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Kant on the Conceptual Possibility of Actually Infinite *Tota Synthetica*

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Abstract

Most interpreters hold that Kant rejects actually infinite *tota synthetica* as conceptually impossible. This view is attributed to Kant to relieve him of the charge that the first antinomy's thesis argument presupposes transcendental idealism. I argue that important textual evidence speaks against this view, and Kant in fact affirms the conceptual possibility of actually infinite *tota synthetica*. While this means the first antinomy may not be decisive as an indirect argument for idealism, it gives us a better account of how our ideas of the unconditioned generate the antinomies, and it allows us to see important and often overlooked elements in Kant's account of the infinite.

Keywords: infinity; actual infinity; totality; world-concepts; unconditioned; conceptual possibility; antinomy

1. Introduction

According to an influential interpretation, Kant holds that actually infinite *tota synthetica* are a conceptual impossibility.[1] That is, if a whole is composed from parts (rather than being given prior to its parts), then its actual infinity can be ruled out on purely conceptual grounds. Call this view the 'No Actually Infinite Tota Synthetica' view, or 'NAITS' for short. In the scholarship, NAITS is often attributed to Kant for the following reason. If Kant does not endorse NAITS, the argument goes, then the thesis argument of the first antinomy begs the question against the transcendental realist. For the thesis argument aims to show that an actually infinite spatiotemporal world is impossible, but it appears to reason from claims about our inability to grasp (or 'synthesise') an infinite world to the conclusion that an infinite world cannot exist. And as commentators have worried, a transcendental realist arguably can reject this line of reasoning as question-begging. However, if Kant holds that actually infinite *tota synthetica* are a conceptual impossibility, then no such problem arises, and the thesis argument is pitched in terms that the transcendental realist must accept.[2]

Against this interpretation, I argue in this article that Kant does not accept NAITS, and his considered position is rather that actually infinite *tota synthetica* are (at least) conceptually possible. While this may mean that the first antinomy's indirect argument for idealism is dialectically weak against the transcendental realist (depending on what the thesis of transcendental realism turns out to involve), the

payoff is (i) a better understanding of how our ideas of the unconditioned drive the antinomies and (ii) a better appreciation of important and often overlooked elements in Kant's account of the infinite. Moreover, the consensus view arguably fails to free the first antinomy's thesis argument from idealistic suppositions in the way that it intends to; hence, it does not have the advantage it is typically thought to have.[3]

The article proceeds as follows. In section 2, I present the distinction between *tota synthetica* and *tota analytica*, as well as the arguments motivating the consensus view that Kant embraces NAITS. In section 3, I argue that Kant's discussion of reason's ideas of the unconditioned provides evidence that he takes actually infinite *tota synthetica* to be conceptually possible (contra the current consensus). Section 4 considers and responds to two objections to my interpretation of the textual evidence in section 3. Section 5 builds on the discussion in section 4 to show that the consensus view fails to free the first antinomy's thesis argument from the idealistic assumptions it originally aimed to remove from that argument. Section 6 shows how revising the current consensus can improve our understanding of Kant's views on the infinite.

2. The consensus view: Kant embraces NAITS

In the secondary literature, Henry Allison's (1983) *Kant's Transcendental Idealism* has become the locus classicus for the consensus view that Kant rejects actually infinite *tota synthetica* as conceptually incoherent. Allison begins from the observation that Kant makes an important distinction between wholes that result from a combination or unification of pre-given parts (*tota synthetica*) and wholes that are given prior to their parts (*tota analytica*).[4] Space and time are paradigmatic examples of *tota analytica*, for in space and time (as Kant understands them) the 'parts are possible only in the whole, and not the whole through the parts' (A483/B466). In contrast, the material world (as it is treated in the antinomies) is a *totum syntheticum*, for it is a whole formed from a combination of prior parts.[5] As Kant writes, the idea of the material world is the idea of '**[t]he absolute completeness** of the **composition** [*Zusammensetzung*] of the given whole of all appearances' (A415/B443).[6] Because the material world requires a *composition*, it is a *totum syntheticum* rather than a *totum analyticum*. And for proponents of the current consensus, this is a crucial part of Kant's explanation of why space and time can be actually infinite, while the material world cannot (per the first antinomy's thesis argument). As the argument goes, *tota synthetica* can exist only as a product of the complete composition or combination of their parts, and actually infinitely many parts can never be completely combined, on pain of contradiction. In contrast, space and time are given as wholes prior to their parts, and so they do not depend on composition; hence, their actual infinity is unproblematic.[7]

As just noted, one thing motivating proponents of the current consensus is their desire to explain why Kant thinks space and time can be actually infinite, while the material world cannot. However, for those who read Kant as a proponent of NAITS, a further crucial consideration is that NAITS would seem to relieve Kant of an otherwise damning criticism, namely, that the thesis argument of the first antinomy presupposes transcendental idealism. Consider Allison's discussion. According to Allison, the thesis argument of the first antinomy seems to make a questionable claim when it says that 'the infinity of a series consists precisely in the fact that it can never be completed through a successive synthesis' (A426/B454). For unless one had already

assumed that synthesis is a *mental* activity performed by finite human minds, it is not clear why one would take an infinite synthesis to be impossible (Allison 1983: 42-3). And unless one had already accepted transcendental idealism, it is not clear why one would grant that what can be synthesised by finite minds determines answers to questions about how the spatiotemporal world can *be*.[8] Since the antinomies are supposed to show that the commitments of *transcendental realism* lead to contradictions, this is a problem; their arguments ought not to infer from facts about what *we* cannot represent to conclusions about what cannot *exist* (or so proponents of the current consensus argue).[9]

In response to these worries, Allison argues that the claims concerning 'synthesis' in the thesis argument should be read as expressing conceptual truths about the notion of infinity. That is, when Kant says (in the voice of a transcendental realist) that an infinite successive synthesis cannot be completed, he means to be saying that the very thought of a complete infinite combination is conceptually impossible or logically incoherent. And if it is correct that the very concept of infinity excludes the concept of completeness in this way, then actually infinite *tota synthetica* can be ruled out without presupposing transcendental idealism. After all, transcendental realists and transcendental idealists alike hold that contradictory states of affairs cannot obtain in the world, so if an actually infinite *totum syntheticum* is a contradiction in terms, then transcendental realists cannot complain that the thesis argument begs the question. As Allison summarises his solution, in the thesis argument 'the critique of the infinitistic position turns on a conceptual claim and has nothing to do with the presumed psychological impossibility of grasping or comprehending the infinite' (1983: 43).

