Cohen on the *Kalam* Cosmological Argument

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ABSTRACT: Yishai Cohen raises three related objections to the *kalam* cosmological argument. Firstly, Cohen argues that, if the argument against the possibility of an actual infinite, which is used to support the *kalam* cosmological argument, is sound, then a predetermined endless future must also be impossible. Secondly, Cohen argues that the possibility of a predetermined endless future entails the possibility of an actual infinite. Finally, Cohen maintains that Robert C. Koons' Grim Reaper paradox shows that a predetermined endless future is impossible. I intend to show that Cohen's three arguments are not sound and that the possibility of an endless future is not a thorn in the *kalam* cosmological argument.

KEYWORDS: Actual infinite, Yishai Cohen, Grim Reaper paradox, *kalam* cosmological argument, Wes Morriston, potential infinite.

1. Introduction

The *kalam* cosmological argument (KCA) is a notable theistic argument that attempts to demonstrate three claims, namely, (1) that the universe had a beginning, (2) that the universe has a cause of its beginning, and (3) that this cause is a transcendent, personal being (or God). I will, thus, present the KCA as the following syllogism (*cf.* Craig 1979: 63):

(A1) If the universe came into being, God brought it into being.

(A2) The universe came into being.

(A3) Therefore, God brought the universe into being.[1]

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[1] The KCA is usually presented as a syllogism that does not introduce God in its premises, such as the following syllogism: Everything that begins to exist has a cause; the universe began to exist; therefore, the universe has a cause. However, since the KCA is an argument for God's existence, I find it appropriate to introduce God in its premises.

A distinguishing characteristic of the KCA is that its philosophical arguments in support of (A2) make use of the notion of infinity to show that the universe came into being. Perhaps the most common argument in support of (A2) used by advocates of the KCA is the argument against the possibility of an actual infinite. Let us refer to this as the "Infinity Argument". According to the Infinity Argument, if the universe had no beginning, then an actually infinite number of past events (such as days) have occurred. However, it is impossible for an actually infinite number of things (such as events) either to exist simultaneously or to come into existence one at a time. Thus, the series of past events must be finite. It follows, then, that the universe had a beginning.

However, Yishai Cohen (2015) raises three related objections to the Infinity Argument.[2] Firstly, Cohen argues that, if the Infinity Argument is sound and a beginningless past is impossible, then an endless future is likewise impossible.[3] Cohen then argues, secondly, that, if God is able to predetermine an endless future, then God is also able to bring an actually infinite number of objects into existence simultaneously and that this is inconsistent with the Infinity Argument. Finally, Cohen argues that the proponents of the KCA cannot use Robert C. Koons' (2014) Grim Reaper paradox in favour of (A2) because, as with the Infinity Argument, the Grim Reaper paradox implies that a predetermined endless future is impossible. According to Cohen, if his three arguments are sound, then the possibility of an endless future is a thorn in the KCA because "the apparent metaphysical possibility of an endless future remains an obstacle for the *a priori* case for the universe's beginning" (Cohen 2015: 186).

In this paper I intend to show that Cohen's three arguments are unsuccessful. More precisely, I argue that (1) Cohen's first argument is based on a misinterpretation of the Infinity Argument, (2) Cohen's second argument fails to appreciate the potential/actual infinite distinction, and (3) Cohen's third argument shows, at most, that it is impossible for God to actualise an ungrounded causal chain. I will begin by briefly describing the Infinity Argument.

2. The Infinity Argument

As mentioned above, the Infinity Argument attempts to show that the universe must have had a beginning because an actually infinite number of things, such as past events, cannot exist. Let A mean "is actually infinite",

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[2] Cohen's first argument is similar to Wes Morriston's (2010; 2012) objection to the Infinity Argument.

