewhere,[4] but here I will employ the second strategy. I will produce a very natural restriction of the PSR that is immune to counter-examples like those above, and then I will show that the restricted PSR is still sufficiently strong to ground a cosmological argument to a necessarily existing first cause of the contingent entities in existence.

The restricted PSR

Consider the following natural line of argument by someone impressed by the idea (which I take to be actually false) that the proposition that Jones freely killed Smith, or maybe that Jones freely chose to act on reason R rather than on reason R*, cannot be explained. It is fine to ask for explanations of why it is raining now or why the planets move around the sun. The question of why these things happen makes perfect sense. But to ask the question of why Jones freely killed Smith is not just to invite a tolerant but incredulous stare. Rather, it is to betray one's failure to understand the word 'freely'. For if he *freely* killed him, then no explanation can be had, and the question is no longer a sensible one to

CAMBRIDGE JOURNALS
http://journals.cambridge.org Downloaded: 01 Feb 2013 IP address: 128.84.126.78

ask. Yes, our why-questions have answers, but only when they are *sensible* why-questions. Some why-questions just *cannot* have answers.

If we accept this line of reasoning, then we have a very natural way to restrict the PSR:

> RPSR If p is a true proposition and possibly p has an explanation, then p actually has an explanation.

This restricted PSR does not appear to be ad hoc. If one knew that p could not have an explanation, then a request for explanation would be flawed. There is a bright line that can be drawn between requests for explanation that cannot have an answer and ones that can. If one is to restrict the PSR, this is a very natural restriction to make. To be more explicit, RPSR claims that if p is a true proposition such that there is a possible world w at which p is true, and a proposition q true at w such that it is true at w that q explains p, then p also has an explanation in the actual world. Note that the RPSR does not claim that q is in fact the explanation of p: if there is a possible explanation, there is an actual explanation, but nothing is said about whether the two are the same or not, as indeed nothing should be said, since a given proposition might have one explanation in one world and another in another.

Now, observe that the RPSR immediately takes care of all the counter-examples that present propositions that cannot have an explanation. For if a proposition cannot have an explanation, then it does not fall under the scope of the RPSR. Thus, either the proposition that Smith freely killed Jones could have an explanation or not. If it could have an explanation, we do not have a counter-example to any PSR, unless we can give some supplementary argument for why, although there *could* be an explanation, in fact there is not. But if it could not have an explanation, then we do not have a counter-example to the RPSR.

The quantum case would go as follows. Consider, for instance, an experiment where an electron goes through a magnetic field and either moves upward or downward, but the direction of its movement is not determined by the previous state of the system. The proposition that the electron moved, say, upwards does in fact have an explanation. The explanation is that the laws of nature are such-and-such, and under these laws of nature the experimental system indeterministically caused the electron to move upwards. Thus far, an explanation can be given. But of course the opponent of the PSR will then ask: can an explanation be given of the claim that the experimental system indeterministically caused the electron to move upwards? Some might hold that this claim is self-explanatory (*modulo* the unproblematic part of the claim that states that the system exists, which part can be explained in terms of something else), and hence can have an explanation – the explanation is it itself – and I have argued elsewhere for this possibility. Those people will not see this as a counter-example to the PSR. Others might deny indeterminism. If one takes either route, there is no

CAMBRIDGE JOURNALS
http://journals.cambridge.org Downloaded: 01 Feb 2013 IP address: 128.84.126.78

problem for the PSR. But if one doesn't take either route, then the most reasonable thing to say *qua* opponent of the PSR seems to be that there just cannot be an explanation for why A has *indeterministically* caused B. But if so, then we do not have a counter-example to the RPSR on our hands.

Even grander apparent counter-examples do not sway the RPSR. Consider van Inwagen's counter-example. Let p be the conjunction of all contingent propositions – the Big Conjunctive Contingent Fact (BCCF). Proposition p is itself a contingent proposition. Now, if p has an explanation, say q, this explanation is either contingent or necessary. If contingent, then q is one of the conjuncts of p, and hence q ends up explaining itself, which is held to be absurd. If necessary, then a necessary proposition explains a contingent one, which is also held to be absurd. While I have argued elsewhere that neither horn in this dilemma need be fatal to the defender of the PSR, suppose the argument is sound. Then, p cannot have an explanation. Fine: if so, then the RPSR does not require that p have an explanation.