Finally, note that Allison also takes Kant's putative endorsement of NAITS to be supported by his claim in the remark on the thesis argument that 'the true (transcendental) concept of infinity is that the successive synthesis of unity in the traversal of a quantum can never be completed' (A432/B460). According to Allison, Kant intends to establish with this remark that the notion of 'inexhaustibility' is built into the very concept of the infinite. Since it is also built into the concept of a *totum syntheticum* that pre-given parts have been brought together *completely* by a synthesis or combination, it follows according to Allison that the notion of an infinite *totum syntheticum* is a contradiction in terms. As Allison argues, '[s]ince [the material universe] is conceived as a totum syntheticum (it could hardly be regarded as a totum analyticum), the thought of the complete enumeration or "synthesis" of its parts, which is built into this concept, contradicts the thought of inexhaustibility, which is similarly built into the concept of the infinite' (1983: 43). To summarise then, for proponents of the current consensus, Kant thinks the idea of an actually infinite material universe embodies a contradiction *because* it is the contradictory idea of an actually infinite *totum syntheticum*; whatever is a *totum syntheticum* is by definition the product of the *complete* combination of its parts, while whatever has infinitely many parts by definition *cannot* be completely combined (or so the argument goes).[10]

3. The thinkability of actually infinite *tota synthetica* in the Transcendental Dialectic

It is clear that Kant conceives of space and time as actually infinite *tota analytica*, and it is clear that he intends to deny that the spatiotemporal world exists as an actually infinite

totum syntheticum. Nonetheless, in this section, I argue that Kant does not rule out the possibility of *all* actually infinite *tota synthetica* on purely conceptual grounds, and so he does not embrace NAITS. On the contrary, according to Kant, human reason has a non-contradictory idea of an actually infinite *totum syntheticum* in its idea of an infinite whole series of conditions, and this idea plays an important explanatory role in generating the antinomies. Thus, as I argue, a proper appreciation of how the antinomies arise in fact requires acknowledging that Kant thinks actually infinite *tota synthetica* are conceptually possible (even if an actually infinite spatiotemporal world is not).

To see that Kant embraces the logical possibility of actually infinite *tota synthetica*, consider the following passage from the first section of the antinomies, where Kant says that we can *think* (*denken*) of the unconditioned (*das Unbedingte*) in two ways when the conditioned and its conditions form a series.[11] Having argued that pure reason pursues objects answering to the idea of the unconditioned in the antinomies (such that each of the thesis and antithesis positions asserts the existence of something unconditioned), Kant writes:

> Now one can think [*denken*][12] of this unconditioned either as subsisting merely in the whole series [*in der Ganzen Reihe*], in which thus every member without exception is conditioned, and only their whole [*das Ganze*] is absolutely unconditioned, and then the regress is called infinite; or else the absolutely unconditioned is only a part of the series, to which the remaining members of the series are subordinated but that itself stands under no other condition. In the first case the series is given *a parte priori* without bounds (without a beginning), i.e., it is given as infinite and at the same time whole [*ganz*] . . . In the second case there is a first in the series, which in regard to past time is called the **beginning of the world** . . . (A417-8/B445-6, my underlining)[13]

In an important footnote, Kant expands on why even an *infinite* series of conditions can be unconditioned as follows:

> The absolute whole [*das absolute Ganze*] of the series of conditions for a given conditioned is always unconditioned, because outside it there are no more conditions regarding which it could be conditioned. (A417-8/B445fn)

Together, these passages allow us to draw two important conclusions. First, they establish that Kant does not believe the idea of an *infinite whole series of conditions* is a conceptual or logical impossibility. As Kant writes, we can *think* of an infinite series of conditions as being 'absolutely unconditioned' *qua* 'absolute whole'. That is, we can think of a series of conditions that is both *infinite* and *whole*. It is infinite in the sense that every member is conditioned by a further condition. It is whole in the sense that 'outside it there are no more conditions regarding which it could be conditioned', i.e., it contains *all* the conditions of the relevant kind.[14] Since whatever we can *think* is not contradictory in Kant's account (see Bxxvifn and Bxxviii), it follows that the idea of an infinite whole series of conditions is not a contradictory idea in his view.

But given this, we can draw a second important conclusion: an actually infinite *totum syntheticum* must not be a contradictory notion in Kant's view. We can draw this conclusion because a *series of conditions* satisfies Kant's conception of a *totum*

syntheticum. Why is this? Recall that a *totum syntheticum* is a whole resulting from the combination or composition of its parts, where the parts precede the whole. As Kant puts it in a reflection, a *totum syntheticum* is 'that whose composition, as to its possibility, is grounded on its parts, which can also be thought without any composition' (*Refl* 3789, 17: 293.9-11). But the idea of a whole series of conditions is precisely an idea of this kind of object. A series of conditions is a collection of pre-given items (conditions) brought together or composed (via conditioning relations) to form a whole (the series). Thus, if an infinite whole series of conditions is a conceptual possibility, as Kant claims it is, then so too is an infinite *totum syntheticum*. Hence, Kant does not think that the very notion of an infinite *totum syntheticum* is a contradiction in terms. We can *think* (even if we cannot *cognise*) an actually infinite *totum syntheticum*.

Notice further that these conclusions show that two notions of totality are in fact applicable to the idea of an infinite and yet unconditioned whole series of conditions. First, the series of conditions qualifies as a whole or totality in the sense that it contains *all* of the conditions of the relevant type. In virtue of this, Kant argues, it can be thought of as *unconditioned* (recall Kant's explanation at A417-8/B445fn that 'outside it there are no more conditions regarding which it could be conditioned'). But second, the series also qualifies as a totality in the sense that it is a plurality of things brought together to form a unity. This feature of the series is what qualifies it as a *totum **syntheticum***, or synthetic whole. That is, it is a series made up of constituent conditions, which metaphysically precede the whole series that they form, and they form a series in virtue of the conditioning relations that order them and unite them together. Moreover, in virtue of being united in this way, the *category* of totality can also be thought of as applying to the series. According to Kant, the category of totality is 'nothing other than plurality considered as unity [*die Vielheit als Einheit betrachtet*]' (B111). And when we think of an unconditioned infinite whole series of conditions, we are thinking of something to which this notion applies (at least in its unschematised form). We are thinking of a plurality of items (the conditions) as united (via conditioning relations) to form a unity (the whole series). So, in Kant's view, an actually infinite series of conditions is thinkable as a totality in two senses. It is thinkable as containing *all* of the conditions of the relevant type (i.e., it is thinkable as the *complete* collection of conditions). And it is thinkable as structured into a *unified* whole (since it is thinkable as formed from conditions that are unified via the conditioning relations that structure the series).[15]

4. Is the idea of an infinite whole series of conditions really a logically coherent idea of an infinite *totum syntheticum*?

There are several ways in which a proponent of the current consensus might resist the conclusion that our idea of an infinite whole series of conditions is a logically coherent idea of an actually infinite *totum syntheticum*. In this section, I consider two especially salient lines of resistance. According to the first line of resistance, an actually infinite series of conditions can be conceived, but because it *is* infinite, it cannot really be conceived as a *totum syntheticum*. According to the second line of resistance, we have an idea of an actually infinite *totum syntheticum*, but this idea is ultimately shown to be incoherent; that is, it is a contradictory idea after all.

