



A new cosmological argument undone

MICHAEL J. ALMEIDA & NEAL D. JUDISCH

University of Texas at San Antonio, Department of Philosophy, San Antonio, Texas, USA

Introduction

There is an intriguing recent effort to develop a valid cosmological argument on the basis of quite minimal assumptions.¹ Indeed, the basis of the new cosmological argument is so slight that it is likely to make even a conscientious theist suspicious – to say nothing of our vigilant atheists. In Section 1 we present the background assumptions and central premises of the new cosmological argument. We are sympathetic to the conclusion that there necessarily exists an intelligent and powerful creator of the actual universe, but we show in Section 2 that the new cosmological argument cannot establish this claim. Specifically, we show by *reductio ad absurdum* that the new argument is unsound, and that every plausibly modified version of the argument is also unsound.² We close our discussion with a diagnosis of what went wrong in the new cosmological argument. Our conclusion is that this intriguing new argument promises considerably more than it can show.

1. The new cosmological argument

The modal premises of the new cosmological argument are expressed in the familiar, quasi-formal language of possible world semantics. A possible world is interpreted as ‘a maximal, compossible conjunction of propositions’.³ Each possible world, w , then, is identified with a proposition, p , that conjoins each member of a consistent and saturated set S of propositions. Since S is consistent, we know that all members of S can be true together. Since S is saturated, we know that it contains every proposition or its negation as member. Each possible world, then, is a largest consistent conjunction, or a ‘Big Conjunctive Fact’.⁴

We stipulate that some of the propositions comprising The Big Conjunctive Fact of a world are necessary truths.⁵ Among the necessary propositions we include such propositions as $2 + 2$ is not 5, the proposition that there is a number 3, the proposition that if p is the Big Conjunctive Fact

of w then p is the Big Conjunctive Fact of w , and of course any proposition stating the existence of a necessary being. Each possible world contains some necessary truths, but this does not nearly ensure that the same necessary truths hold at every possible world *simpliciter*.⁶ If we wish to have the same necessary propositions as conjuncts in *every* Big Conjunctive Fact (i.e., holding in every possible world) we must further assume that nothing weaker than the logic of S5 governs our modal inferences.

Since a logic at least as strong as S5 is a central premise in the new cosmological argument, we make explicit some of the central theses of S5.⁷ Among the theses of S5 we find the important axiom E, and the characteristic theorem of the logic, T1.

$$\text{E.} \quad Mp \rightarrow LMp$$

$$\text{T1.} \quad MLp \rightarrow Lp.$$

In English, the axiom E states that if a proposition is possible, then the proposition is necessarily possible, and T1 states that if a proposition might be necessarily true, then it is necessarily true. We also find in S5 the familiar theorem of S4, T2.

$$\text{T2.} \quad Lp \rightarrow LLp$$

T2 states that what is necessary in any possible world is necessary in every possible world. So, if we label our necessary propositions ‘L-propositions’, and label our possibility propositions ‘M-propositions’, the theses of S5 guarantee that the very same L-propositions are true at every possible world and the very same M-propositions are true at every possible world. So we know that every modal proposition true at *any* possible world is true at *every* possible world. In short, all possible worlds are *modally equivalent* under S5.⁸

If our possible worlds are modally equivalent, then we can individuate possible worlds if and only if they differ in matters of contingent fact. Let’s call the conjunction of contingent propositions at a world w the Big Conjunctive Contingent Fact of w . It is the Big Conjunctive Contingent Fact of w that individuates w from other worlds. And since the Big Conjunctive Contingent Fact is maximal, it will individuate w from *all* other worlds, or uniquely individuate w .⁹

The first explicit premise of the new cosmological argument follows directly from assumptions we have noted. It is a plausibly restricted expression of Leibniz’s principle of the Identity of Indiscernability, concerning which we have no interesting quarrel.

- (1) If p_1 is the Big Conjunctive Contingent Fact of a world w_1 and p_2 is the Big Conjunctive Contingent Fact of w_2 , and if p_1 and p_2 are identical, then $w_1 = w_2$.¹⁰

Now suppose that p is the Big Conjunctive Contingent Fact of the actual world, @. We assume that p describes every contingent event at @, including the contingent actions of necessary and non-necessary beings, and that p reports the existence of all contingent beings at @¹¹ We expressly state the assumption in premise (2).

- (2) p is the Big Conjunctive Contingent Fact of @.