The cosmological argument

It might seem that the RPSR is too restricted to do any serious cosmological-argument work. For instance, consider the following attempt. Let p be the claim that there exists at least one contingent being. Then, possibly p has an explanation. Hence, by the RPSR, p in fact has an explanation. Since the agency of a contingent being cannot, without vicious circularity, explain why there exists at least one contingent being, it follows that the explanation of p invokes the agency of a necessary being which is a first cause.

However, the atheist who denies the PSR and only accepts the RPSR may balk at this argument. She will say: 'You have not given me any reason to think that possibly p has an explanation. It is clear that any explanation would have to involve a necessary concrete being, and it just is not clear to me that a necessary concrete being is possible, and anyway I see by S_5 that if I were to admit that such a being is possible I would have to admit that such a being is actual.'

There is, nonetheless, a better cosmological argument that can be run from the RPSR. I will first give the simpler version of this argument, even though I think the simpler version is in the end problematic. Let p be the Big Contingent Existential Proposition (BCEP). This is the conjunction of all propositions of the form: 'r exists', as r ranges over rigid designators of all contingent beings (if we are in a Aristotelian mood, we can further specify 'beings' as substances) that actually exist (timelessly). In other words, p is something like:

> Bill Clinton exists and Napoleon exists and Bucephalus exists and electron e_{139830} exists and … .[5]

Now, it should not be that controversial that possibly there is an explanation for p. For instance, imagine a world containing all of our world's contingent beings,

CAMBRIDGE JOURNALS
http://journals.cambridge.org Downloaded: 01 Feb 2013 IP address: 128.84.126.78

and additionally an infinite number of contingent and powerful ghosts (distinct from any ghosts existing in the actual world, should the actual world contain ghosts). Consider the proposition q:

> Ghost g_1 created Bill Clinton and ghost g_2 created Napoleon and ghost g_3 created Bucephalus and ghost g_4 created e_{139830} and … .

If one doesn't like ghosts, one can just imagine powerful material beings that have various abilities that the material beings we are familiar with lack, including the ability to create Napoleon. If q is possible, then p is possibly explained, since p has an explanation, namely q, in any world in which q is true.

Let w be a world where q holds. Note that while p is true at w, it is not true at w that p lists all the contingent beings. For while Bill Clinton, Napoleon, Bucephalus, and all the rest exist at w, they are not exhaustive of the class of contingent beings at w: the ghosts are added on. But since the BCEP p does not *say* that it lists all the contingent beings, there is no problem here for arriving at the conclusion that q would explain p were q true. Observe, too, that p is not the BCEP of w, even though p is true at w.[6]

Or, perhaps more simply, it seems quite possible for there to exist a deity, maybe contingent and finite, that could create Bill Clinton, Napoleon, Bucephalus, and all the other contingent beings we know of. This deity would have to be either necessary or else contingent and non-actual, so as to ensure that the deity would not itself be mentioned in p. Admittedly, if this deity is contingent, then at a world where this is so the list of beings in p would no longer be a complete list of contingent beings. But again that is not a problem. One might think one has a bit of a problem if one thinks that no entity, or no entity other than the God of monotheism, can create *ex nihilo*, but we need not suppose the deity to create *ex nihilo* – alongside this deity, there might be a large supply cabinet full of pieces for the construction of the beings mentioned in p.

Therefore, possibly p is explained. By the RPSR, p is actually explained. Now, the explanation of the existence of a concrete contingent being involves the causal efficacy of another concrete being. Thus, the explanation of p must involve the causal efficacy of at least one concrete being. Moreover, the beings whose causal efficacy is invoked in the explanation of p cannot all be contingent. For then these beings, by explaining p, end up explaining their own existence. However, neither the individual existence of a contingent being is self-explanatory nor is the existence of a bunch of contingent beings self-explanatory. Thus, the explanation of p must involve the causal efficacy of at least one necessary being, a first cause. QED.