First consider the suggestion that an actually infinite series of conditions cannot really be represented as a *totum syntheticum* because it *is* infinite. This is in fact how Allison understands the thesis argument of the first antinomy in his classic defence of the consensus view. According to Allison, the first antinomy's thesis argument begins from the assumption that the series of past world-states is infinite. But as Allison continues:

> [I]t must be noted that the assumption that the series is infinite does not entail merely that it cannot be completed in a finite time, but rather that it cannot be completed at all. If, however, it cannot be completed at all, then it does not constitute a world (totum syntheticum). We thus have two alternatives: either (1) the series does not constitute a world, or (2) there is a first moment. The correct Kantian option is, of course, the first; but since the argument presupposes that the series does constitute a world, the proper conclusion is the second. (Allison 1983: 44)

Here, Allison suggests that Kant's own view is that the series of past world-states *is* infinite, and for this reason it cannot be a *totum syntheticum*. Notice that there are in fact two ways of understanding this claim. First, one might take it to mean that the series cannot in fact have the structure of a *totum **syntheticum*** because it is infinite; it must rather be a *totum **analyticum***.[16] This clearly is not how Allison intends for us to read Kant, for in his view, the world as treated in the antinomies can 'hardly be regarded as a totum analyticum' (1983: 43).[17] I agree with Allison on this point, for Kant explicitly describes the ideas of the unconditioned treated in the antinomies as '**world-concepts** (*Weltbegriffe*)' (A408/B434), and throughout his career he describes the concept of a world as the concept of a *composite*, which (since composition builds from parts to wholes) must be a *totum syntheticum*.[18]

A second alternative more in line with Allison's own intentions goes as follows. Because the series *is* infinite, it cannot be a true *totum*. Or as Allison himself puts the point, 'since, as infinite, the series has only one end, it cannot constitute a totality' (1983: 44). Note also that a further consideration one might take to support this line of resistance is Kant's commitment to the idea that the concept of the infinite as such is not problematic; only its application to the material world is contradictory. As one might reason, this should make us think that considering a series of conditions as infinite is unproblematic in exactly the same sense in which considering the infinite as such is unproblematic: we have a perfectly coherent concept of both. And given this, one might be tempted to conclude, Kant's view must be that problems arise only when we attempt to combine the concept of an infinite series of conditions with the concept of a *totum* or totality. That is, as one might argue, the concept of an infinite series of conditions has the same status as the concept of the infinite (it is perfectly coherent), but the concept of an infinite series of conditions considered *as a totum* (or totality) has a different status – it is an incoherent concept.[19]

However, this argument fails to appreciate the significance of the A417-8/B445-6 passage. First, as explained above, an infinite series of conditions *does* qualify as a totality in the sense of being a plurality of items brought together to form a unified whole; its status as a *totum **syntheticum*** indicates that it is a totality in this sense. But second, we have also seen that Kant thinks an infinite series of conditions coherently

can be thought as the *complete* collection containing *all* the conditions of the relevant type for a given conditioned thing. Consider again Kant's claim that we can think of an infinite whole series of conditions as unconditioned. As Kant puts it, we can *think* of an infinite whole [*ganze*] series of conditions as one 'outside [of which] there are no more conditions regarding which it could be conditioned', and our ability to represent an infinite series in this way explains why we can represent it as unconditioned (A417-8/B445fn). But thinking of an infinite whole series of conditions in this way – i.e., thinking of it as containing *all* of something's conditions, such that outside of the series no conditions are missing – is precisely to think of an infinite series of conditions as a complete collection or totality of conditions in the relevant sense.[20] So, although one *can* consider an infinite series of conditions without considering it as a totality in the relevant sense, Kant is explicit at A417-8/B445-6 that our idea of the unconditioned in its infinite manifestation *is* an idea of an infinite series of conditions considered as a complete totality.[21]

Note that this conclusion also is not impugned by the fact that Kant rejects the idea of an infinite *number*. According to Kant, 'the concept of a **number** [*Zahl*] (which belongs to the category of allness) is not always possible wherever the concepts of multitude and of unity are (e.g., in the representation of the infinite)' (B111). With this in mind, one might be tempted to argue that Kant must rule out infinite numbers *because* he thinks that the concept of an infinite totality is absurd. As one might reason, Kant thinks numbers are finite because he thinks numbers are always reachable by counting, and this seems to suggest the availability of an argument that goes as follows. Just as an infinite number is impossible because one cannot *completely* count through all the finite numbers to reach an infinite number, so too an infinite totality in general is impossible because one can never completely enumerate infinitely many things.[22] In fact, one might even argue that Kant just means to say at B111 that the category of totality does not apply to the infinite at all (even though the categories of unity and plurality do).[23]

However, Kant's rejection of infinite numbers does not entail that all magnitudes are finite or that every *totum syntheticum* has a magnitude that is representable by a number. His claim at B111 also does not entail that infinite multiplicities cannot be represented as totalities at all. For, first, the claim that the concept of number belongs to the category of totality does not entail that the concept of number is applicable whenever the concept of totality is. The concept of number might be more determinate than the concept of totality and hence might be more restricted in its application (e.g., in virtue of being a schematised concept, as Kant suggests at A142-3/B182). Second, Kant in fact has a longstanding commitment to the view that some magnitudes (namely, infinite ones) cannot be represented by a number, and he does not hold that only *tota analytica* can have such magnitudes. Instead, even in the early part of his career, Kant is at pains to stress that *tota synthetica* should not be *defined* so as to entail their finitude. Consider Kant's claim in the *Inaugural Dissertation* that it is a 'prejudice' of our 'cognition of quantity' that we mistakenly believe '*every actual multiplicity can be given numerically, and thus every magnitude is finite*' (2: 435). In saying this, Kant suggests that magnitudes in general are not limited to those that can be represented with number.[24] Now add to this Kant's early criticisms of Baumgarten's finitistic conception of a *world*. According to Kant, Baumgarten wrongly builds finitude into his very definition of a world, for '[i]t is not necessary

that the finitude of the world, which is yet to be proven, is brought into the definition' (*MH*, 28: 39). In saying this, Kant suggests that the very concept of a world does not include the mark of finitude; hence, neither does the very concept of a *totum syntheticum*. Thus, Kant in fact embraces the logical possibility of actually infinite *tota synthetica*, and he takes this to be compatible with his claim that the idea of an infinite number is 'absurd'.[25]

Let us turn now to a second strategy for resisting the conclusion that our idea of an infinite whole series of conditions is a coherent idea of an actually infinite *totum syntheticum*. Namely, one might argue that the upshot of the antinomies is that our idea of an actually infinite whole series of conditions is *not* a logically coherent idea after all. One might develop this line of resistance as follows. First, one might note, Kant goes out of his way to stress in the A417-8/B445 footnote discussed above that '[t]he absolute whole of the series of conditions for a given conditioned' is 'a problematic concept, whose possibility has to be investigated'. But as one might then argue, the upshot of the antinomies is precisely that our ideas of the unconditioned turn out to be ideas of *impossible* objects. For example, we find out in the first antinomy that a series of conditions with an infinite magnitude is in fact *impossible*, for we establish the possibility of a magnitude by successively synthesising its elements, and one of the lessons of the first antinomy is that 'the infinity of a series consists precisely in the fact that it can never be completed through a successive synthesis' (A426/B454). Thus, one might reason, although the idea of an infinite series of conditions initially *looks* like the idea of a possible object, we find out through the antinomy's investigation that it is actually *impossible*. Hence, the idea of an actually infinite *totum syntheticum* is an incoherent idea after all.

