

A Renewed Argument for the Existence of a First Cause

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Introduction

The theorizing about causation is perhaps as old as philosophy itself. More specifically, arguments for the existence of a first cause have a long and rich history¹. Ever since Plato philosophers developed first cause arguments. This paper does not aim to provide an historical overview of all the first cause arguments offered by Plato, Aristotle, Aquinas, Leibniz, Clarke and many others. Instead it describes two paradigmatic forms² of a first cause argument and discusses the problems associated with each of them. Subsequently a renewed argument for the existence of a first cause is developed – one that does not conform to either of the two paradigmatic forms – and that does not face any of these problems. Contrary to the two paradigmatic forms, the proposed renewed argument does not rely on the metaphysical modal notions of necessary or contingent truths or objects.

Some initial stage setting is indispensable before the aforementioned renewed first cause argument can be advanced. First, for this paper a first cause is defined as something that is uncaused and that is the cause or an indirect cause³ of the existence of everything besides itself. Second, the proposed argument is deductive in nature. The conclusion that a first cause exists follows logically from the premises, i.e. if the premises are true than the claim that there is a first cause is true as well. Third, in this paper being⁴ or existence is treated univocally. There is only one kind of being, i.e. something either exists or not. Anything that exists is called an object and an object is something that exists. There may be different kinds of objects, e.g. abstract objects in addition to concrete objects, and universal objects in addition to particular objects. Still, discerning kinds of objects is not relevant for the proposed argument: a first cause, if it exists, is an object of some kind that is the cause or an indirect cause of each other object, regardless of its kind. Fourth, for this paper causality is plausibly understood as a relationship between two objects: the

cause and the effect. Thus this paper adopts an objectual, i.e. object oriented, conception of causality according to which causation is a two-place relation whose relata are objects. The scope of the present paper is limited to causation with respect to bringing about existence. In what follows an object is thus understood to be the cause of another object if and only if the former object brings the latter into existence. In other words, some object causes another object in case it is the cause of *the existence of* that other object. Also, the conception of causation employed is maximally inclusive, that is, *the* cause of the existence of an object encompasses all that is responsible for the object's existence and the existence of each of its caused parts. Thus, for example, the cause of a bronze sculpture does not just refer to the sculptor, but also to that what is responsible for the existence of the bronze out of which the sculpture is made⁵. In this paper a number of causal principles applicable to the notion of causation under consideration are specified and argued for. In this way the relevant conception of causality is further explicated. Fifth, the aforementioned definition of a first cause implies that only one object can be a first cause⁶. So, if there is a first cause, then it is properly described as the single ultimate origin of all other objects.

The first paradigmatic form

In his *Summa Theologiae* Thomas Aquinas presents five arguments for the existence of a first cause. These arguments are widely known as the 'Five Ways'. In the second way Aquinas reasons from the observation that the observable world contains caused things:

“The second way is based on the nature of causation. In the observable world causes are found to be ordered in series; we never observe, nor ever could, something causing itself, for this would mean it preceded itself, and this is not possible. Such a series of causes must however stop somewhere; for in it an earlier member causes an intermediate and the intermediate a last (whether the intermediate be one or many). Now if you eliminate a cause you also eliminate its effects, so that you cannot have a last cause, nor an intermediate one, unless you have a first. Given therefore no stop in the series of causes, and hence no first cause, there would be no intermediate causes either, and no last effect,

and this would be an open mistake. One is therefore forced to suppose some first cause, to which everyone gives the name ‘God’”⁷

The second way is historically important because in it Aquinas is concerned with the cause of a thing’s existence and not with the cause of the motion or change of an already existing thing as Plato, Aristotle and others before Aquinas had done. The context of the second way is thus causation with respect to bringing about existence instead of bringing about motion or change. Aquinas’s second way can be schematized as follows:

1. There are caused objects (premise),
2. There are no cyclic series of causes (premise),
3. There are no downward infinite series of causes (premise),
4. The series of causes of each caused object is finite and acyclic (from 2, 3),
5. The series of causes of each caused object starts with an uncaused cause (from 4),
6. There is a first cause (from 1, 5).

Aquinas’s second way is at its face-value not a logically valid argument. Premise (1) and intermediate conclusion (5) imply that the total number of uncaused causes is greater than or equal to one and less than or equal to the number of caused objects. Now, how does the conclusion (6) that there is a first cause logically follow from this? The argument does not make this clear. Moreover, the argument would still not be logically valid if it could be assumed that the number of uncaused causes is equal to one. The reason is that this sole uncaused cause might still not be a first cause. After all, a first cause is the cause or an indirect cause of *everything* besides itself. Therefore, a single uncaused cause only qualifies as a first cause if there are no isolated objects (i.e. objects that are uncaused and that are neither the cause of another object).