There is a powerful Kripkean objection to this argument. According to the Kripkeans, the origin of an entity is an essential property of it: I could not have different parents from the ones I do. Thus, it might be impossible for the entities listed in p to originate in a way other than they do. If someone were to have been

CAMBRIDGE JOURNALS
http://journals.cambridge.org Downloaded: 01 Feb 2013 IP address: 128.84.126.78

made by ghost g_1, rather than conceived by Clinton's parents, then the person would not have been Bill Clinton. This is a controversial doctrine, but I find it plausible, and in any case it is desirable not to make the argument rest on the denial of it.

Fortunately, the above cosmological argument can be salvaged. For any entity *e*, let the Complete General Intrinsic Concept (CGIC) of *e* be the conjunction of all the intrinsic non-relational properties of *e* that can be described in purely general terms, i.e. without using proper names, demonstratives or like non-repeatables. Now, Leibniz's Principle of the Identity of Indiscernibles (PII) claims that the CGICs are individuative of the concrete entities that exist: if the CGIC of *e* is identical with the CGIC of e^* then $e = e^*$. Quite possibly, Leibniz is committed to the stronger claim that CGICs *must* be individuative. Many find this stronger claim implausible, while the merely contingent truth of the PII seems quite plausible, empirically and otherwise. I will need a technical assumption even weaker than the contingent truth of the PII. The assumption is that, perhaps only contingently, for each CGIC there are at most finitely many actual concrete entities that have that CGIC. So if there are indiscernibles, there are only finitely many of each kind. This seems plausible.

Now, let *p* be the conjunction of all true propositions of the form:

> There are exactly *n* contingent concrete entities having CGIC *c*.

Now, while the Kripkean would deny the possibility that a ghost could create Bill Clinton, there is no similar problem with a ghost creating someone having Bill Clinton's CGIC. On Kripkean principles, this person would not be identical with Clinton; nonetheless, this person would be indiscernible from Clinton. Thus, there is no Kripkean objection to the claim that possibly *p* has an explanation. Perhaps the possible explanation takes the form:

> There exist contingent beings g_1, g_2, … such that g_1 causes there to be n_1 contingent concrete entities having CGIC c_1, and g_2 causes there to be n_2 contingent concrete entities having CGIC c_2, … .

But once it is granted that *p* possibly has an explanation, then by the RPSR we conclude that it *actually* has an explanation. Any explanation of the existence of contingent beings will have to be causal since no other form of explanation that we know of can explain the existence of contingent beings, and we must go by what we know. This will either invoke solely the causal efficacy of contingent beings or it will also invoke the causal efficacy of at least one necessary being, a first cause. If it invokes the causal efficacy of contingent beings, then a bunch of contingent beings will end up causally explaining their own existence, which is absurd.

Finally, observe that someone who thinks that perhaps there are some contingent entities that could not have a cause, for instance the realities that

CAMBRIDGE JOURNALS
http://journals.cambridge.org Downloaded: 01 Feb 2013 IP address: 128.84.126.78

undergird the lawfulness of laws of nature, should still accept a modified version of the argument that shows the existence of an immaterial cause for the aggregate of all material entities. To see this, instead of enumerating in our explanandum *p* all contingent beings, just list all the material ones. Plainly, each material being can have a cause, and, as before, there can be an explanation of *p*. Thus, by the RPSR there *is* an explanation of *p*. Since the existence of a contingent being is to be explained causally, at the pain of vicious circularity this explanation must involve the causal efficacy of an immaterial being. Hence, the RPSR at the very least undermines materialism.

This last argument assumes that any material being can have a cause and is contingent. One road to the possibility of a cause is to argue that all contingent concrete or substantial beings can have causes. But this still leaves open the question, raised by Hume[7] and an anonymous reader for this journal, whether a material being could not exist necessarily. However, there are several considerations against this. First of all, all the material beings we know about come to exist and cease to exist, and any being that does either one of these is surely a contingent being. By induction, all material beings are contingent, and applying inductive arguments to the collection of all material objects is not as problematic as applying such arguments, say, to all beings. Moreover, it is plausible that all material beings must be spatio-temporal. But for any one region of space-time, it is possible that that region be unoccupied. Hence, at least, for any material being, say Fred, that exists, it might not exist *where* it exists. To get the stronger claim that it might not exist *at all*, we need the claim that it is possible for a whole time-slice to be unoccupied or occupied by other things than Fred. But this *is* plausible. Certainly, it seems that we can conceive of the possibility, and conceivability is a powerful guide to possibility. While Hume's argument[8] that any being that can be conceived to exist can be conceived not to exist is dubious in the case of immaterial entities like God or the number seven, it becomes more much plausible for material beings, since we have a much better handle on what these beings are like and what it is to conceive of them as existing or not existing in some place at some time.