[3] In this context, the phrase "a beginningless past" means "an infinite regress of past events", while the phrase "an endless future" means "an infinite series of future events".

let E mean "exists in the real world", let D mean "is beginningless", and let r be *the temporal regress of events*. Accordingly, the Infinity Argument may be formulates as follows (*Cf.* Craig and Sinclair 2012: 103):

(B1) $\forall x\, [\neg\, (Ax \wedge Ex)]$ Premise

(B2) $Dr \supset (Ar \wedge Er)$ Premise

(B3) $\neg(Ar \wedge Er)$ (B1), Universal Instantiation

(B4) $\neg Dr$ (B2), (B3), *Modus Tollens*

In order to understand this argument better, we must distinguish between the actual infinite and the potential infinite. The *actual infinite* is an endless set whose members are, nevertheless, present all at once. The members of an actually infinite set may be placed in a one-to-one correspondence with a proper part of the set, with each member in the subclass being paired with only one member in the set. Thus, the actual infinite is a completed totality of infinitely many distinct members. On the other hand, the *potential infinite* is an indefinite process, such as endless addition. Such a process or series is dynamic because it increases endlessly towards infinity but at no point does it become actually infinite. Thus, the potential infinite is always finite and never complete. The crucial difference, then, between the actual infinite and the potential infinite is that the latter is not a completed totality whereas the former is.

In order to defend (B1), William Lane Craig (in Craig and Sinclair 2012: 108–10) uses thought experiments to show that certain alleged absurdities would result if an actual infinite were metaphysically possible. One such thought experiment is David Hilbert's so-called *Hilbert's Hotel*: Imagine a hotel with an infinite number of rooms, with each room being occupied by a guest. Now, suppose that the guest in room number 1 departs and, thus, the room becomes available. Oddly enough, however, although there is one less guest in the hotel, the number of guests in the hotel has not changed and remains infinite. Thus, infinity minus one equals infinity. Now, suppose that all guests in odd numbered rooms depart. In that case, although an infinite number of guests have left, the number of guests in the hotel remains the same, namely, infinity. Consequently, infinity minus infinity equals infinity. However, if all the guests in room numbers 5 and above depart, then only four guests would remain–those in room numbers 1, 2, 3 and 4. Thus, infinity minus infinity equals four. This, in turn, leads to three inconsistent situations:

1. Infinity minus one equals infinity ($\aleph_0 - 1 = \aleph_0$).

2. Infinity minus infinity equals infinity ($\aleph_0 - \aleph_0 = \aleph_0$).

3. Infinity minus infinity equals four ($\aleph_0 - \aleph_0 = 4$).

Thus, the Hilbert's Hotel thought experiment illustrates that, if an actually infinite number of objects can exist in the real world, then an equal quantity may be subtracted from an equal quantity and yet produce different results. However, according to Craig, such a situation is unbelievable and, thus, an actual infinite cannot exist:

> Hilbert's Hotel is absurd. But if an actual infinite were metaphysically possible, then such a hotel would be metaphysically possible. It follows that the real existence of an actual infinite is not metaphysically possible (Craig and Sinclair 2012: 110).

Thus, Craig believes that (B1) is true. Furthermore, Craig argues that (B2) is obviously true because "if there has been a sequence composed of an infinite number of events stretching back into the past, then the set of all events in the series would be an actually infinite set" (Craig and Sinclair 2012: 115). Accordingly, Craig concludes that an infinite temporal regress of events cannot exist and, thus, the universe had a beginning.

3. A Critique of Cohen's First Argument

Cohen's (2015: 168–77) first objection to the Infinity Argument is that the argument depends on an unjustified principle, namely, that any series may be actually infinite only if it is part of reality. Cohen states that some of the proponents of the Infinity Argument, such as Craig (2010), affirm the following six metaphysical claims:

i.   The tensed, or A-theory of time, is true because the past, present and future are objectively distinct, temporal becoming is real, and the temporal series of events comprises every past and present event and nothing more.

ii. Presentism is true because only temporally present objects, timeless objects (if any), and the present moment exist.

iii. The past and the present are part of the actual world, whereas the future is not.

iv. Platonism is false because abstract objects, such as propositions and future tensed truths, do not exist.

v.   God's knowledge is non-propositional in nature because God has one simple intuition through which he knows all reality. Furthermore, although God's knowledge is non-propositional, finite creatures may endlessly break God's simple intuition down into a potentially infinite number of propositions.

vi. For any series x, x may be actually infinite in quantity only if x is actual or part of reality.

Cohen assumes, for the sake of argument, that claims (i) to (v) are true. He then argues that (vi) is the unjustified principle on which the Infinity Argument relies. According to Cohen, claims (i) to (v) do not, by themselves, allow one to affirm the following proposition:

(D) An endless temporal regress of events is an actual infinite,

and also to deny the following proposition:

(E) An endless temporal progress of predetermined events is an actual infinite.