Perhaps the most interesting assumption of the new cosmological argument is attributed to Duns Scotus and designated the Weak Principle of Sufficient Reason, or W-PSR. It is W-PSR that lends particular significance and power to this version of the cosmological argument. Unlike its stronger counterpart, W-PSR requires only that there is a *possible explanation*, q , for each true proposition p at each world w . More clearly expressed in our quasi-formal language, W-PSR forms premise (3) of the new cosmological argument and states the following.

- (3) W-PSR: For any proposition, p , and any world w , if p is in w 's Big Conjunctive Fact, then there is some possible world, w_1 , and proposition q such that w_1 's Big Conjunctive Fact contains p and q , and the proposition that q explains p .¹²

It is perhaps true, as the authors note, that it would be unreasonable for atheistic opponents (and, we assume, for theistic opponents as well) not to grant W-PSR. Still, we believe that any alert and logically informed atheist will have deep reservations concerning the formulation of W-PSR. But we certainly do not want to incur immediately the charge of being unreasonable. So let us then grant, for the moment, the principle, W-PSR.¹³

The new cosmological argument is concerned primarily with establishing that the cause of the *actual* world was an act of a necessary being, so we will focus on the explanation of the actual world's Big Conjunctive Fact.¹⁴ In premise (4), we instantiate W-PSR accordingly.

- (4) If p is the Big Conjunctive Contingent Fact of @, then there is some possible world, w_1 , such that w_1 's Big Conjunctive Fact contains p and q and the fact that q explains p .

And propositional logic licenses the inference from (2) and (4) to (5) just below.

- (5) There is possible world w_1 and a proposition q such that the Big Conjunctive Fact of w_1 contains p and q and the proposition that q explains p .

We know that q is a possible explanation of the Big Conjunctive Contingent Fact of the actual world, but is q the actual explanation of the Big Conjunctive Contingent Fact of @? The authors of the new cosmological

argument maintain that this radical conclusion is one simple proof away. If it can be shown that $w_1 = @$, they claim, then q constitutes the actual explanation of @.

Call the proof that $w_1 = @$ the *Identity Proof*. Let p_1 be the Big Conjunctive Contingent Fact of w_1 . By premise (2), p is the Big Conjunctive Contingent Fact of @, and by premise (5) p_1 contains p . Suppose there is a conjunct r of p_1 that is not a conjunct of p . Since r is conjunct of p_1 but not of p , $\sim r$ must be a conjunct of p (by hypothesis p is maximal). But then p_1 contains p and $\sim r$, and so contains r and $\sim r$, which is impossible. Therefore p_1 contains no proposition r that is not contained in p . But, of course, p contains no conjunct not contained in p_1 (by premise (5), p is in p_1). Finally, S5 ensures that there is no L-proposition or M-proposition that is not a conjunct of *both* w_1 and @. Therefore, $w_1 = @$, and q is in fact the explanation of the actual world!

2. The argument undone: *reductio ad absurdum*

The new cosmological argument leads us to the radical conclusion that q is the explanation of the actual world from the rather bland assumption that q is a possible explanation of the actual world. But what does the proposition q state? The authors of the new cosmological argument argue at length that q is a *contingent* proposition that reports the free and intentional action of a necessary being. Let us then adopt the following content of q as the authors urge.

- (6) q is a contingent proposition that reports the free intentional action of a (very powerful, intelligent, and good) necessary being that explains the existence of the actual universe.

We now show that it is simply not true that the contingent claim in (6) follows from premises (1)–(5), no matter how the necessary being is characterized.

Assume for *reductio ad absurdum* that q is a contingent proposition describing a possible explanation of the actual world's Big Conjunctive Contingent Fact. Since q is contingent, we know that q is neither necessary nor non-necessary.

- (1*) $\sim Lq \ \& \ \sim L\sim q$ Assumption

From (1*) it follows immediately by modal definitions in S5 that (2*).

- (2*) $Mq \ \& \ M\sim q$

The authors of the new cosmological argument urge that any reasonable opponent of their argument will grant Mq . But from Mq and W-PSR we know that there is some w_1 such that w_1 contains p (i.e., the Big Conjunctive

Contingent Fact of the actual world) and q , and the fact that q explains p . But by the Identity Proof above we know that $w_1 = @$. So, we must conclude that,

(3*) The actual world contains q .