Objections

But is the first cause a deity?

A cosmological argument should have some religious significance. But so far only the existence of a first cause has been shown. Is this first cause at all god-like? Is it even a person? The latter can probably be answered positively if the following argument is sound. The explanation in terms of the efficacy of the first cause will probably not be a scientific explanation, since scientific explanations involve the causality of contingent beings, whereas our main argument showed the existence of a necessary being who is a first cause. The only other form of

CAMBRIDGE JOURNALS
http://journals.cambridge.org Downloaded: 01 Feb 2013 IP address: 128.84.126.78

causal explanation we know of besides scientific explanation is an agency-based explanation in terms of the free choice of a person. Furthermore, the complexity of the beings mentioned in the BCEP, which will presumably include humans and animals, makes it reasonable to infer that this person is highly intelligent and very powerful. To show that this person is morally good would require other arguments, either Thomistic metaphysical arguments that a necessary being must be pure actuality and hence perfectly good since things are good to the extent that their nature is actualized, or the use of all the available theodicies combined with teleological arguments. Is the first cause one, or a committee? The orderliness of the universe suggests a unity in the first cause.

Observe that this version of the cosmological argument, unlike for instance the argument of Gale and Pruss,[9] is based on the BCEP rather than the stronger BCCF. As a result, the conclusion reached is weaker: it is not shown that there is a being that brings the BCCF about but only that there is a being that brings the BCEP about. This means that it is not shown that the first cause causes facts that are not purely existential, and that Jerome Gellman's[10] clever argument extending the Gale and Pruss argument to show the omnipotence of the deity does not directly apply here. Of course, everything in the present argument is compatible with the further claims that the first cause is omnipotent and brings about the BCCF – it's just that the argument does not show these claims. One can, however, extend the argument further by arguing for large classes of non-existential facts that they can have an explanation and hence do have an explanation. This investigation is left as an exercise to the reader.

But it is worth mentioning an advantage of using the BCEP instead of the BCCF. For if the first cause brings about the BCCF, there is a prima facie problem due to the fact that the BCCF will include reports of free human actions.

Schopenhauer's taxi-cab objection

The taxi-cab objection says that once the existence of the first cause is inferred, the PSR is dismissed, like a taxi after it has brought us to our destination, instead of being applied to the first cause or its creative act. However, the first cause is a necessary being. Plausibly, this opens up two possibilities. Maybe its existence is either going to be self-explanatory, in which case there is no problem here for the PSR or the RPSR, or it is categorically the sort of being whose existence cannot be explained, in which case there is no problem for the RPSR, though there would be one for a completely unrestricted PSR that also applies to necessary proposition. How about, though, the proposition that God freely chose to create these and not other beings? Can that proposition be explained? Well, this proposition is not a part of the BCEP. Moreover, it is exactly the kind of proposition that we have seen poses no problem for the RPSR – for it either poses no problem for the full PSR, in which case it poses none for the RPSR which is weaker, or else it is a proposition that cannot have an explanation, and hence the

CAMBRIDGE JOURNALS
http://journals.cambridge.org Downloaded: 01 Feb 2013 IP address: 128.84.126.78

RPSR does not apply. In any case, there is no problem here for the adherent of the RPSR.

Note here that it is not just the necessary existence of the first cause that explains the BCEP, p, but what explains the BCEP is something like the proposition, q, that a necessarily existing first cause brings it about that p. Note that proposition q, though it talks of a necessarily existing being, is a contingent proposition because it reports what this necessarily existing being contingently brings about. One might, of course, wonder how a necessarily existing being could act in a way that has a contingent effect. Perhaps the only way possible is through libertarian free will, which allows an intelligent agent in one and the same state to be able to cause different outcomes. If this is the only possibility, then we have an additional argument for the first cause being an intelligent agent.