The reason for this, argues Cohen (2015: 172), is that "assumptions (i)–(v) alone cannot establish a relevant difference between the past and the future", such that (D) is true and (E) is false. Therefore, unless the proponents of the Infinity Argument affirm (vi), they must either affirm both (D) and (E) or deny both (D) and (E). There is no third option.

In order to arrive at this conclusion, Cohen maintains that there are five different interpretations of (D) and also five different interpretations of (E). Let Q mean "an endless temporal regress of past events entails that", and let R mean "an endless progress of predetermined events entails that". Accordingly, Cohen states that (D) may have one of the following five meanings:

(D1) Q (There are an actually infinite number of past events).

(D2) Q (It has at some time been the case that there are an actually infinite number of past events).

(D3) Q (It has always been the case that there are an actually infinite number of past events).

(D4) Q (There were an actually infinite number of past events).

(D5) Q (There are an actually infinite number of past-tensed truths).

Similarly, Cohen states that (E) may have one of the following five meanings:

(E1) R(There are an actually infinite number of future events).

(E2) R(It has at some time been the case that there are an actually infinite number of future events).

(E3) R(It has always been the case that there are an actually infinite number of future events).

(E4) *R*(There will be an actually infinite number of future events).[4]

(E5) *R*(There are an actually infinite number of future-tensed truths).

In view of the fact that Cohen evaluates no other interpretation of (D) and (E), and also that he states that (i) to (v) alone cannot render (D) true and (E) false, it is clear that Cohen believes that the above interpretations of (D) and (E) are the only interpretations that advocates of the Infinity Argument may adopt. Given these interpretations, Cohen correctly argues that presentism, or claim (ii) above, rules out (D1) to (D3) and (E1) to (E3). Furthermore, Cohen points out that, if (i) to (v) render (E4) and (E5) false, then (i) to (v) likewise render (D4) and (D5) false. Thus, Cohen concludes that the Infinity Argument relies on (vi).

However, Cohen then argues that (vi) is an implausible principle. Recall that (vi) states that, for any series *x*, *x* may be actually infinite in quantity only if *x* is actual or part of reality. In order to bring (vi) into question, Cohen asks us to imagine that God determines right now that two angels, Gabriel and Uriah, will praise God only four times each. In that case, the number of future praises that both Gabriel and Uriah will make is eight, even though these future events are not yet actual. But if it is possible for an unactualised series of events to be finite, argues Cohen, then it is difficult to see how (vi) may be true. Cohen, thus, concludes that (vi) is implausible.

Now, Cohen's first argument, I believe, is unsound because (D1) to (D5) are not the only available interpretations of (D), and (E1) to (E5) are not the only available interpretations of (E). Recall that (D) states that an endless temporal *regress* of events is an actual infinite, while (E) states that an endless temporal *progress* of predetermined events is an actual infinite. Now, Cohen's argument assumes that (D1) to (D5) and (E1) to (E5) are the only interpretations available to the proponents of the Infinity Argument. However, this assumption is puzzling because the proponents of the Infinity Argument espouse none of the interpretations of (D) and (E) offered by Cohen and, instead, they espouse very different interpretations. For example, according to Mark R. Nowacki (2007:

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[4] Both (D4) and (E4) are ambiguous. For example, (D4) may mean either (1) that "*Q*(It has at some time been the case that there *are* an actually infinite number of past events)" or (2) that "*Q*(An actually infinite number of past events *have occurred*)". To all appearances, it would appear that Cohen is of the opinion that (D4) means neither (1) nor (2). In his evaluation of (D4) and (E4), Cohen interprets (D4) to mean that "In a beginningless universe there is a number of past-tensed truths, such that the number of them is an actual infinite", and he interprets (E4) to mean that "In an endless universe there is a number of future-tensed truths, such that the number of them is an actual infinite" (Cohen 2015: 175–6). Furthermore, Cohen argues that (i) to (v) alone cannot render (D5) true and (E5) false for the same reasons (i) to (v) alone cannot render (D4) true and (E4) false. Thus, it turns out that Cohen unintentionally regards (D4) synonymous with (D5) and (E4) synonymous with (E5). Therefore, it is safe to assume that Cohen does not intend that (D4) means (2) and that he does not intend that (E4) means that "An actually infinite number of future events *will occur*".