But since q is contingent we know, too, that $M\sim q$. It is possible that q is not the explanation of the actual world's Big Conjunctive Contingent Fact. But if $M\sim q$ then there is some world w_2 such that w_2 contains p (i.e., the Big Conjunctive Fact of the actual world) and $\sim q$ and the fact that q does *not* explain p .¹⁵ But, of course, by the Identity Proof again, it follows that $w_2 = @$. So, we must conclude (4*).

(4*) The actual world does not contain q .

It follows from (3*) and (4*) by propositional logic that,

(5*) The actual world contains q and $\sim q$.

Since the actual world is logically consistent, (5*) is impossible. We conclude by *reductio ad absurdum* that (2*) is false: q is not a contingent proposition! And since the premises of the new cosmological argument entail a contradiction, the argument is unsound.

The authors of the new cosmological argument have available the option of assuming that q is a *necessary proposition* that reports the free intentional action of a (very powerful, intelligent, and good) necessary being that explains the existence of the actual universe. But the suggestion will simply beg the question against a vigilant opponent unless q is a *contingently necessary proposition*. We now show that the assumption of a contingently necessary explanation of the actual world is not useful to the new cosmological argument.

Assume for *reductio ad absurdum* that q is a contingently necessary proposition.

(5*) $MLq \ \& \ M\sim Lq$. Assumption

But it follows immediately from the first conjunct of (5*) and the theses T1 and T2 (above) of S5 that,

(6*) LLq

But from (6*) and simple modal definitions we have,

(7*) $\sim M\sim Lq$.

Conjoining (7*) and the second conjunct of (5*) we have,

(7*) $M\sim Lq \ \& \ \sim M\sim Lq$.

Since (7*) is a contradiction, it follows by *reductio ad absurdum* that our assumption is false, q is not a contingently necessary proposition.

One remaining way to preserve the soundness of the new cosmological argument is to assume that q is simply a necessary truth. Of course, anyone who insists it is a necessary truth that the actual world has a personal explanation, q , should be prepared for the atheist to exit smiling. After all, that is just what the atheist finds perfectly unnecessary.

But suppose instead we assume that a logic weaker than S5 governs our modal inferences. We could then consistently assume that q is a contingent proposition or that q is a contingently necessary proposition. No *reductio ad absurdum* would be forthcoming under either assumption in the new cosmological argument. But this alternative is not particularly promising for the theist, since the Identity Proof is invalid unless we assume a logic at least as strong as S5.¹⁶ So if q is a possible explanation of the actual world, it will not follow that q *in fact* explains the actual world unless the S5 axioms hold.

3. What went wrong in the new cosmological argument?

Suppose we turn our attention to those who are already sympathetic to the belief that there necessarily exists an intelligent and powerful creator of the actual universe. There is good reason to believe that they will not welcome the conclusion of the new cosmological argument that q is necessarily true. The problem is that the new cosmological argument would have an attentive theist knowingly committed to some indefensible conclusions. The new cosmological argument entails, for instance, the impossibility claim, IC, below.

IC. For any possible world, w , if w has no explanation in fact, then it is impossible that w should have had an explanation.

But even a devout atheist is likely to hold that a world for which there is no actual explanation at least *might* have had one. But notice that the new cosmological argument also entails the necessity claim, NC.

NC. For any possible world, w , if w has an explanation in fact, then it is necessary that w has an explanation.

So, the new cosmological argument would commit a theist to the fully implausible view that, for each world w , either it is necessary that w has an explanation or impossible that w has an explanation.

But why do these claims follow from the new cosmological argument? All of these consequences follow on the fact that all modal distinctions collapse among the candidates, q , for *world-explanations*. We now prove that for any new-cosmological-explanation, q , for the existence of any world, w , all modal distinctions collapse, MDC.

MDC. $(q \Leftrightarrow Mq) \& (Mq \Leftrightarrow Lq)$

We know that, in general, if q is an actual explanation for a world w then q is a possible explanation for w . The new cosmological argument establishes the converse of this claim: if q is a possible explanation for w , then q is an actual explanation for w . So, we have the first conjunct of MDC established.