This objection can be answered by invoking Kant's important distinction between *real* and *logical* possibility. According to Kant, we establish the real possibility of an object (i.e., that it could really exist in space and time) by showing that it is compatible with the forms of experience (i.e., the forms of intuition and the categories).[26] As Kant puts it at A596/B624fn, an object is really possible if 'the objective reality of the synthesis through which [its] concept is generated … rests on principles of possible experience.' Or, as he puts it earlier in the *Critique*, an object is really possible if its concept is one for which 'an example from experience' can be thought (A290-1/B347). Arguably, this means that to prove the real possibility of an actually infinite series of conditions, we must show that it could actually exist in space and time, and this would require completing an infinite successive synthesis of all of its parts. But as we have seen, Kant holds this to be impossible (recall A432/B460).

However, notice that even if an actually infinite *totum syntheticum* can be shown to be *really* impossible in this way, it does not follow that Kant thinks we lack a proof of its *logical* possibility. On the contrary, Kant holds that an object is logically possible if its concept can be *thought*, which is to say if we have a concept of it that does not 'cancel[] itself out' (A292/B348-9). Our idea of an infinite whole series of conditions is not self-cancelling in this way, for as the A417-8/B445-6 passage proves, we in fact can think of an actually infinite *totum syntheticum* in an idea of reason.

This said, let me stress here that Kant's embrace of the logical coherence of actually infinite *tota synthetica* does not entail that he thinks an actually infinite *spatiotemporal world* is even logically possible. For although a spatiotemporal world is a *totum syntheticum*, there are (at least logically) possible *tota synthetica* that are not

spatiotemporal worlds. For example, we think of a *totum syntheticum* that is not a spatiotemporal world when we think of a *totum syntheticum* composed of things in themselves (which is at least logically possible). Reason also thinks a *totum syntheticum* that is not yet a spatiotemporal world in its idea of an actually infinite unconditioned series of conditions (discussed at A417-8/B445-6); this is the idea of a *totum syntheticum* of conditions that is not yet determined as to any specific spatiotemporal properties. And we can see Kant's case for the *unthinkability* of an actually infinite spatiotemporal world in the thesis argument of the first antinomy. As we have seen, Kant argues that '[t]he true (transcendental) concept of infinity is that the <u>successive</u> synthesis of units [*Einheit*] in the traversal [*Durchmessung*] of a quantum can never be completed' (A432/B460, my underlining). This is plausibly interpreted as the claim that it is logically or absolutely impossible for a *temporally successive* process to be actually infinite. After all, Kant held even prior to the first *Critique* that even an infinite intellect could not complete an infinite *successive* synthesis; and as he argued at that time, what no intellect whatsoever can represent is absolutely impossible in the sense of being 'unthinkable'.[27]

So, the argument against the conceptual possibility of an actually infinite spatiotemporal world can be understood as follows. According to Kant, a spatiotemporal world is both a spatially and a temporally extended object, and its temporal magnitude depends on the successive combination of the world-states that determine the length of its history. As Kant puts it, the temporal magnitude of the spatiotemporal world is a result of its previous states having 'elapsed' (*abgelaufen*) or 'passed away' (*verflossen*) (A426/B454). But as the first antinomy's thesis argument shows, an infinite *successive* combination can never be completed, and for this reason 'an infinitely elapsed world series [*unendliche verflossene Weltreihe*] is impossible' (A426/B454). That is, because of the way in which a temporally infinite world would require an infinite and yet completed temporal succession of states, it is a conceptual impossibility.[28] This argument can go through without ruling out the possibility of actually infinite *tota synthetica* that do not require a temporally successive combination of their parts.[29]

Finally, notice that this interpretation does not commit Kant to saying that we cannot represent any kind of infinite temporal series at all. Rather, on this reading, his arguments leave open the possibility that we can represent an infinite series of items ordered in temporal relations such as the relations of 'before than' and 'later than', since such a representation need not involve a successive process. They also allow for our ability to represent the infinity of time as a whole in our original intuition of it (A32/B48). Kant's definition of the infinite at A432/B460 prohibits only the possibility of representing an infinite multiplicity via a successive mode of representation and the related phenomenon of representing a complete infinite succession as such.[30]

5. NAITS's putative advantage for interpreting the first antinomy

Thus far, I have argued that Kant is not a proponent of NAITS, the view that all actually infinite *tota synthetica* are conceptually impossible or logically incoherent. As I have argued, Kant speaks unambiguously of our possession of an idea of an actually infinite whole series of conditions (which is our idea of the unconditioned in its

infinite manifestation). And since this idea is an idea of a *totum syntheticum*, his view is not that the very notion of an actually infinite *totum syntheticum* is an unthinkable contradiction in terms. I have also noted in the discussion above that these conclusions are compatible with the claim that an actually infinite temporally successive process is incoherent. In light of this, it is possible for Kant to argue that a *temporally* infinite spatiotemporal world is absolutely impossible, even if it is not the case that *all* actually infinite *tota synthetica* can be ruled out on purely conceptual grounds.

In this section, I consider whether abandoning the current consensus in this way – i.e., arguing that Kant does not embrace NAITS – is unacceptable because it makes the first antinomy's thesis argument question-begging against the transcendental realist. As I will argue, the reading I have offered does show that the *spatial* side of the thesis argument may not speak to transcendental realists in terms they would accept, but closer examination of the consensus view reveals that it is not obviously better off in this regard. Moreover, the reading I offer fares better than does the current consensus in a different respect, since it offers a better story of why Kant thinks we so easily become embroiled in antinomies in the first place.

Recall that proponents of the current consensus argue that if Kant embraces NAITS, then the first antinomy's thesis argument does not illicitly slide from observations about what *we* can represent to conclusions about how the world can *be.* As the argument goes, if Kant's talk of *synthesis* in the first antinomy refers to what finite minds like ours can accomplish, then the transcendental realist can reject them out of hand. But if Kant means to articulate purely conceptual claims with his talk of synthesis, then no such problems arise. According to proponents of the current consensus, the claim that an infinite successive synthesis is impossible can be rendered as the claim that the very concept of a complete infinite combination is incoherent. And since the concept of a *totum syntheticum* includes the idea of a complete combination of its elements, an actually infinite *totum syntheticum* can be rejected as a contradiction in terms.

