

# THE COSMOLOGICAL ARGUMENT

the  
PSR

Leibniz's  
argument

objections  
to the  
PSR





Last time we considered an objection to Aquinas' assumption that if a first cause exists, then God exists: the objection was that the first cause could simply be some event, like the Big Bang, which is not a plausible candidate to be God.

Here is one source of dissatisfaction with that reply: namely, that one could still ask of such a first cause **why** it occurred. It seems as though there should be some explanation why the Big Bang occurred. But it is hard, you might think, to see how we could answer them without appealing to God.

One can think of our topic today — the cosmological argument — as a much more precise and sophisticated version of this intuitive line of thought.

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The form of the cosmological argument we'll be discussing today is due to Gottfried Wilhelm Leibniz. Leibniz was a German philosopher, mathematician, theologian, and scientist, whose achievements included the invention of calculus.



His intellect and achievements were such that they led Diderot, a later French philosopher, to remark that

***“When one compares the talents one has with those of a Leibniz, one is tempted to throw away one's books and go die quietly in the dark of some forgotten corner.”***



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Leibniz's argument is best thought of as beginning with a question which he poses at the end of the first paragraph of our reading for today:

“Why is there any world at all,  
and why is it the way that it is?”

Leibniz thought that there must be **some** explanation of why there is a world at all because he endorsed a certain principle about explanation, known as the **principle of sufficient reason**.



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Leibniz thought that there must be **some** explanation of why there is a world at all because he endorsed a certain principle about explanation, known as the **principle of sufficient reason**.

To state the PSR precisely, we'll need to introduce three terms which will also be important for topics we will discuss later in the course.

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necessary

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Philosophers use the word 'possible' in a very broad sense: something is possible just in case it **could have happened** - no matter how absurd, or bizarre, it is.

Here are some examples of things that are possible, in this broad sense.

The sky is blue.

The sky is red.

South Quad is full of pink donkeys.

USC is a better school than Notre Dame.

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Does this mean that **everything** is possible?

Not quite. Here are some things which do not seem to be possible, even in this broad sense.

There is a three-sided plane closed Euclidean figure with four angles.

Alfred is taller than Sam and Sam is taller than Alfred.

There is an object which is bright red and bright green all over.



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Once you understand what it means for a scenario to be **impossible**, you can understand what it means for a situation to be **necessary**: a situation is necessary just in case its opposite is impossible.

Here are some examples of things which seem to be necessary.

Every three-sided plane  
closed Euclidean figure has  
three angles.

If Alfred is taller than  
Sam, then Sam is  
shorter than Alfred.

There are no objects which are bright  
red and bright green all over.



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Once you understand what possible and necessary mean, you can understand what it takes for a state of affairs or thing to be **contingent**.

A state of affairs is contingent just in case (i) it actually is the case, and (ii) it is not necessary (that is, it is possible that it not be the case).

Here are some examples of contingent facts.

Most of the earth is covered  
in water.

Notre Dame is in Indiana.

You are a student at Notre  
Dame.

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necessary

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Just as we can talk about contingent facts, we can talk about contingent things or beings. (I will use those words interchangeably.)

A contingent thing is a thing whose existence is contingent -- that is, a thing which could have failed to exist.

You

Me

This lectern

The Milky Way  
galaxy



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Using these terms, we can state the Principle of Sufficient Reason as follows:

**The principle of sufficient reason**

Every contingent fact has an  
explanation.

The basic idea behind the principle is this: Take any feature of the world. If the world could have failed to be that way, then there must be some explanation of why the world is that way.

Why might someone think that this is true? Suppose we notice that although the sky is blue, it might not have been — the sky could have been red, or green, instead of blue. Doesn't it follow from this that there must be some explanation of **why** the sky is blue?

## The principle of sufficient reason

Every contingent fact has an  
explanation.

The basic idea behind the principle is this: Take any feature of the world. If the world could have failed to be that way, then there must be some explanation of why the world is that way.

Why might someone think that this is true? Suppose we notice that although the sky is blue, it might not have been — the sky could have been red, or green, instead of blue. Doesn't it follow from this that there must be some explanation of **why** the sky is blue?