But suppose that q is a possible explanation for a world w . It then follows from E, the characteristic theorem of S5, that q is a necessarily possible explanation of w . So, Mq holds in every possible world. But it follows from the first conjunct of MDC that if Mq holds in every world, q holds in every world. We conclude that q holds in every possible world, or, equivalently, Lq . The converse is even easier. Since everything that is necessary is possible, we know that if Lq then Mq . That concludes the proof of MDC. The resources of propositional logic are enough to lead us from MDC to the additional conclusion that $q \Leftrightarrow Lq$. In short, q is an actual explanation for a world w if and only if q is a necessary explanation for w .¹⁷

The central problem for the new cosmological argument, as we see it, is that it simply collapses the obvious distinctions between claiming that q is an actual explanation for a world, q is a possible explanation for a world, and q is a necessary explanation for a world. These claims are *semantically equivalent* under the assumptions of the new cosmological argument. Yet it is obvious to all parties to the discussion that these claims do not mean the same thing. After all, the disagreement between theists and atheists has presumably not been that atheists simply do not understand the meaning of the phrase ' q is a possible explanation for @'. It is small wonder, then, that the cosmological argument manages to 'derive' an actual explanation for the existence of the world from a possible explanation for it. It might as well have derived a necessary explanation for the world from the remotest possibility that it has one. It is all the same in the new cosmological argument.

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Notes

1. See Richard M. Gale and Alexander R. Pruss, 'A New Cosmological Argument', *Religious Studies* 35 (1999), pp. 461–476. Throughout our discussion, 'the authors' refers to R.M. Gale and A.R. Pruss.
2. Graham Oppy has shown that the new cosmological argument makes assumptions no weaker than older cosmological arguments. Specifically, he shows that the weak principle

- of sufficient reason (below) entails the strong principle of sufficient reason. But the new cosmological argument has far more serious problems. Among those problems is the fact that the weak principle of sufficient reason entails what we might call the “ultra-strong principle of sufficient reason” (i.e., that every world which has a possible explanation q , necessarily has an explanation q). But cf. “On ‘A New Cosmological Argument,’” *Religious Studies* 36 (2000), pp. 345–353.
3. It is not completely clear from the discussion, but these worlds seem to be linguistic ersatz worlds. Since each possible world includes infinitely many atomic propositions the conjunction would have to employ non-standard, infinitary connectives. But compare David Lewis, *On the Plurality of Worlds* (Cambridge: Blackwell Publishers, 1986) and Andrew Roper, ‘Toward an Eliminative Reduction of Possible Worlds’ *The Philosophical Quarterly* 32 (1982), pp. 45–59.
 4. See Richard M. Gale and Alexander R. Pruss, ‘A New Cosmological Argument’, *Religious Studies*, op. cit., p. 462 ff. We follow the terminology of Gale and Pruss in our use of ‘Big Conjunctive Fact’ and ‘Big Conjunctive Contingent Fact’. In addition, the authors seem to maintain that worlds are not closed under logical implication (cf. n. 2, p. 262). It is not true in any world w that if p is true at w , then $(p \ \& \ p)$ is true at w . The motivation is to avoid “the absurdity of a conjunction being one of its own conjuncts”. But it is not obvious (to us, at any rate) that there is anything logically absurd in conjoining a Big Conjunctive Fact with itself, since $\neg p \Leftrightarrow (p \ \& \ p)$.
 5. This is not particularly controversial stipulation. If there are necessary truths, then every world contains some, even worlds from which no other worlds are accessible, the so-called ‘dead end worlds’, and even worlds whereof you speak truly only by contradicting yourself, the so-called ‘impossible worlds’.
 6. S5 is usually characterized as permitting every world access to every world. But it can also be the case that every world has access to just those worlds in its equivalence class. The argument is not affected by either assumption.
 7. We follow the axiomatization of S5 in G.E. Hughes and M.J. Cresswell, *A New Introduction to Modal Logic* (New York: Routledge, 1996). Throughout, our necessity operator is L and our possibility operator is M; our conditional connective is \rightarrow and our biconditional connective is \Leftrightarrow .
 8. Since we are evaluating a cosmological argument, the logic of S5 already seems too strong. It is fairly certain that causal necessity is not governed by S5 theorems. For instance, if p is causally possible at the actual world, it does not follow that p is causally possible in all worlds. At least some possible worlds presumably have causal laws very different from our own. But then, if it is causally possible that q explains proposition p at the actual world, we should not expect that it is causally possible that q explains p in every other world! But the authors of the new cosmological argument argue that the only(?) explanation possible for a Big Conjunctive Fact of any world is a ‘personal explanation’. We are assuming that a personal explanation is nonetheless a species of causal explanation since it seems undeniable that at least some of the conjuncts of p (i.e., some of the events occurring in a world) have a causal explanation (perhaps one whose first cause is an unmoved mover who intentionally and freely initiates a causal sequence).
 9. We assumed that the Big Conjunctive Fact is maximal. The Big Conjunctive Contingent Fact is also maximal (with respect to contingent propositions) and is a conjunct of the Big Conjunctive Fact. So, no two worlds have the same Big Conjunctive Contingent Fact.
 10. Gale and Pruss note that two propositions are identical (in this case) if every conjunct of one is a conjunct the other. But since no world seems to be (fully) closed under implic-

ation, a Big Conjunctive Fact (BCF) of w might be distinct from a proposition to which it is logically equivalent. So two logically equivalent propositions (BCF's) might not be identical worlds.