Physical impossibility of an explanation

Perhaps, though, the defender of the quantum mechanical objection to the PSR will say not that it is metaphysically or logically impossible for there to be an explanation for why A indeterministically causes B, but only that it is physically impossible. If so, then A's indeterministically causing B would fall under the RPSR, implying that there *is* an explanation for it. But it is *physically* impossible that there be an explanation, and hence there is no explanation, since physically impossible things do not happen. Thus, the RPSR is false.

However, once we admit that it is logically possible for there to be an explanation, then it is difficult for us to be justified in believing that there is, in fact, no explanation for A's indeterministically causing B. If we are sceptical about the PSR, we might not be sure that there is an explanation, but presumably we will also not be sure that there is none. I can see only one way of making the present objection run, and that is by assuming physicalism and then arguing that we have empirically ruled out all possible *physical* causes of A's indeterministically causing B. The assumption of physicalism is of dubious justifiability, however, and I am also sceptical that we can rule out all logically possible physical causes of A's indeterministically causing B, as we would need to to be sure that there was no explanation if an explanation were logically possible.

A bunch of contingent beings can explain their own existence

This is the classic Hume–Edwards objection to the cosmological argument. If we have explained every conjunct, then we have explained the conjunction. Now, suppose that we have an infinite causal chain of contingent beings: A_1 caused by A_2, A_2 caused by A_3, and so on. Then, let p_n be the proposition that A_n exists. Let p be the conjunction of the p_n. Observe that p_n is explained by p_{n+1} which is another conjunct of p. Thus, p contains the resources for explaining every one of its conjuncts, and hence p is self-explanatory.

CAMBRIDGE JOURNALS
http://journals.cambridge.org Downloaded: 01 Feb 2013 IP address: 128.84.126.78

However, the Hume–Edwards objection is false, because explanation is not agglomerative – one can explain the conjuncts without explaining the conjunction. See, for instance, the discussion by Gale[11] and Pruss.[12] For a simple counter-example,[13] suppose that at noon a cannonball is fired and flies for one minute in a vacuum. Let $p(t)$ be a proposition reporting the state of the cannonball at t. Let p be the conjunction of all the $p(t)$ for t such that $12.00 < t < 12.01$. Observe that every conjunct of p is explained by an earlier conjunct of p, since, by the denseness of the interval from 12.00 to 12.01, for any t such that $12.00 < t < 12.01$ there is a t^* such that $12.00 < t^* < t$ and $p(t^*)$ causally explains $p(t)$. By the Hume–Edwards principle, p will be self-explanatory. But it is plain that p is not self-explanatory. A definitive way to see this is to note that if a proposition p is such that there is something more to be said that would do more to explain why p is true, then p is not self-explanatory. A self-explanatory proposition carries in itself all that it needs for explanation. But something more remains to be said that would give further explanatory information about p: we can add to p the claim that the cannonball was fired at 12.00.

Not all explanation of contingent existential claims involves the causal efficacy of entities

For instance, one might explain why some entity exists by saying that it popped in, under the laws of nature, from the quantum vacuum. Or one might explain existential propositions in terms of principles rather than the activity of beings – Rescher,[14] for instance, insists on this possibility.

However, the quantum vacuum is not nothing. It may not be an ordinary material object, but it is something governed by laws of nature, something to which causal powers are ascribed. Nor are the laws of nature grounded in non-entities: if they are to be explanatory, they must be grounded in some underlying reality. Finally, the notion of explaining something in terms of a principle rather than an entity is quite obscure. If the principle is to be explanatory, it cannot be a mere accidental generalization. Rather it must be a statement that has the further property of *principlehood*. But if so, then there must be something about reality in virtue of which that statement is a principle. And this 'something about reality' must *exist* – we cannot speak of what is not, and certainly we cannot explain positive facts in terms of what is not.