Some have also thought that the PSR is a presupposition of modern science.

Science seems to proceed by discovering facts about the world and then asking what theories would best explain those facts. But doesn't that method basically just assume that the PSR is true?



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The principle of sufficient reason

Every contingent fact has an  
explanation.

Now recall Leibniz's central question:

“Why is there any world at all,  
and why is it the way that it is?”

Leibniz thinks that, once we see that the PSR is true,  
we can show (1) that this question must have an  
answer, and (2) that the only satisfactory answer to this  
question will imply the existence of God.

Let's see why he thought that.

... we cannot find in any of the individual things, or even in the entire collection and series of things, a sufficient reason for why they exist.

Let us suppose that a book on the elements of geometry has always existed, one copy always made from another. It is obvious that although we can explain a present copy of the book from the previous book from which it was copied, this will never lead us to a complete explanation, no matter how many books back we go, since we can always wonder why there have been such books.

What is true of these books is also true of the different states of the world ... however far back we might go into previous states, we will never find in those states a complete explanation for why there is a world at all, and why it is the way it is.

His key premise seems to be that **if nothing existed besides the sorts of things we find in the world, there would be no explanation of why these things exist.**

He illustrates this point by his **example of the geometry books.**

Leibniz thinks that, even we can explain the existence of each of the geometry books by the one from which it was copied, we can't explain why these books exist at all.

And what goes for the geometry books, Leibniz thinks, goes for the world as a whole. Even if we can explain every state of the world in terms of the preceding state of the world, **we lack an explanation of the fact that there is a world at all.**



When Leibniz says that the existence of “the individual things, or .. the entire collection and series of things” needs some explanation, which things is he thinking of?

The example of the geometry books gives us a clue. Is the existence of some geometry book contingent, or necessary?

This suggests an answer to our question. When Leibniz says that “the entire collection and series of things” needs some explanation, he is talking about the entire series and collection of things whose existence is not metaphysically necessary - **i.e., the collection of things which exist only contingently.**

This gives us a plausible candidate for a premise of Leibniz's argument:

The fact that there  
are contingent things  
has an explanation.

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The fact that there  
are contingent things  
has an explanation.

Now recall our statement of the principle of sufficient reason:

Every contingent fact  
has an explanation.

Given the PSR, what assumption would be needed to get us to the conclusion that the fact that there are contingent things has an explanation?

The fact that there are  
contingent things is  
contingent.

Is this assumption plausible? How might one argue for it?

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has an explanation.

The fact that there  
are contingent things  
has an explanation.

Is this assumption plausible? How might one argue for it?

Here is one kind of argument. Take some contingent thing, like the chair you are sitting on. Can you imagine a world just like this one, but without that chair?

Now pick another contingent thing. Can you subtract that from the world you just imagined?

But, you might think, we can just go on subtracting contingent objects, until there are none left. And then we are imagining a scenario in which there are no contingent things. If that is possible, as it seems to be, then the fact that there are contingent things is itself contingent.



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The fact that there  
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Now recall again the example of the geometry books. Leibniz's idea there seemed to be that, even if the existence of each geometry book in the (infinite) series could be explained by the one which preceded it, still the existence of the series as a whole cannot be explained by any geometry book in the series.

This seems plausible. It seems that if we want to explain why there are **any** things of a certain kind, this explanation can't be given in terms of some thing of that kind.

Suppose that we wanted to explain why rabbits exist in the universe. Our explanation could not begin like this: "Well, there were these two rabbits.  
And then ..."

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The fact that there are  
contingent things is  
contingent.

Every contingent fact  
has an explanation.

The fact that there  
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This line of thought seems to suggest the following:

The fact that there are  
contingent things can't  
be explained by any  
contingent thing.

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The fact that there are  
contingent things is  
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Every contingent fact  
has an explanation.

The fact that there  
are contingent things  
has an explanation.

The fact that there are  
contingent things can't  
be explained by any  
contingent thing.

The fact that there  
are contingent  
things is explained  
by some thing which  
is not contingent.