The arguments of this article suggest that the *temporal* side of the thesis argument would be acceptable to transcendental realists, since, as I have argued, it rules out a *temporally* infinite world by arguing that a temporally successive infinite combination is impossible simpliciter (not merely impossible for finite minds to represent). However, the *spatial* side of the thesis argument does not seem to fare so well on the reading I have been recommending. For in the spatial part of the argument, Kant (speaking in the voice of a transcendental realist) seems to infer from the impossibility of an infinite *successive* synthesis to the impossibility of an infinite *simultaneous* combination of things. And as one might object, it is not clear why the spatial extent of the world should depend on a successive combination from the point of view of transcendental realism. Consider the text of the thesis argument itself. Kant writes that if the world is spatially infinite, then 'in order to think the world that fills all space as a whole, the successive synthesis of the parts of an infinite world would have to be regarded as completed, i.e., in the enumeration [*Durchzählung*] of all coexisting things, an infinite time would have to be regarded as having elapsed, which is impossible' (A428/B456). But as one might object, the transcendental realist can deny that the spatial extent of the world is determined by what can be enumerated or counted through (*durchgezählt*) in a temporally successive process. Indeed, as one

might object, even if *we* can represent magnitudes only via temporally successive counting processes (which cannot be actually infinite), it is not clear why transcendental realists must accept that this determines the kinds of magnitudes that can exist.[31]

Here, I want to bracket the question whether it might, in fact, be acceptable to some transcendental realists to argue that magnitudes that cannot be measured also cannot exist. As I see it, this depends on questions about the precise content of transcendental realism, which I cannot settle here. Instead, what I want to argue is that the consensus view is, in relevant respects, on a par with mine when it comes to making the thesis arguments depend on claims about what minds like ours can represent. Hence, the consensus view does not have the clear advantage it is often taken to have.

Recall that the consensus view holds that Kant articulates purely conceptual claims about the notion of infinity via the language of 'synthesis'. Thus, as Allison has put it, the first antinomy's thesis argument 'has nothing to do with the presumed psychological impossibility of grasping or comprehending the infinite' (1983: 43). However, as Allison himself also admits, construing the argument in this way 'does not eliminate all reference to mind' (1983: 44). The reason for this is that the interpretation depends on a theory of concepts according to which concepts are defined through intellectual procedures involving synthesis. As Allison puts it in his discussion of the concept of a *totum syntheticum*, 'the concept of a totum syntheticum is here operationally defined in terms of the intellectual procedure through which it is conceived, much as geometrical figures were thought to be given 'real' or 'genetic' definitions through the articulation of the rules for their construction' (1983: 43).

As should be clear, although this interpretation makes the first antinomy's thesis position depend on conceptual claims, it does this only by shifting mentalistic constraints on possibility to the account of concept definition. That is, it makes the first antinomy's thesis argument depend on a theory of concept definition according to which intellectual procedures involving successive synthesis define concepts such as <infinity> and <*totum syntheticum*>. But to make our intellectual procedures the determinants of the marks of concepts in this way is another way of making the first antinomy's arguments depend on assumptions about what minds like ours can represent. Thus, upon closer inspection, the current consensus does not have the clear advantage it is often taken to have. According to the consensus view, mentalised constraints on possibility enter the thesis argument via its assumed account of concept definition, which limits coherent conceptual contents to what can be synthesised in our intellectual grasping procedures (procedures which involve successive synthesis). According to the view I have been recommending, the spatial part of the thesis argument infers directly from the claim that we cannot grasp a magnitude in successive synthesis to the conclusion that the magnitude is impossible. Either way, features of *our* representational capacities are being called upon to limit what magnitudes can exist in space and time.[32]

Finally, let me also point to one further advantage my view has over the current consensus, which is that it can help to explain why we so easily become embroiled in antinomies in the first place. Consider the following. If Kant embraces NAITS, then the very idea of an actually infinite *totum syntheticum* is contradictory. But this is presumably something we can see just by thinking about the ideas of the infinite and

of *tota synthetica*, respectively. However, if this is the case, then it is not obvious why we would find it tempting to think that the spatiotemporal world can be actually infinite. After all, we ought to be able to see right away that an infinite *totum syntheticum* is contradictory – i.e., we ought to be able to see that an infinite *totum syntheticum* is contradictory even prior to thinking about any particular spatiotemporal manifestation that an infinite *totum syntheticum* might take (and indeed prior to the arguments of the thesis positions).

In contrast, if Kant rejects NAITS and holds that the generic notion of an actually infinite *totum syntheticum* is perfectly coherent, then we can readily understand why we are so tempted to think that the spatiotemporal world can be actually infinite. Namely, since the idea of an actually infinite *totum syntheticum* is not itself incoherent (and in fact is one of our core representations of the unconditioned), when not on our guard, we can easily slide from the coherence of this idea to the belief that an actually infinite spatiotemporal world is possible. But the spatiotemporal world has determinations that the generic idea of a t*otum syntheticum* does not have, and once we consider the antinomial arguments (and what it would mean for the spatiotemporal world in particular to be infinite), we see that such as world is impossible. Indeed, as I have argued, the coherence of the idea of an actually infinite *totum syntheticum* is crucial to Kant's account of how the antinomies get up and running in the first place, for each antinomy depends on the assumption that a series of conditions is either unconditioned and finite or unconditioned and infinite. That is, each antinomy depends on the assumption that an actually infinite *totum syntheticum* is at least logically possible.

6. Upshots for Kant's views on the infinite

If the arguments above are correct, then Kant is not a proponent of NAITS, and he instead holds that actually infinite *tota synthetica* are conceptually possible (even if some *spatiotemporal* manifestations of actually infinite *tota synthetica* are not). In this section, I conclude by drawing out some upshots for our overall understanding of Kant's views on the infinite.

The first upshot is that Kant does not believe the very concept of the infinite excludes the concept of completeness (contra Allison). This is an implication of rejecting NAITS. If the concept of the infinite *can* coherently be combined with the concept of a *totum syntheticum*, and if the concept of a *totum syntheticum* includes the mark of completeness (insofar as a *totum syntheticum* is the result of the complete combination or composition of its parts), then the mark of completeness cannot be excluded by the concept of infinity as such.

We might be surprised by this result insofar as Kant seems to associate infinity with incompleteness in his discussion of the 'true (transcendental) concept of infinity' (A432/B460). There, Kant says that the true (transcendental) concept of infinity is that 'the successive synthesis of units in the traversal [*Durchmessung*] of a quantum can never be completed' (A432/B460). But while this initially looks like a way of defining the infinite as incomplete, we should instead understand the passage as follows. According to Kant, an infinite magnitude is greater than any finite unit of measurement repeated any finite number of times, and so it is greater than any magnitude that one could *measure through* (*durchmessen*) (given that measurement

occurs successively in Kant's account).[33] And crucially, this is not to say that the infinite as such is incomplete; it is just to say that the process of *measuring* an infinite magnitude can never be completed.