The RPSR entails the PSR

This objection states that the RPSR entails the PSR. Hence, if the PSR is false due to counter-examples, so is the RPSR. To see the entailment, proceed as follows. Let r be the false proposition that Bill Clinton died in 1990. Let p be any true proposition. Let q be the disjunction p or r. Observe that it is possible that q have an explanation: in a possible world where Bill Clinton dies of a heart attack

CAMBRIDGE JOURNALS
http://journals.cambridge.org Downloaded: 01 Feb 2013 IP address: 128.84.126.78

in 1990, q is explained by Bill Clinton's heart attack. Thus, by the RPSR, q actually has an explanation. But an explanation of a disjunction, one of whose disjuncts is false, will have to explain the true disjunct. Thus, an explanation of q will have to explain p. Thus, p has an explanation. Since p was an arbitrary true proposition, it follows that all true propositions have explanations.

There are two responses. The first is to restrict the RPSR even further. We first need a useful notion of one proposition being true in virtue of another. I do not have an analysis of this notion, but can illustrate it through examples. For instance, a disjunction p or r is true in virtue of p whenever r is false. If r is also true, then the disjunction is also true in virtue of r: there can be multiple propositions in virtue of which a proposition is true. Likewise, the claim that there is an even number of people in the auditorium may be true by virtue of there being 812 people in the auditorium. *Being true in virtue of* is, I take it, a transitive relation. Further, if p is true in virtue of q, then q entails p, q is true, and q's truth is more basic in the actual world than that of p. These three may not be a sufficient condition for p to be true in virtue of q, but they are necessary. Furthermore, the notion of being true in virtue of another proposition is closely allied to notions of reduction. If a proposition p reduces in a sufficiently strong sense to q, then if p is true, it is true in virtue of q being true. This should be enough to give us a handle on the *is true in virtue of* relation.

Say that a proposition is *explainable* if there is a possible world where it is true and has an explanation. We can now state:

> RPSR2 Suppose p is an explainable true proposition that is not true in virtue of an unexplainable proposition. Then, p has an explanation.

This takes care of the disjunctive case. For the disjunction that p or Clinton died in 1990 is true in virtue of p, and hence RPSR2 will apply to it only if p is explainable. And RPSR2 saves the intuitions behind the RPSR. Furthermore, the cosmological argument based on the RPSR works under RPSR2.

However, RPSR2 may be unnaturally weak, since it will not apply to a disjunction of two true propositions, an explainable one and an unexplainable one. Such a disjunction is, arguably, explainable, namely in terms of the explainable proposition. To make RPSR2 more natural, we might use the following definition. Write $p \geq q$ for the relation p being true in virtue of q, or of p and q being identical and true (or both).

> RPSR3 Suppose p is an explainable true proposition and that there is a q with $p \geq q$ such that for any r such that $q \geq r$ proposition r is explainable. Then, p has an explanation.

Observe RPSR entails RPSR3 which in turn entails RPSR2 (this uses the transitivity of *is true in virtue of*), and that our cosmological arguments adapt to use only

CAMBRIDGE JOURNALS
http://journals.cambridge.org Downloaded: 01 Feb 2013 IP address: 128.84.126.78

RPSR3. I think the intuitions behind RPSR support RPSR3. However, at this point things may be getting too complicated for one's intuitions.

A different response to the objection is this. Not all explanation of contingent propositions is causal. Sometimes, the explanation is logical. If p is true in virtue of q, then q explains p. In particular, plausibly, if p holds and r is false, then the disjunction p *or* r is explained by p's holding. We do not need p to be further explained for this to be so. I think this matches our ordinary language usage. Why is it true that Napoleon lost at Waterloo or Clinton died in 1990? Well, this is true because Napoleon lost at Waterloo. To explain the disjunction we do not need to state why Napoleon lost, though of course we would need to state it to explain the first disjunct, and we would certainly need to explain this to give a more ultimate explanation (in the sense in which an explanation of a death in terms of the pressing of a trigger is more ultimate than an explanation in terms of the bullet's entry into the heart). Why is it true that this piece of metal is hot? It is true because the molecules are moving a lot in it. Observe that this last example is a non-causal but reductive explanation: that the metal is hot is true in virtue of its being the case that the molecules are moving a lot. This is really just a variant of Aristotle's account of formal explanation in *Metaphysics* H.4: that an eclipse of the moon occurs reduces to the claim that the earth's shadow covers the moon, but is also explained by this claim (though of course we may note that the explanation is not ultimate: we would like to know why the earth was between the moon and the sun at this time).