But this gets us very close to Leibniz's intended conclusion that the reason for the existence of the contingent things we find in the universe must lie outside of the universe.



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be explained by any  
contingent thing.

The fact that there  
are contingent  
things is explained  
by some thing which  
is not contingent.

The fact that there  
are contingent  
things is explained  
by a necessary  
being.

There is a necessary being  
that explains the existence  
of contingent things.



1. The fact that there are contingent things is contingent.
2. Every contingent fact has an explanation. (PSR)
3. The fact that there are contingent things has an explanation. (1,2)
4. The fact that there are contingent things can't be explained by any contingent thing.
5. The fact that there are contingent things is explained by some thing which is not contingent. (3,4)
6. The fact that there are contingent things is explained by some necessary thing. (5)

-----  
C. There is a necessary thing which explains the existence of contingent things. (6)

Of course, like Aquinas, Leibniz is interested in arguing for the existence of God; so the representation of the argument at left is incomplete.

Let's expand it in the obvious way.

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  7. There is a necessary thing which explains the existence of contingent things. (6)
  8. If there is a necessary thing which explains the existence of contingent things, then God exists.
- 
- C. God exists. (7,8)

This looks like a plausible interpretation of Leibniz's argument.



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We found reason to doubt the assumption that, if there is a first cause, then God exists. Do similar doubts apply to premise (8) of Leibniz's argument?

Here we can say things similar to the things we said about quasi-theism when we were discussing the first cause argument.

We can again consider the hypotheses of simple theism and simple atheism, and now consider alongside them the quasi-theistic hypothesis that the universe was created by a being with the unusual property that it is literally impossible for that being not to exist.

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It is a point familiar from our discussion last time that one can always reply to an argument for the existence of God by opting for some form of quasi-theism. Such arguments are always arguments that a being with such-and-such special properties exists, and one can always concede that a being with the special properties exists, but deny that that being is God.

But, arguably, this move gets less and less plausible the more special the properties are, and the less likely it is, from an atheist's point of view, that a being with those properties would exist.

And so it is worth emphasizing that the property of existing necessarily is a very special property indeed. Everything around us seems to be contingent. A being whose existence is literally impossible would be fundamentally unlike any of the things that surround us.

But, arguably, this move gets less and less plausible the more special the properties are, and the less likely it is, from an atheist's point of view, that a being with those properties would exist.

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It is a feature of many religious traditions that, in some sense or other, God's nature includes existence itself, and that nothing could exist without God. Leibniz's argument — if it is sound — seems to show that a being with these surprising properties exists.



It is worth emphasizing one strength of Leibniz's argument as compared to the various versions of the first cause argument. That argument relies on the assumption that there are no infinite causal chains. The kalām argument also relies on the assumption that the universe began to exist at some time.

Leibniz's argument does not rely on either assumption. As he says:

I certainly grant that you can imagine that the world is eternal. However, since you assume only a succession of states, and since no reason for the world can be found in any of them ... it is obvious that the reason must be found elsewhere.

... even if we assume the eternity of the world, we cannot escape the ultimate and extramundane reason for things, God.

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... even if we assume the eternity of the world, we cannot escape the ultimate and extramundane reason for things, God.

Imagine that the universe is eternal, and that its history includes infinite causal chains with no first cause. So long as the existence of that universe is contingent, the principle of sufficient reason tells us that its existence must have an explanation. And that's enough to get Leibniz's argument off and running.

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Is Leibniz's argument  
valid?



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If it is valid, then we can turn to the question of whether it is sound. And this boils down to the question of whether all of the four independent premises are true.

We've already discussed premises (1), (4), and (8).

If we grant that premises (1), (4), and (8) are true, and that the argument is valid, then the success of Leibniz's argument hinges on premise (2): the principle of sufficient reason. Let's turn to two objections to that premise.

The first objection is based on certain interpretations of **quantum mechanics**, our best current theory of the physical world.

According to the standard interpretations of quantum mechanics - though not all interpretations of the theory - the physical world is indeterministic.

That is, what the laws of nature tell us in many cases is not what will happen, but rather just probabilities of various outcomes.