From the above it follows that by adding the following two additional premises:

- If there is an uncaused cause, then the number of uncaused causes is one,
- Every uncaused object is itself a cause,

a logically valid argument for the existence of a first cause is obtained:

1. There are caused objects (premise),
2. There are no cyclic series of causes (premise),
3. There are no downward infinite series of causes (premise),
4. The series of causes of each caused object is finite and acyclic (from 2, 3),
5. The series of causes of each caused object starts with an uncaused cause (from 4),
6. There is an uncaused cause (from 1, 5),
7. If there is an uncaused cause, then the number of uncaused causes is one (premise),
8. There is one uncaused cause (from 6, 7),
9. Every uncaused object is itself a cause (premise),
10. There is one uncaused cause of everything besides itself (from 8, 9),
11. There is a first cause (from 10 and the definition of 'first cause').

In what follows this argument is referred to as the first paradigmatic form of a first cause argument. It consists of five premises (1, 2, 3, 7 and 9), five intermediate conclusions (4, 5, 6, 8 and 10) and a final conclusion (11). Aquinas's second way is adequately thought of as being an instance of this form in case it is assumed that premises (7) and (9) are both implicitly part of Aquinas's reasoning.

The first paradigmatic form is logically valid, that is, the conclusion that there is a first cause follows logically from the five premises. Therefore, if the premises are true, the conclusion is true as well. Now, are there good reasons to think that each of these five premises is true? In what follows each of these premises is considered in more detail.

Premise (1)

The first premise is entirely acceptable on empirical grounds. Surely, we perceive a world that appears to be full of all kinds of caused objects, such as tables, chairs, plants, trees, animals and humans. So, the first premise is an unproblematic observational datum. It is certainly plausible enough to be used as a premise. Note that this premise is a posteriori and not a priori justified. Hence the first paradigmatic form is an a posteriori argument.

Premise (2)

The second premise introduces the concept of a cyclic series of causes. A cyclic series of causes is a series of causes that starts and terminates with the same object. Such a series is properly described as either ‘A causes A’, ‘A causes B , B causes A’ or ‘A causes B, B causes __ , ... , __ causes A’. The second premise holds that there are no cyclic series of causes. The justification for this premise is that no object can be directly or indirectly ontologically prior⁸ to itself. In Aquinas’s second way this point is made when he writes: “we never observe, nor ever could, something causing itself, for this would mean it preceded itself, and this is not possible”. The second premise seems to be unproblematic. Surely, nothing can be the cause or an indirect cause of its own existence. So the second premise is intuitively plausible. It is certainly reasonable enough to accept as a premise.

Premise (3)

The concept of a downward infinite series of causes comes along with the third premise. Such a series of causes is bounded from above but unbounded from below, i.e. it contains a last but not a first member. A downward infinite series of causes can be adequately denoted as ‘... , __ causes B, B causes A’. According to the third premise there are no downward infinite series of causes. The second way does not provide a clear explicit justification for this premise⁹. Still, the justification might be that an infinite downward regress of causes of an object is not possible since in that case the object would not be able to actually come into existence. This might seem to be a sufficient justification. An infinite regression of causes appears implausible since it is for us inconceivable how the existence of something could actually originate from an interminable sequence of causes without a lower bound, i.e. without an initial originating cause. The claim that an infinite downward regression of causes is impossible is thus certainly not groundless since it is at least acceptable as an assertion about how we perceive reality. The third premise appears to be justified as a common sense proposition about how the world is intuited by us. So, it seems to be a sufficiently warranted premise to utilize within metaphysical inquiries. On the other hand it has to be admitted that apart from these considerations there seems to be no good argument for the third premise that proceeds to its conclusion through discursive reasoning rather than direct intuition. An infinite regress of causes might be possible even

though it is hard for us to conceive. A first cause argument that does not rely upon this premise should therefore, everything else being equal, be preferred above a first cause argument that does. As becomes clear in the rest of this paper the second paradigmatic form and the proposed renewed version of a first cause argument do not rely upon the questionable premise that an infinite downward regress of causes is impossible.