If this is correct, then the inference from r's being false and there being an explanation of p or r to there being an explanation of p fails, and hence the proposed derivation of PSR from RPSR fails.

Another counter-example

Consider the following apparent counter-example to the RPSR, based on two clever examples by one of the referees for this journal. Assume that there are indeterministic quantum processes and that one cannot explain why an indeterministic process leads to the result it does lead to. One of the main points of introducing the RPSR instead of the PSR was to placate opponents of the PSR who thought that this sort of thing *can* happen, so this possibility cannot be rejected without the RPSR's defender falling back on the PSR. Consider now a set-up where two different experimental systems are hooked up to a light which can be green or blue. System A, when electrified, causes deterministically the light to go green. System B, when electrified, causes indeterministically the light to go green or to go blue, with no explanation as to why it indeterministically caused one outcome rather than another. The experimenter has a big red power switch on top of a power supply, which is connected in turn to a selector switch choosing whether the electricity from the power supply goes to System A or to System B. First the selector is turned to A or B, and then the big red power switch is pressed.

CAMBRIDGE JOURNALS
http://journals.cambridge.org Downloaded: 01 Feb 2013 IP address: 128.84.126.78

Suppose in the actual world, the selector switch is set to B. The experimenter presses the power switch. By chance, the light happens to go green. We have supposed that then there is no explanation as to why pressing the power switch resulted in a green light – it was just chance, a brute fact. But there could have been an explanation. In a possible world where the selector is set to A, the light also goes green, but there is an explanation in terms of the deterministic process in System A. Hence, it is possible that there is an explanation, and so by the RPSR there is an explanation. But there is not. Hence, the RPSR is false.

Before we consider this putative counter-example, consider a simpler case. We just have an indeterministic coin flip. The indeterministically flipped coin either lands on heads or tails. It, in fact, lands on heads: let p_1 be the proposition that it does so. Then, it is possible for there to be an explanation of p_1: there is a possible world, w_1, where the coin is dropped in a careful and deterministic manner, perhaps with some magnetic guidance, and it lands on heads. In that world there is an explanation of why it lands heads up. Thus, by the RPSR there is an explanation. But since the event was indeterministic, how can there be?

This argument shows that the defender of the RPSR must give an explanation for the way the coin landed, even when it did so in an indeterministic manner. But there *is* a solution: the reason the coin landed heads up was because heads was the result of an indeterministic tossing process P. Now, on the hypothesis that there cannot be an explanation as to why an indeterministic process came out as it did, there cannot be an explanation for the proposition, p_2, that the indeterministic tossing process P came out heads up. But doesn't what we said in the previous paragraph show that the RPSR commits one to an explanation for p_2? No: the RPSR, in the argument of the previous paragraph, commits one to an explanation for p_1 and not for p_2. In fact, p_2 explains p_1. Observe that p_2 is false in world w_1, since there no indeterministic tossing process P occurs, and hence the construction of w_1 does nothing to show that p_2 possibly has an explanation.

The more complicated case we started with can be considered similarly. Let p_1 be the proposition that pressing the power switch resulted in a green light. ('Resulted' here is used loosely enough to encompass both a deterministic and an indeterministic reading.) The argument given shows that p_1 must have an explanation, because there is a possible world, w_1, where the selector is set to B and there p_1 does have an explanation. But in the actual world, this explanation is p_2, the proposition that the pressing of the power switch triggered an indeterministic process in System A that resulted in a green light. Now, to explain p_2 would require explaining why the indeterministic process came out as it did. But it was assumed at the outset of this objection that this sort of thing cannot be explained. Therefore, the RPSR does not apply to p_2, and the problem disappears. Yes, p_1 has an explanation, namely p_2, but if there cannot be an explanation why an indeterministic process, as such, came out as it did, then p_2 does not possibly have an explanation and so the RPSR does not require p_2 to have one.