We should also be careful not to conclude that because the infinite does not by definition exclude the concept of completeness, it must therefore be *complete* by definition. For Kant does not appear to be committed to this view. According to Kant, an infinite magnitude *can* be thought of as complete (as is the case in our idea of an unconditioned infinite whole series of conditions), but this is not the same as saying that it *must* be or that the mere idea of an actually infinite magnitude is the idea of a complete magnitude. Consider again Kant's discussion of the infinite in his remark on the first antinomy's thesis argument. There, Kant says that by an 'infinite whole' (*unendlichen Ganzen*) one understands 'not **how great** [*wie groß*] it is', but rather one 'thinks only its relation to an arbitrarily assumed unit, in respect of which it is greater than all number' (A431-2/B459-60). Following Smyth (2023), I think we should take seriously Kant's suggestion here that infinite wholes are appraised as strictly greater than all finite ones, but this is not to assign to them a determinate (measurable) size of their own. And given this, we can leave open the question whether an infinite magnitude is complete or incomplete when we say that it *is* infinite. An infinite magnitude is by definition greater than any finite one, but unless more is specified, it might or might not be complete.

We can clarify this point by considering Kant's discussion of space and time as infinite wholes given prior to their parts. It is tempting to think that space and time must be given as complete infinite wholes in intuition, since, as Kant says, they are given as magnitudes in which the 'parts are possible only in the whole [*im Ganzen*], and not the whole through the parts' (A438/B466). As one might reason, if space and time are given as infinite wholes in this way, then they must be complete, for unless they were given in their *entirety* prior to their parts, they could not properly be said to be given as *wholes* at all.

While I am somewhat sympathetic with this line of reasoning, we should be sensitive to Kant's effort to distinguish between space as it is represented in intuition and space as it is represented by reason in the idea of absolute space. According to Kant, we have (in addition to our pure intuition of space) an *idea* of absolute space, and this idea represents space as an unconditioned whole with reference to which all motion is determined (e.g., see *MFNS*, 4: 559). In the *Critique of the Power of Judgement*, Kant further elaborates on reason's representation of infinite space as follows. According to Kant, 'the voice of reason [*die Stimme der Vernunft*] . . . requires totality [*Totalität*] for all given magnitudes' and it 'does not exempt from this requirement even the infinite (space and past time), but rather makes it unavoidable for us to think of it (in the judgment of common reason) as **given entirely** (in its totality) [*als ganz (seiner Totalität nach) gegeben zu denken*]' (5: 254). Kant continues several lines down: 'what is most important is that even being able to think of it as **a whole** [*als ein Ganzes auch nur denken zu können*] indicates a faculty of the mind which surpasses every standard of sense. . . . **even to be able to think** the given infinite without contradiction requires a faculty in the human mind that is itself supersensible' (5: 254). Here, Kant seems to suggest both (a) that reason surpasses what intuition alone represents when it *thinks* the infinite as a given *complete* totality and (b) that reason can think such a totality without contradiction. Putting aside other

interpretative questions about the idea of absolute space, I take this to support the conclusion that representations of the infinite do not always include the kind of completeness that reason represents in its ideas of totality. The idea of absolute space (an idea of reason) represents a completeness that our pure intuition of space does not.[34]

Finally, notice that the conclusions of this article also allow us to refine our understanding of Kant's place in seventeenth- and eighteenth-century debates about the infinite. Leibniz famously argued that an actually infinite multiplicity of things cannot constitute a true whole, and many historians of philosophy take this rejection of actually infinite totalities to be unchallenged until the time of Cantor (when actually infinite sets and transfinite cardinalities came to be widely accepted). According to Leibniz, actually infinite 'multiplicities' are possible, but in the case of the actually infinite, 'this multiplicity is not a number or a single whole' (Leibniz 2000: lxii).[35]

However, if this article's arguments are correct, then Kant's thinking about the infinite is not Leibnizian in this way.[36] For rather than embracing Leibniz's argument for NAITS, Kant holds that we can very well conceive of an infinite multiplicity or collection of items as constituting a whole – as we have seen, Kant holds that we can *think* of an actually infinite series of conditions as an 'absolute whole ... outside of which there are no more conditions' (A417-8/B445fn). And in thinking of such a series, we are thinking of a totality that is both complete (in the sense of containing *all* the conditions of the relevant type) and unified into a whole (since it is a series of conditions brought together and ordered via conditioning relations). None of this is to say that we can *sensibly cognise* such a whole, but it is to say that an actually infinite totality is logically or conceptually possible – and, as we have seen, the reason for this is that whatever we coherently can *think* cannot be ruled out on merely conceptual grounds in Kant's view. Of course, this falls short of saying that Kant anticipates nineteenth-century developments in set theory, for Kant had nothing like Cantor's conception of cardinality for infinite sets. But amid other profound differences, Kant shared with Cantor one important judgement. Like Cantor (and unlike Leibniz), Kant held that there is nothing incoherent in the idea of collecting together actually infinitely many items to form a whole. Indeed, *reason* (*Vernunft*) represents actually infinite wholes in its idea of an unconditioned infinite whole series of conditions.

7. Conclusion

I have argued in this article that we must revise the consensus view that Kant embraces NAITS, the thesis that actually infinite *tota synthetica* are a conceptual impossibility. Although Kant argues that an actually infinite spatiotemporal world is impossible in the antinomies, this argument does not proceed by appealing to the incoherence of the very concept of an actually infinite *totum syntheticum*. On the contrary, as I have argued, the conceptual coherence of actually infinite *tota synthetica* in fact plays an important role in the Transcendental Dialectic insofar as reason's ability to think the unconditioned in an actually infinite whole series of conditions first gets the antinomies up and running.

Notes

1 Unless otherwise noted, English translations of Kant are drawn from the Cambridge University Press translations (Kant 1997, 1998, 2001, 2002, 2004, 2005, 2014). When English translations are not available, translations are my own and refer to the standard pagination from the *Akademie* edition (Kant 1900-). Additionally, I use the following abbreviation conventions: *ID = Inaugural Dissertation*; *MFNS = Metaphysical Foundations of Natural Science; Refl = Reflexionen; MH = Metaphysik Herder; ML₁ = Metaphysik L₁*.

2 Allison (1983: 42-3) offers the canonical argument for reading Kant as a proponent of NAITS. Similar interpretations can be found in Al-Azm (1972: 13), Boehm (2011: 687, 699), Grier (2004: 185-7), Holden (2004: 41), and Proops (2021: 226).

3 In this article, I do not aim to determine how transcendental realism and transcendental idealism should be understood. Instead, I aim only to show that *if* proponents of the current consensus are right that the first antinomy's thesis argument risks begging the question, then their proposed interpretation does not fully dispel that risk.

4 Kant also uses the language of '*compositum reale*' and '*compositum ideale*' to mark this distinction (A438/B466). See also his definition of a *totum syntheticum* in *Refl* 3789 as 'that whose composition, as to its possibility, is grounded on its parts, which can also be thought without any composition' (17: 293.9-11, my translation).

5 As Allison puts it: 'Not only does the concept of such a whole presuppose its distinct, pregiven parts, it is also conceived as the product of collection (in Kant's term, "synthesis") of these parts' (1983: 43).

6 Here we should read 'appearances' (*Erscheinungen*) in the neutral sense of 'things appearing in space and time'. For Kant clearly does not mean to assume transcendental idealism in the notion of the material world employed in the antinomies.