Premise (7)

According to this premise, if there is an uncaused cause, then the number of uncaused causes is one. This premise surely seems implausible. Why could there not be two or more uncaused causes? Nevertheless, if mereological universalism, i.e. the claim that every sum¹⁰ of objects is itself an object, is true, one could argue that there is a sense in which there is only one uncaused cause. Let UC be the sum of all uncaused causes. UC is an object if mereological universalism is true. Further, UC is uncaused since it is the sum of all uncaused objects. Thus UC is itself an uncaused cause and each uncaused cause is a part¹¹ of it. Given this, one could argue that UC is the single uncaused cause that contains every other uncaused cause as one of its proper parts¹². The problem of this argumentation is that mereological universalism itself is a controversial thesis. In the contemporary literature objections to mereological universalism are raised and alternative mereological accounts have been proposed, such as those of van Inwagen (1990), Fine (1999), Johnson (2002) and Koslicki (2008). Without mereological universalism, there appears to be no cogent way of holding that there could be at most one uncaused cause. Premise (7) is therefore too problematic. There seems to be no plausible reason for it that could convince those who do not accept the claim that every sum of objects is an object.

Premise (9)

This premise holds that every uncaused object is itself the cause of another object. It is a direct logical consequence of the metaphysical principle that everything that exists is caused by another object or is the cause of at least one other object¹³. The posited disjunction is inclusive. It is possible that an object is itself caused and is also the cause of one or more other objects. Note that this metaphysical principle immediately implies that mereological universalism is untenable since it follows that the sum of all objects is

not an object¹⁴. Premise (9) seems plausible enough to accept as a premise. The intuition behind it is that something can only exist if it is part of ‘the causal fabric’ of the world. Something that is not caused and that is neither the cause of anything else can not exist simply because it does not take part in the *all-embracing* process of causation. Premise (9) is thus grounded in the viewpoint that the world as a whole is a causally intertwined whole or that the world does not contain fully isolated inert objects. Reality is a causally interweaved coherent unity in which every object participates. Everything that exists is causally connected because reality is in its broadest sense a linked unity. In fact, premise (9) is a premise of the renewed first cause argument presented later on in this paper¹⁵.

Evaluation

From the above it can be concluded that the first two premises are sufficiently justified. Premise (9) seems to be sufficiently justified as well. However, premise (3) and premise (7) are too problematic. It is questionable whether we are warranted to think that these premises are true. From this it follows that the first paradigmatic form is not a good argument. It is not a good argument because two of its premises are not sufficiently warranted. Now, as a next step, the second paradigmatic form is presented and evaluated.

The second paradigmatic form

In his *The Monadology* Leibniz argues that there exists a metaphysically necessary being which is the sufficient reason for the existence of the universe. In other words, this being is the reason or rational ground for there being a totality of contingent beings¹⁶. This totality is to be understood as all contingent beings taken together. The existence of a metaphysically necessary being is Leibniz’ answer to his famous question as to why there are contingent beings at all or, more generally, why there is anything at all rather than just nothing. Leibniz provides the following argument:

“[...] there must [...] be a sufficient reason for contingent truths [...]. [Now,] [t]here is an infinity of figures and of movements, present and past, which enter into the efficient cause of my present writing, and there is an infinity of slight inclinations and dispositions, past and present, of my soul, which enter into the final cause. And as all this

detail only involves other contingents, anterior and more detailed, each one of which needs a like analysis for its explanation, we make no advance: the sufficient or final reason must be outside of the sequence or series of this detail of contingencies, however infinite it may be. And thus it is that the final reason of things must be found in a necessary substance [...]; and this is what we call God”¹⁷

Leibniz considers the universe as a whole, i.e. as the totality of all contingent objects. He holds that there must be a sufficient reason for the fact that there are contingent objects at all rather than nothing. In other words, the existence of the universe must have a rational basis or ground. It is important to notice that Leibniz does not exclude the possibility of an infinite downward regress of causes, as Aquinas did. There might be series of causes that proceed to infinity. However, according to Leibniz, such series, if they exist, do not constitute a sufficient reason for the existence of the universe itself, i.e. the totality of all finite and infinite causal series. In other words, some series of causes might go to infinity, but this cannot account for the fact that there exists a totality of contingent objects. A sufficient reason for the universe considered as a whole can only be found in an object that exists outside the realm of contingent objects, i.e. a non-contingent and therefore necessary existing object. This metaphysically necessary object is referred to by Leibniz as ‘the final reason of things’. As ‘the final reason of things’ it is not only the sufficient reason for the existence of a totality of contingent objects, but also for its own existence. Hence, by virtue of its own nature, it is not possible for this necessary being not to exist¹⁸.