242), (D) means that an actually infinite number of past events have occurred and that the occurrence of each event has left a distinct temporal mark. Similarly, according to Craig and Sinclair, "when we say that the number of past events is infinite, we mean that prior to today, [an actually infinite number of] events have elapsed" (Craig and Sinclair 2012: 116). Clearly, then, the proponents of the Infinity Argument interpret (D) to mean the following:

> (D6) An endless temporal regress of past events entails that, prior to today, an actually infinite number of events *have* occurred.

Similarly, since the majority of the proponents of the Infinity Argument affirm (D6), they will probably interpret (E) to mean the following:

> (E6) An endless progress of predetermined events entails that, subsequent to today, an actually infinite number of events *will* occur.[5]

Both (D6) and (E6) are valid interpretations of (D) and (E). Indeed, (D6) and (E6) appear to be the most natural interpretations of (D) and (E). It is, therefore, surprising that Cohen overlooks these two interpretations.

That both (D6) and (E6) are valid interpretations of (D) and (E) raises the following question: Can claims (i) to (v) alone render (D6) true and (E6) false? The answer to this question is *yes*. In the first place, (D6) and (E6) do not commit one to (vi) because they imply that unactualised events may be numbered. In the second place, according to the A-theory, (D6) is true because the temporal series of events is either finite or actually infinite. Given the arrow of time, the past cannot be potentially infinite because it would then be finite but endlessly expanding in a backwards direction. Accordingly, if the temporal series of events has no beginning, then the number of events that have occurred prior to today is actually infinite and this, in turn, implies that (D6) is true. Moreover, the A-theorist will deny (E6), insisting that the future is potentially infinite only because an actually infinite number of events will never occur. God can, at most, predetermine a potentially infinite series of events, and this is possible given God's non-propositional knowledge. In addition, presentism does not rule out either (D6) or (E6) because neither (D6) nor (E6) imply that an actually infinite number of events exist right now. Therefore, proponents of the Infinity Argument may deny (vi) and still be justified in affirming (D) while denying (E) and, thus, Cohen's first argument is unsuccessful.

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[5] An actually infinite series is actualised only if all its members either come into existence successively or exist simultaneously. Thus, both (D6) and (E6) concern the number of events that *have or will be actualised* and not the number of *true propositions* that describe past or future events. This distinction is important because it centres the discussion, not on the number of true propositions about the past or the future, but on the number of events that have occurred or will occur one after the other.

4. A Critique of Cohen's Second Argument

As a second argument, Cohen (2015: 178–81) maintains that the theist, who believes that God is omnipotent, must affirm the following proposition:

(H)　If an endless series of events is possible, then Hilbert's Hotel is metaphysically possible.

However, (H) is ambiguous for it may mean one of the following two different propositions:

(H1)　If an *actually* infinite series of events is possible, then Hilbert's Hotel is metaphysically possible.

(H2)　If a *potentially* infinite series of events is possible, then Hilbert's Hotel is metaphysically possible.

The theistic advocate of the KCA will affirm (H1) but deny (H2). Thus, in order for Cohen's second argument to be successful, he must show that the theist is committed to (H2). But, as we shall see, he has not succeeded in doing this.

Cohen's argument may be briefly summarised as follows: For any object *x* that will come into existence in the future, if God is omnipotent, then God may bring *x* into existence at the present moment. Now, imagine that the future is endless and that in one thousand years' time, a hotel room builder will begin to build a hotel room for every minute without end. Suppose that God decides right now to bring every hotel room that *will be built* into existence simultaneously. In addition, God sustains these hotel rooms in existence for one year only. In that case, God brings an actually infinite number of hotel rooms into existence simultaneously and this, in turn, implies that Hilbert's Hotel is metaphysically possible. Therefore, if an endless series of events is possible, then Hilbert's Hotel is metaphysically possible.

There is a fundamental problem with this argument, however. Cohen states that his argument depends on the theist being committed to the following proposition:

(P1)　For any object *x* that will come into existence in the future, if God is omnipotent, then God may bring *x* into existence at the present moment.

It turns out, however, that Cohen's argument depends on the theist being committed, not to (P1), but to the following proposition:

(P2)　For any collection *x* of objects that will come into existence in the future, if God is omnipotent, then God may bring every element of *x* into existence simultaneously at the present moment.