7 For a sampling of the literature acknowledging Kant's acceptance of the actual infinity of space and time, see Friedman (2015), Guyer (2018), Proops (2021), Rosefeldt (2022), Smyth (2023), Tolley (2016), and Winegar (2022). Note also that in this article, I bracket the question exactly how we should articulate the difference between actual and potential infinity in Kant's view (however, I discuss this distinction at length in Chaplin (n.d.)). For my purposes here, what is important is only that Kant embraces a conception of infinity according to which a magnitude is infinite if it is strictly greater than any finite part one could pick out in it, and he takes this to be a conception of actual infinity. See note 14 for further discussion.

8 Commentators who think the thesis argument presupposes idealist principles include Bennett (2016: 120-1), Guyer (1987: 407), Kemp Smith (1918: 485), and Strawson (1966: 177). For a recent argument challenging this criticism, see Melamedoff-Vosters (2023).

9 Let me again emphasise that I do not intend to defend an interpretation of transcendental realism on which the transcendental realist never infers from claims about what we can grasp to conclusions about how the world can be. Rather, as I explain in section 5, my point is only to show that *if* arguments relying on these kinds of inferences beg the question against the transcendental realist, then the current consensus view represents the thesis argument in a way that leads to analogous worries about begging the question.

10 See also Boehm's claim that the first antinomy's thesis proof 'relies on the claim that the notion of a complete infinity is inconsistent' (2011: 687). For further references to proponents of the current consensus in current Kant scholarship, see note 2 above.

11 Kant says conditions form a series (*Reihe*) when they are 'subordinated' rather than 'coordinated' with one another, and the conditions treated in the antinomies are of this kind (A409/B436).

12 Kant in fact writes '*gedenken*', but Valentiner corrects it to '*denken*', as Kant uses '*gedenken*' in several other places in the Dialectic where it is clear that '*denken*' is what he intends.

13 Here, I have slightly modified the Guyer and Wood translation. Guyer and Wood omit the phrase 'and then the regress is called infinite' (*und dann heißt der Regressus unendlich*).

14 Here, we should avoid the temptation to think that Kant is understanding an infinite series of conditions as merely *potentially* infinite. This is confirmed by his claim that the antithesis position of the first antinomy, which affirms that the world *is* an infinite series of conditions, at the same time affirms the 'actual infinity' (*wirkliche Unendlichkeit*) of the world (A521/B549). It also fits with his longstanding commitment to the idea that a magnitude is actually infinite if it is strictly greater than any finite part or unit one could pick out in it (and equivalently, greater than any finite unit repeated any finite number of times). For Kant's commitment to this conception of actual infinity, see *ID*, 2: 389fn; A432/B460; and *On Kästner's Treatises* (Kant 2014: 309). For recent scholarship examining Kant's commitment to this conception of actual infinity in detail, see Smyth (2023).

15 Here, I wish to remain officially neutral as to exactly how these two notions of totality relate to one another. My claim is only that reason thinks the complete collection of an object's conditions in its representation of an unconditioned infinite series of conditions, and it thinks of this series as a unified or structured whole (since it is thought of as formed from conditions brought together via conditioning relations). This does not settle questions about exactly how we arrive at reason's representation of completeness, or how it might (or might not) be derived from the understanding's representation of the category of totality.

16 Though he does not directly discuss Kant's *totum analyticum/syntheticum* distinction, Anderson (2015) can be interpreted as saying that reason's ideas of the unconditioned always represent *tota analytica* rather than *tota synthetica*. According to Anderson, reason's ideas of the unconditioned always represent a *collective* (rather than *distributive*) unity, and 'in a collective unity the (singular) representation of the whole is prior to the constituents and brings them all along with it as proper parts' (2015: 314). See also Boehm, who explicitly argues that reason's idea of an unconditioned infinite whole series of conditions is the idea of a *totum analyticum* (2011: 691).

17 Should we worry that only a *totum analyticum* can be unconditioned as a whole after all, since all *tota synthetica* are conditioned by the parts that constitute them? I think we should not, since when Kant says that the absolute whole of a series of conditions is always unconditioned, he means that it is unconditioned with respect to the particular conditioning relation under consideration. (And in general, when Kant calls something unconditioned, he always means that it is unconditioned with respect to some particular conditioning relation.) Just to give one example, consider a series of causal conditions. According to Kant, the entirety of an infinite series of causal conditions is (causally) unconditioned when no further conditions outside the series causally condition it; the fact that the whole series depends on its members does not undermine this point (i.e., it does not make the whole series *causally* conditioned).

18 For example: in *MH*, he says the parts (*Theile*) of the world 'are grounds of the whole' (*Gründe vom ganzen sind*) (28: 40); in *ML₁*, he says that a world is a 'composite' (*composito*) differing from every other in that it is a 'substantial whole that is not a part of another *<totum substantiale, quod non est pars alterius>*' (28: 196); in the *ID*, he again defines a world as consisting of *parts*, which are brought together in relations of reciprocal connection to form an '*absolute* totality' (2: 389-91); and so on. So, while there is some textual evidence indicating that ideas of reason are representations of *tota analytica* (e.g., see *Refl* 5248, 18: 130-1), I agree with Allison that Kant's considered view is that the idea of an infinite whole series of conditions is the idea of a *totum syntheticum*, not a *totum analyticum*. The A415/B443 passage quoted at the beginning of section 2 is further confirmation of this, since whatever results from *composition* must be structured from parts to whole, rather than the reverse.

19 Again, I take it this is Allison's position. Recall that he writes: '[I]t is clear that the alleged contradiction in the infinitistic position must be located in its application of the concept of the infinite, which is itself perfectly legitimate, to the material universe. Since this universe is conceived as a totum syntheticum … the thought of the complete enumeration or "synthesis" of its parts, which is built into this concept, contradicts the thought of inexhaustibility, which is similarly built into the concept of the infinite' (1983: 43).

20 It also will not do to argue that this representation does not count as a representation of a *totum syntheticum* because it is not a representation of a specifically *spatiotemporal* series of conditions. For although a representation of a *spatiotemporal* world is a representation of a *totum syntheticum* of spatiotemporal conditions, spatiotemporality is not included in the generic concept of a *totum syntheticum* as such. Indeed, reason's non-contradictory representation of an actually infinite *totum syntheticum* (i.e., its idea of an unconditioned actually infinite series of conditions) is precisely the idea of

a non-spatiotemporal *totum syntheticum* (or at least of a *totum syntheticum* that is not yet determined as to any spatiotemporal properties).

21 We might represent an infinite series of conditions *without* representing it as a totality in the relevant sense when we represent it without representing it as containing *all* of an object's conditions. But as I argue below, the fact that we *can* do this does not mean that we cannot also represent an infinite series as a complete totality.

22 For Kant's conception of numbers as reachable by counting, see A103 and A142-3/B182. Note also that the objection considered here amounts to the claim that infinitely many things can never constitute a *unified* totality (because, just as one cannot count to an infinite number in a successive, enumerative process, so too infinitely many things cannot be completely composed). As I explain below, however, the mistake with this line of reasoning is its assumption that items in *tota synthetica* can be united only via successive processes. Since *tota synthetica* can come together via non-successive forms of combination (at least as a conceptual possibility), *tota synthetica* formed from infinitely many parts are at least logically possible, contra the consensus view.