Leibniz characterizes this necessarily existing object as being the ultimate *reason* for the existence of the universe, not as being the first *cause* of the universe. However, it seems obvious that the only way in which an object can be the reason for the existence of a totality of other objects is by being the originating cause of the existence of that totality. In other words, if the reason of the universe is a specific object, as Leibniz holds, then that object is properly described as being the originating cause of the universe. Therefore, Leibniz’ argument can be schematically represented as a first cause argument as follows:

1. There must be a sufficient reason for each contingent truth (premise),

2. The universe is the sum of all contingent objects (definition),
3. It is a contingent truth that there is a universe (premise),
4. There must be a sufficient reason for the existence of the universe (from 1, 3),
5. The reason for the existence of the universe is found outside the universe (premise),
6. There is a necessary being that is the reason for the universe's existence (from 2, 5),
7. If a being is the reason for the universe's existence, than it is its cause (premise),
8. There is a necessarily existing being that is the cause of the universe (from 6, 7),
9. If the cause of the universe exists necessarily, then it is a first cause (premise),
10. There is a first cause (from 8, 9).

The first premise of the above argument is widely known as the principle of sufficient reason (PSR). In addition to the formulation of PSR in the above quoted fragment, i.e. "there must be a sufficient reason for contingent truths", Leibniz provides many other formulations of this famous principle in his work¹⁹. According to the PSR there is a sufficient explanation for every contingently true proposition. The PSR is nowadays rather controversial. A forceful objection against it has been raised by van Inwagen (1983). He argues against PSR by showing that the conjunction of all contingently true propositions is itself a contingently true proposition that cannot have an explanation. His line of reasoning is in essence as follows²⁰. Since no necessarily true proposition explains a contingently true proposition²¹, it follows that the explanation of the conjunction of all contingently true propositions is a contingently true proposition E. The contingently true proposition E explains itself since E is part of the conjunction of all contingently true propositions and E explains this conjunction and therefore each part of it. But it is surely impossible that proposition E explains itself since no contingently true proposition can explain itself. The assumption that the PSR is true leads therefore to a contradiction. Consequently, the PSR is to be rejected. Now, this powerful line of reasoning of van Inwagen cannot be applied to the following weaker version of the PSR:

(1^{*}) Every contingent object is caused by another object.

This more restricted version of the PSR only claims that each contingent object is caused, not that for every contingently true proposition there is a sufficient explanation. It is based on the intuition that a contingent object exists but could not have existed, and must therefore have a reason for its existence, being the fact that its existence is caused by another contingent or necessary object. In order to argue against (1^{*}) in a way comparable to van Inwagen's forceful objection to (1) one would have to argue that the totality of all contingent objects, i.e. all contingent objects taken together, is itself a contingent object that cannot have been caused by another object. This is however not possible, precisely because of the fact that one could counter such an objection by maintaining that the contingent aggregation of all contingent objects is a contingent object that has a metaphysical necessary object as its cause. In fact, this claim is exactly what the first cause argument as derived from the quoted fragment of Leibniz's *The Monadology* amounts to. Therefore, by replacing (1) by (1^{*}), and adjusting some of the other propositions accordingly, a first cause argument is obtained that is not directly vulnerable to van Inwagen's forceful objection to the PSR:

- 1^{*} Every contingent object is caused by another object (premise),
2. The universe is the sum of all contingent objects (definition),
3. There are contingent objects (premise),
4. The sum of all contingent objects is a contingent object (premise),
5. The universe is a contingent object (from 2, 3, 4),
6. The universe is caused (from 1, 5),
7. The cause of an object is disjoint with that object (premise),
8. The cause of the universe is not a contingent, i.e. a necessary, object (from 2, 6, 7),
9. If the cause of the universe exists necessarily, then it is a first cause (premise),
10. There is a first cause (from 8, 9).

In what follows this argument is referred to as the second paradigmatic form of a first cause argument. It consists of five premises (1^{*}, 3, 4, 7 and 9), an explicit definition (2), three intermediate conclusions (5, 6 and 8) and a final conclusion (10). Leibniz' argumentation for the existence of a metaphysically necessary being that constitutes a

sufficient reason for the existence of the universe, as presented in the quoted fragment from *The Monadology*, can be adequately thought of as being an instance of the second paradigmatic form if we may assume that premises (1^{*}), (4) and (9) are part of Leibniz' reasoning.