However, (P2) is patently false. If a tree will come into existence in one year's time, and a boat will be built from the wood of that tree in ten years' time, then can God bring both the tree and the boat into existence simultaneously right now? Clearly not, for the boat and the tree cannot exist simultaneously. Likewise, because it is part of the nature of the potential infinite that its members cannot exist simultaneously, God cannot bring a potentially infinite number of things into existence all at once.

Therefore, Cohen fails to appreciate the difference between the potential infinite and the actual infinite. As noted above, the actual infinite is a completed totality whereas the potential infinite is not. The elements of an actual infinite may be present simultaneously whereas the elements of a potential infinite cannot be present simultaneously. Furthermore, if the future is potentially infinite, then the collection of hotel rooms that will be built is dynamic and potentially infinite and not static and actually infinite.[6] This collection may be actually infinite only if the future is actually infinite. Therefore, since it is metaphysically impossible for the elements of a potential infinite to be present all at once, it is metaphysically impossible for God to bring every future hotel room into existence all at once. Consequently, (H2) is false.

If Cohen insists that an actually infinite number of rooms will be built, then he is implicitly affirming that an actually infinite number of events will occur (namely, the events in which the hotel rooms are built) and this, in turn, implies that the series of future events is actually infinite. In that case, Cohen has defended (H1) and not (H2). However, Cohen may argue that, although the future is potentially infinite and an actually infinite number of hotel rooms will not be built, the number of hotel rooms that *will be built but have not yet been built* is actually infinite. But this claim is false because the collection of hotel rooms that *will be built* is the same as the collection of hotel rooms that *will be built but have not yet been built*. Again, this collection may be actually infinite *only if* the future is actually infinite. *Mutatis mutandis* for the collection of hotel rooms that God *predetermines to be built*. Perhaps, then, Cohen will argue that the collection of hotel rooms that *will never be built* is actually infinite. In that case, since these non-existent "hotel rooms" are really abstract objects, Cohen is not attempting to defend (H2) but, rather, he is attempting to defend the following proposition:

(H3) If an actually infinite collection of abstract objects exist, then Hilbert's Hotel is metaphysically possible.

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[6] Cohen (2015: 180) affirms this claim: "It is certainly true that at no point in time will an actual infinite number of hotel rooms be built". However, in the next sentence he claims that the number of hotel rooms that will be built is actually infinite. These two claims are simply inconsistent. The number of hotel rooms that will be built is either actually infinite or not actually infinite – it cannot be both.

However, the proponent of the Infinity Argument may affirm (H3). Therefore, Cohen cannot show that the theist is committed to (H2) and, thus, his second argument is unsuccessful.

5. A Critique of Cohen's Third Argument

Cohen's (2015: 181–185) final objection is to argue that, even if the proponent of the KCA abandons the Infinity Argument and defends Koons' (2014) version of the Grim Reaper Paradox (GRP), he or she still faces the problem of a predetermined endless future. For present purposes, we may ignore the intricate details of Koons' GRP and present his paradox as follows: Suppose that the temporal series of past events is actually infinite and that an actually infinite number of Grim Reapers exist. Suppose also that, at each past moment in time, a unique Reaper was assigned to issue a death warrant iff no previous Reaper had already issued a death warrant. This, in turn, implies that a death warrant may be issued only if some Reaper has issued it. However, this would result in the following two inconsistent states. Firstly, for any past time t_n, a death warrant has been issued prior to t_n because, if no Reaper prior to t_{n-1} has issued a death warrant, then the Reaper at t_{n-1} would have issued a death warrant. However, this implies, secondly, that no Reaper has issued a death warrant. Thus, for any past time t_n, a death warrant both *has* been issued at t_n and *has not* been issued at t_n. Notice that, if the temporal series of past events is finite, then the contradiction disappears because the first Reaper would issue a death warrant and all subsequent Reapers would do nothing. Therefore, an actually infinite past is impossible.