CAMBRIDGE JOURNALS
http://journals.cambridge.org Downloaded: 01 Feb 2013 IP address: 128.84.126.78

But what if one says that p_1 is instead explained by p_2*, the proposition that the pressing of the power switch triggered a process in System B that led to a green light? Note that p_2*, unlike p_2, does not say that the process was indeterministic. We now have two cases. Either p_2* can have an explanation or not. If not, the RPSR does not apply to it, and there is no problem. But what if it can have an explanation? Maybe there is some possible world where System B is in fact a deterministic system (this depends on questions about transworld identity of experimental systems). If there is such a possibility, then it seems not unreasonable to say that p_2* is actually explained by something very much like p_2. System B's functioning leading to a green light is explained by System B's being in fact indeterministic and indeterministically causing a green light. And the latter again escapes the RPSR on the given assumptions.

What if, instead of demanding an explanation of why the pressing of the power switch led to a green light, one asks for an explanation of why the pressing of the power switch led to a green *rather than* red light? I think exactly what was said before applies. The explanation is that System B was activated and indeterministically caused a green rather than a red light. Alternately, one might note that the difference between 'pressing the power switch led to a green rather than red light' and 'pressing the power switch led to a green light and did not lead to a red light' is only a pragmatic difference and not a difference in the propositions expressed. Insofar as I am using explanation as a relation between propositions, all I need is an explanation of the latter claim. And that explanation is given by p_2, which explains why there was a green light, conjoined with an explanation why the light could not be *both* green and red.

This objection refines what we are to say about quantum cases by showing that we must say that a given event, such as a coin landing on heads, always has an explanation, but the explanation might just be that an indeterministic process caused that – perhaps with no further explanation being possible of why (though, of course, someone like me who thinks the strong PSR holds will dispute that, but that is a different story).

Of course, my argument is intended for a very specific audience. It is not intended for someone like Hume who is quite willing to allow for the possibility of bricks coming into existence *ex nihilo*. The intended audience is people who would accept the PSR, but apparent counter-examples stop them. And such people should accept the RPSR and hence the existence of a first cause.[15]

Notes

1. See, for instance, Thomas D. Sullivan 'On the alleged causeless beginning of the universe: a reply to Quentin Smith', *Dialogue*, **33** (1994), 325–335 and my draft manuscript *Ex Nihilo Nihil Fit*.
2. Richard M. Gale and Alexander R. Pruss 'A new cosmological argument', *Religious Studies*, **35** (1999), 461–476.
3. Peter van Invagen *An Essay on Free Will* (Oxford: Oxford University Press, 1983), 202–204.

CAMBRIDGE JOURNALS
http://journals.cambridge.org Downloaded: 01 Feb 2013 IP address: 128.84.126.78

4. In my *Ex Nihilo Nihil Fit* manuscript.
5. I am passing over the technical question of whether we get separate conjuncts for entities that have multiple rigid references to them. Thus, do we have separate conjuncts 'Cicero exists' and 'Tully exists', or do we have just one of them in the BCEP? If we have just one, then we may need to employ something like the axiom of choice to ensure there is such a proposition. Whether we throw in all such conjuncts or just one conjunct per entity will not affect my argument below, however.
6. This shows that BCEPs are not sufficient to individuate worlds, in the way that Big Conjunctive Contingent Facts do (see Gale and Pruss 'A new cosmological argument').
7. David Hume *Dialogues Concerning Natural Religion*, part 9 (1779).
8. *Ibid.*
9. Gale and Pruss 'A new cosmological argument'.
10. Jerome Gellman 'Prospects for a sound stage-3 of cosmological arguments', *Religious Studies*, **36** (2000), 195–201.
11. Richard M. Gale *On the Nature and Existence of God* (Oxford: Blackwell, 1991), ch. 7.
12. Alexander R. Pruss 'The Hume–Edwards principle and the cosmological argument', *International Journal for the Philosophy of Religion*, **43** (1998), 149–165.
13. Based on *ibid.*
14. Nicholas Rescher *Nature and Understanding* (Oxford: Clarendon Press, 2000), ch. 8.
15. I am grateful to Peter Byrne, David Manley, and Thomas Sullivan for a discussion of some of these topics. I am also grateful to two anonymous readers for this journal for a number of helpful suggestions.

CAMBRIDGE JOURNALS
http://journals.cambridge.org Downloaded: 01 Feb 2013 IP address: 128.84.126.78