Imagine, for example, that we have some uranium, and we are interested in whether some particular atom will decay in a certain amount of time.

Quantum mechanics will tell us something like this: there is a 12.37% chance that the atom will decay in that amount of time.

Suppose now that the atom does decay, and we ask: **why** did it decay?

Suppose now that the atom does decay, and we ask: **why** did it decay?

On standard interpretations of quantum mechanics, there is literally no answer to this question. There was a chance that it would, and a chance that it wouldn't, and it just did — end of story. Is that a problem for the PSR?

It appears so. For it looks like this would imply that there is a contingent fact -- namely, that the atom would decay at that moment -- which has no explanation.

The defender of the cosmological argument can always reply that this shows that quantum mechanics is incomplete. And this is not an entirely unreasonable thing to say. Quantum mechanics is inconsistent with our other best theory of the physical world -- the general theory of relativity -- which suggests that the correct complete theory of the physical world may not look quite like any of our current theories.



The defender of the cosmological argument can always reply that this shows that quantum mechanics is incomplete. And this is not an entirely unreasonable thing to say. Quantum mechanics is inconsistent with our other best theory of the physical world -- the general theory of relativity -- which suggests that the correct complete theory of the physical world may not look quite like any of our current theories.

But in response to this reply to the objection, there are two things to be said.

The first is simple. The fact that a premise of an argument conflicts with well-supported claims of our best scientific theory is a strike against that premise. Whether or not it convinces us to reject the premise, it seems that it should at least reduce our confidence in it.

The second reply to the reply is more abstract.

First, notice that the current objection to the PSR does not depend on any details of quantum mechanics. It just depends on the idea that our best physical theory is indeterministic.

So it seems that if you defend the PSR, you must think that the correct theory of the physical world is a deterministic theory -- one on which the laws of nature, plus the state of the world, determine what will happen in the future.

Here's the problem. As we'll see in the next section of the course, a plausible argument can be made that determinism is inconsistent with the existence of free will.

But free will is a big part of the most popular response to the main argument for atheism -- the argument from evil.

So it looks like the defender of the cosmological argument might need to think hard about whether her picture of the world makes room for freedom of the will, and evil.

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A final objection is quite different, and in some ways more worrying.

Let us suppose for purposes of argument that the conclusion of Leibniz's argument is true, and hence that the following is true:

God brings about  
the existence of  
contingent things

This must be either necessary, or contingent. But either path leads to trouble.

necessary

contingent



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God brings about  
the existence of  
contingent things

necessary

contingent

then it is a  
necessary truth  
that there are  
contingent things

then, by the PSR,  
there must be some  
explanation of  
God's bringing  
about the existence  
of contingent  
things

but then premise  
(1) of the original  
argument is false

but what could this  
be?

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God brings about  
the existence of  
contingent things

contingent

then, by the PSR,  
there must be some  
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but what could this  
be?

The right hand side of the dilemma  
might not look too bad at first. We  
might think, for example, that we  
can explain God's creation of  
contingent things in terms of God's  
deciding to create contingent things.

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The right hand side of the dilemma might not look too bad at first. We might think, for example, that we can explain God's creation of contingent things in terms of God's deciding to create contingent things.

But this just gives us a new fact:

God decides to  
bring about the  
existence of  
contingent things

And this fact must be necessary, or contingent.

If it is necessary, then, again, premise (1) of our initial argument is false.

And if it is contingent, then by the PSR it must have some explanation. But what could this be?



And if it is contingent, then by the PSR it must have some explanation. But what could this be?

The problem for Leibniz's argument is that we can keep asking this question. And this seems to give us just two choices.

### Option 1.

We eventually supply a necessary fact as an explanation of the fact that God creates contingent things. But that threatens to make the existence of contingent things necessary, which falsifies premise (1) of Leibniz's argument.

### Option 2.

There is an infinite series of contingent facts, each one of which explains the next.

## Option 2.

There is an infinite series  
of contingent facts, each  
one of which explains the  
next.

Option 2 might not look so bad. This series would seem to be like Leibniz's example of the geometry books, where each book in the series is explained by the preceding one.