11. It is of course a matter of important metaphysical debate whether a necessary being can perform contingent acts. But, in our view, this is among the lesser worries of the new cosmological argument, so we do not engage the problem.
12. As mentioned in note (4) above, the principle, W-PSR is not particularly plausible under S5, since W-PSR seems to be claiming that for at least some occurrences p in a world w it is possible that q causally explains p .
13. An atheist ought to insist that WPSR be formulated using two clauses. So, consider WSPR2.

WSPR2: For any proposition, p , and any world w , if p is in w 's Big Conjunctive Fact, then (i) there is some possible world, w_1 , and proposition q such that w_1 's Big Conjunctive Fact contains p and q , and the proposition that q explains p and (ii) there is some possible world, w_2 , and proposition $\sim q$ such that w_2 's Big Conjunctive Fact contains p and $\sim q$, and the proposition that q does not explain p .

WSPR2 ensures that any explanation for the existence of the actual world is not only possible, but also contingent.

14. It is worth noting that even if the new cosmological argument were successful, it would show only that the actual world *was* caused by an act of a necessary being. A Deistic reply might urge that this is compatible with the necessary being thereafter retiring from the actual world completely (i.e., with a non-immanent necessary being).
15. There are two ways to prove this claim. (1) Suppose it were not true that there is some world w_1 which contains the Big Conjunctive Contingent Fact of @, p , and $\sim q$ and the fact that q does *not* explain p . In that case, *every* world w^* which contained p would also contain q and the fact that q explains p . But that is just to say that Lq , contrary to our assumption in (1*). So, there must be such a w_1 , as we have assumed. (2) Since q is a contingent explanation of the BCCF of @, we know that the actual BCCF *might* have had some other explanation r , such that $\sim M(r \ \& \ q)$. Since r is a possible explanation of @, and $\sim M(r \ \& \ q)$, we know (by the identity proof) that there is a world w_1 such that w_1 contains p , $\sim q$, r , the fact that r explains p , and the fact that q does not explain p . So, clearly, there is a world (viz., w_1) that contains $\sim q$ and p . Many thanks to Gino Scarselli for suggesting that we prove the claim formally.
16. Proof. Without a logic as strong as S5, it is not true that all worlds are modally equivalent. Suppose w_1 contains the Big Conjunctive Contingent fact p , q and the proposition that q explains p . The Identity Proof shows that w_1 and @ contain the same *contingent* propositions. But, without the assumption of S5, w_1 and @ *might not* contain the same modal propositions. So, the Identity Proof cannot show that $w_1 = @$. And since it is possible that @, w_1 , and w_2 are three modally distinct worlds, there is a model in which w_1 contains p , q and the proposition that q explains p , and w_2 contains p , $\sim q$ and the fact that q does not explain p . So, we can consistently assume that q is contingent at @, or Mq and $M\sim q$.
17. It is important to note that the propositional variable q is restricted to world-explanations. So, MDC holds only for the explanations for worlds (or, more precisely, the BCCF's of worlds). To see MDC more intuitively, assume that there are two worlds w and w' such that w contains p (the BCCF of @) and the explanation q , and w' also contains p and the explanation r , where $r \neq q$. If this were possible, then for possible explanation q , it would

be true that Mq and $\sim Lq$, and MDC would be false. But of course the assumption is not possible. It follows from the assumption that the BCCF of @ is explained by q and not r , and it is also explained by r and not q . So, if Mq then Lq . The remaining implications in MDC are uncontroversial, given the assumptions of Gale and Pruss.

Address for correspondence: Professor Michael J. Almeida, The University of Texas at San Antonio, Department of Philosophy, 6900 North Loop 1604 West, San Antonio, TX 78249-0643, USA
Phone: (210) 458-4374; Fax: (210) 458-5366;
E-mail: malmeida@utsa.edu/n.judisch@att.net