In order to show that Koons' GRP faces a problem, Cohen constructs Koons' GRP in reverse as follows: Suppose that time had a beginning, that the future is endless, and that an actually infinite number of Grim Reapers exist. Suppose that, for each time t, a unique Reaper is assigned either (1) to swing his scythe at t iff no Reaper swings his scythe at some time after t, or (2) not to swing his scythe at t iff some Reaper swings his scythe at some time after t. Now, if Reaper$_1$ swings his scythe at t_1 (the first moment of time), then Reaper$_2$ does not swing his scythe and this, in turn, implies that some Reaper swings his scythe after t_2. In that case, we have arrived at a contradiction, namely, it is both true and false that some Reaper swings his scythe after t_1. A similar contradiction results if Reaper$_1$ does not swing his scythe at t_1. Thus, Cohen concludes that an endless future appears to be as impossible as a beginningless past.

What should we think of Cohen's GRP? Unlike Koons' GRP, Cohen's GRP rests on the following two assumptions:

(K1) It is possible for God to predetermine an endless future.

(K2) It is possible for God to actualise an ungrounded causal chain.[7]

Cohen's GRP requires (K1) so that the future is completely determined, and it also requires (K2) so that each Reaper will necessarily swing his scythe iff none of the infinitely many future Reapers swing their scythes. According to Cohen, (K1) must be denied in order to escape Cohen's GRP. However, it turns out that Cohen's GRP may be escaped by denying (K2) while affirming (K1). This is clearly seen by the fact that the logic underpinning Cohen's GRP entails that the same paradox will result *even if* (K1) is false but (K2) is true.[8]

For example, suppose that time had a beginning and has an end. Accordingly, the predetermined series of future events is finite. Suppose further that space is inhabited only by an actually infinite row of successive Grim Reapers such that (1) there is a first Reaper but no last Reaper, (2) each Reaper is located at a unique spatial point, and (3) all the Reapers are facing the same direction. Now, suppose that God has predetermined that, at noon tomorrow, each Reaper will swing his scythe iff no Reaper in front of him swings his scythe. Accordingly, the same contradiction as above will result at noon tomorrow, namely, regardless of whether the first Reaper swings his scythe, it is both true and false that some Reaper in front of the first Reaper swings his scythe. The contradiction disappears, however, if (K2) is false.

This illustrates that, in order to escape Cohen's GRP, the theist need not deny (K1) but, rather, he or she must simply deny (K2). If (K1) is true and (K2) is false, then no paradox results because it is impossible for God to predetermine either a paradoxical future or a paradoxical sequence of Grim Reapers. This conclusion will trouble scarcely any theist. Furthermore, since an endless past – unlike an endless future – is an ungrounded causal chain in which each event is caused by a prior event(s), and since Koons' GRP excludes assumptions (K1) and (K2), one may escape Koons' GRP *only* by denying the pos-

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[7] A causal chain is any causal sequence of items such that all the items, excluding the first item, if it exists, are completely determined by other items that are prior in the causal chain. An *ungrounded* causal chain has a non-well founded relation (xRy, zRx, zRv, wRv, …) because the chain lacks a first cause. Thus, the sequence of Grim Reapers of the form $x_1Rx_2Rx_3Rx_4$… such that Reaper x_1 swinging his scythe depends on Reaper x_2 swinging his scythe, etc. is an ungrounded causal chain. Accordingly, to say that "it is possible for God to actualise an ungrounded causal chain" means that it is metaphysically possible for God to bring about such an ungrounded causal chain either simultaneously or over some duration.

[8] I am indebted to Laureano Luna for bringing it to my attention the fact that an ungrounded causal chain, such as the sequence of Reapers in Cohen's GRP, will result in a paradox even if the entire causal chain is instantiated immediately as opposed to coming into existence over some duration.

sibility of an endless past.[9] Therefore, Cohen has failed to show that Koons' GRP invalidates the view that God predetermined an endless future.

6. Conclusion

Cohen has offered three objections to the Infinity Argument. I have argued, however, that these three objections are all unsuccessful. Firstly, Cohen's first argument depends on interpretations of the phrase "an endless temporal series of events is an actual infinite" that the proponents of the Infinity Argument reject. Secondly, Cohen's second argument fails to appreciate the difference between the potential infinite and the actual infinite. Finally, Cohen's third argument shows, at most, that it is impossible for God to actualise an ungrounded causal chain, which does not preclude the possibility of an endless future. Cohen has, therefore, failed to show that the possibility of an endless future is a persistent thorn in the *kalam* cosmological argument.

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[9] Luna (2009a; 2009b) has also persuasively argued that, because an ungrounded causal chain is impossible, time must have had a beginning.