But the problem is that the existence of the infinite series is itself contingent. So, as in the case of the geometry books, we can ask: what explains why there is such a series at all? And if the principle of sufficient reason is true, this question must have an answer.

It is hard to see how we can answer this question without either making the existence of the series (and hence the existence of contingent things) necessary or appealing to yet another contingent fact, which then (if the PSR is true) would need explanation.

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[This is the end of the main lecture. What follows is another way to present the dilemma for Leibniz's argument discussed at the end of lecture. I include it here for those interested in pursuing this issue further — it is purely optional.]

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This is a complex line of thought. Here's a different way to get at basically the same point.

It seems that for any two contingent facts, we can consider their **conjunction**.

So, for example, if we start with the contingent facts

Notre Dame is in Indiana.

USC is in California.

We can also consider the conjunctive fact

Notre Dame is in Indiana and USC is in California.

It looks like we can also do this for arbitrarily long lists of contingent facts: 3 facts, 10 facts, 1 million facts, etc.



It looks like we can also do this for arbitrarily long lists of contingent facts: 3 facts, 10 facts, 1 million facts, etc.

So now consider the the very big conjunctive fact  $C$ , which is the conjunction of all of the contingent facts that there are.

We know that  $C$  will be contingent. So, if the PSR is true,  $C$  has an explanation. Let's call this explanation "E."

Here's a plausible claim: no conjunctive facts can be explained by one of the facts that make it up. It would not make much sense to say that the reason why Notre Dame is in Indiana and USC is in California is that Notre Dame is in Indiana.

But  $C$  contains all of the contingent facts. So  $E$  must be necessary.

But here is another plausible claim: no necessary truth can ever explain a contingent truth. A necessary truth is something which is true no matter how the world turns out to be. So how could it explain some contingent fact about the world?

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But C contains all of the contingent facts. So E must be necessary.

But here is another plausible claim: no necessary truth can ever explain a contingent truth. A necessary truth is something which is true no matter how the world turns out to be. So how could it explain some contingent fact about the world?

So we appear to have reached a contradiction. What is going on?

One way to think about the line of thought we have just pursued is that it shows that the PSR is inconsistent with the existence of contingent facts.

That would be terrible news for the cosmological argument, for that argument requires both the PSR and the premise that there are contingent things.

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That would be terrible news for the cosmological argument, for that argument requires both the PSR and the premise that there are contingent things.

The view that there are no contingent facts is called **necessitarianism**. Here's a way to make explicit the argument from PSR to necessitarianism which we just rehearsed.

## THE PSR → NECESSITARIANISM ARGUMENT

1. Every contingent fact has an explanation. (PSR)
2. If there are contingent facts, then there is a conjunction C of all of the contingent facts.
3. Any conjunction of contingent facts is contingent.
4. If there are contingent facts, then C is explained by some fact E. (1,2,3)
5. No conjunctive fact can be explained by one of its conjuncts.
6. If there are contingent facts, then C is explained by some necessary fact E. (4,5)
7. No contingent fact can be explained by a necessary fact.

-----  
C. There are no contingent facts.  
(6,7)

Any defender of the cosmological argument must deny that this argument is sound, since its conclusion rules out premise (1) of the cosmological argument.

But of course the defender of the cosmological argument cannot reject the PSR.



## THE PSR → NECESSITARIANISM ARGUMENT

1. Every contingent fact has an explanation. (PSR)
2. If there are contingent facts, then there is a conjunction C of all of the contingent facts.
3. Any conjunction of contingent facts is contingent.
4. If there are contingent facts, then C is explained by some fact E. (1,2,3)
5. No conjunctive fact can be explained by one of its conjuncts.
6. If there are contingent facts, then C is explained by some necessary fact E. (4,5)
7. No contingent fact can be explained by a necessary fact.

-----  
C. There are no contingent facts.  
(6,7)

But of course the defender of the cosmological argument cannot reject the PSR.

So it looks like the defender of the cosmological argument either has to find a flaw in the logic of this argument, or reject one of its other independent premises.

Which looks like the best option here?