23 Sutherland (2021: 70) reads the passage in this way, as does Smyth (2023: 340-1). Notably, however, Smyth distinguishes between the concept <infinite whole> (which is perfectly coherent) and the concept <infinite totality> (which he sees as incoherent because <totality> on his reading denotes an 'enumerative total ordering' resulting from 'a successive and exhaustive synthesis' (2023: 341)). While I agree with Smyth that an infinite successive synthesis cannot be complete, I deny that reason's representation of an infinite totality (in its idea of the unconditioned) presupposes successive synthesis (and so is a 'totality' in Smyth's sense of requiring a successive and exhaustive synthesis). Ultimately, however, I think Smyth and I differ only in terminology, for Smyth does not argue that <infinite whole> can refer *only* to *tota analytica*. On the contrary, he says that Kant employs (in the antinomies) a '*discursive concept*' of an infinite whole that 'exceeds our powers of successive synthesis' (2023: 339). So, while Smyth does not set out to argue that actually infinite *tota synthetica* are conceptually possible, I take his paper to be compatible with my proposal.

24 Smyth (2023) offers further support for this point in his excellent discussion of Kant's account of actual infinity and his commitment to infinite *quanta* that lack *quantitates* (or exact sizes).

25 Kant calls the idea of an infinite number 'absurd' in the *ID*, where he also stresses that the absurdity of an infinite number should *not* be taken as a basis for concluding against 'the actual mathematical infinite' (2: 389fn).

26 There is debate in the scholarship about exactly how Kant's notion of real possibility should be understood. See Chignell (2012), Leech (2017), and Stang (2016) for some different interpretative options. However, these debates do not affect my argument here, for I want only to show that the concept of an actually infinite *totum syntheticum* is *logically* possible, and there is wide agreement that *thinkability* entails logical possibility for Kant.

27 This discussion occurs in the *ID*, where Kant writes that an infinite intellect could 'distinctly apprehend' an actually infinite multiplicity, but it would have to do so 'at a single glance, without the <u>successive</u> application of a measure' (2: 389fn, my underlining). Since Kant also says in the *ID* that '*whatever cannot be cognised by any intuition at all is simply not thinkable*, and is, thus, impossible', we should conclude that he thinks actually infinite successive syntheses are impossible *tout court* (2: 413). While this particular discussion of the absolute impossibility of actually infinite temporally successive processes occurs in 1770, there is no specific evidence that Kant changed his views on this issue by the time of the first *Critique*.

28 Smyth also argues that a complete infinite succession is absolutely impossible in Kant's view (2023: 339). Note that the impossibility of a complete infinite *succession* is compatible with the infinity of time itself, since time itself is given as a whole rather than successively, and the representation of succession in fact presupposes a prior representation of the whole of time (A30-2/B46-8). Winegar (2016) makes a similar point.

29 In connection with this, when Kant appears to assert the impossibility of an infinite composition *tout court* (e.g., see *MFNS* 4: 506-7), I think he is actually only thinking of the impossibility of grasping *successively* an infinite composition (which would be required for any claim to *cognise* an infinite composition).

30 A further point worth mentioning here is that we can hold that Kant rejects NAITS without abandoning the view that the holistic structures of space and time as *tota analytica* play an important role in our knowledge of their infinity. As we have seen, Kant holds that in space and time the whole precedes the parts (A438/B466), and he also holds that any (finite) part of space and time, no matter how large, is surrounded by a greater whole (A25/B39 and A32/B48); from this it follows that space and time are actually infinite, i.e., strictly greater than any finite magnitude. Thus, although we should avoid attributing NAITS to Kant, it is correct to say that our awareness of space and time as *tota analytica* facilitates our knowledge of their infinity, and the status of space and time as *tota analytica* makes them importantly different from the spatiotemporal *world* as treated in the antinomies.

31 A consequence of this article's argument is that spatial and temporal parts of the first antinomy's thesis argument are asymmetrical in the sense that the argument concerning the world's temporal extent turns on a conceptual impossibility, while the argument concerning its spatial extent does not. However, this asymmetry is not a strike against the interpretation I have been recommending, since Kant himself is explicit that the spatial argument requires appealing to kinds of considerations that the temporal argument does not. For example, see A432/B460, where Kant acknowledges that an infinite spatial extent would be given *simultaneously*, and for this reason we must appeal to our inability to *successively represent* the entirety of an infinite spatial extent to rule out its real possibility.

32 At the very least, the debate has now shifted to the question whether transcendental realists would accept the account of concept definition on which the consensus view depends but would *not* accept other ways of constraining possibility by appealing to our representational limitations. And let me stress once more that I do not intend to settle these issues here (or indeed any issues about Kant's theory of concept definition or the precise ways in which we should specify the theses of transcendental realism and idealism). Instead, I only want to show that neither the consensus view nor the one I recommend frees the thesis argument from depending on claims about *our* inability to grasp the infinite, and in this respect, the consensus view does not have an obvious and overwhelming interpretative advantage in its favour. I take Proops to agree with this point insofar as he worries that the consensus view (which he endorses) does not actually give the thesis argument a non-question-begging rendering (2021: 226-7). See also Melamedoff-Vosters for further agreement (2023: 617).

33 This is further compatible with Kant's claim that a magnitude infinite in this sense 'thereby contains a multiplicity (of given units) that is greater than any number, and that is the mathematical concept of the infinite' (A432/B460).

34 An alternative reading might hold that intuition alone does not represent space as an infinite given whole at all, and it is in fact only the idea of reason (i.e., the idea of absolute space) that represents it in this way. This reading would force a controversial interpretation of the Aesthetic, though perhaps we should not rule it out on that account.

35 Leibniz articulates his reasons for holding this view especially clearly where he says that 'the infinite is not a whole [*totum*]; and it is nothing but fiction [*fictionem*], for otherwise the part would be equal to the whole [*alioqui enim foret pars aequalis toti*]' (Leibniz 2003 [1672-1676]: 468). For Leibniz, it is an axiom that the whole is always greater than the part, but infinite multiplicities can be shown to violate this axiom. Consider the following. There are infinitely many natural numbers, and intuitively, the even numbers are only a part of them. But the even numbers can also be put into one-to-one correspondence with the natural numbers, and as Leibniz reasons, this means the even numbers are not less numerous than the natural numbers. But this is just to say that infinite multiplicities violate the whole-part axiom. Hence, Leibniz concludes, they cannot constitute true wholes. Interestingly, Kant accepts the whole-part axiom as analytic (B17), which means he must reject the conception of size for infinite magnitudes on which Leibniz's proof depends. Smyth (2023) confirms that Kant does indeed embrace an alternative conception of size for infinite magnitudes, which Smyth describes as 'mereological'.

36 Cf. Bennett, who argues that Kant's 'thought on these matters was intensely Leibnizian' (2016: 129).

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