The second paradigmatic form is logically valid, that is, the conclusion that there is a first cause follows logically from the five premises. Thus, if the premises are true, the conclusion is true as well. Now, are there good reasons to think that each of these five premises is true? In what follows each of these premises is assessed in more detail.

Premise (1^{})*

As mentioned the premise that every contingent object is caused is a weaker version of Leibniz' principle of sufficient reason (PSR). As being more restricted than PSR, it is not vulnerable to van Inwagen's objection. Nevertheless, the first premise is problematic. To understand why consider the following two propositions:

- (a) the cause of a caused part of a caused object is a part of the cause of that object,
- (b) There is at least one object A for which it holds that
 - A is the cause of an object B,
 - the sum of A and B is a contingent object C²².

Both propositions seem to be *prima facie* sufficiently plausible if taken into account that, as mentioned in the introduction, the context of causation is causation with respect to bringing about the existence of an object, i.e. an object X is the cause of an object Y if and only if X is the cause of *the existence of* Y. It is now shown that (a), (b) and premise (7), i.e. the premise that an object and its cause are mutually disjoint, together contradict premise (1^{*}). According to (b) object C is contingent. Now assume that C is caused and let object D be the cause of C. According to proposition (a) the cause of B is a part of D. Thus A is a part of D. Now, A is a part of C, and therefore D and C are not disjoint, which clearly contradicts premise (7). It therefore follows that the assumption that the contingent object C is caused is untenable. So, C is an uncaused contingent object, which

counters premise (1^{*}). Now, as is argued below, premise (7) is in fact properly justified on independent grounds. Thus, there are two *prima facie* plausible propositions, (a) and (b), that, as shown above, together with the independently justified premise (7) refute premise (1^{*}). Therefore, the first premise, i.e. the premise that states that every contingent object is caused by another object, is not sufficiently plausible and thus problematic. Further, as becomes clear later on in this paper, proposition (a) is one of the premises of the proposed renewed argument for the existence of a first cause.

Premise (3)

This premise is empirically sufficiently warranted. The world surely contains objects that, if things would have gone differently, would have not existed, such as for example the chair one is sitting on. Note that because of this premise the second paradigmatic form is an *a posteriori* and not an *a priori* argument. In this respect it is similar to the first form.

Premise (4)

This premise maintains two things. First, that the sum of all contingent objects is itself an object, and, second, that this object is a contingent object. Now, the second claim is highly plausible. Surely, it would be extremely counter-intuitive to hold that the sum of all contingent objects is a necessarily existing object. Some philosophers contend that each sum has its parts essentially. In that case it follows immediately that the sum of all contingent objects is contingent, since the sum fails to exist in those possible worlds in which at least one of its parts does not exist. The first claim, i.e. the claim that the sum of all contingent objects is an object, is implied by mereological universalism, i.e. the thesis that each arbitrary sum of objects is also an object. However, as mentioned mereological universalism is a controversial thesis, due to the various objections and alternatives by van Inwagen (1990), Fine (1999), Johnson (2002), Koslicki (2008) and others. Hence, the first claim, and thus premise (4) itself, is too problematic. Without universalism, there is no good reason for accepting the claim that the sum of all contingent objects is an object.

Premise (7)

This premise is sufficiently warranted. Plausibly, the cause of the existence of an object is ontologically prior to that object and each of its parts. So, if an object's cause would not be disjoint with the caused object, it would follow that the cause of the object is prior to a part of itself, which seems surely impossible. This point can be put in a different way. Suppose object A is the cause of B and assume that A and B are not disjoint. In that case A and B share a part C. Now, A is the cause of the existence of B. Since C is a part of B it follows that A is also the cause of the existence of C²³. But C is a part of A as well. Thus A is the cause of a part of itself. This is definitely counter-intuitive. Nothing is prior to a part of itself. Therefore the cause of an object is always disjoint with that object. The cause and the caused object have a separate existence: they do not share a common part.

Premise (9)

According to this premise a necessarily existing cause of the universe must be a first cause. This premise is problematic for two reasons. First, the necessarily existing cause of the universe, let's call it object A, might not be the cause or an indirect cause of *everything* besides itself. After all, the argument does not rule out the existence of *other* metaphysically necessary objects that are not caused or indirectly caused by A. If such other objects exist, A is obviously not the cause or an indirect cause of *everything* besides itself, and thus not a first cause. Second, object A might not be uncaused and therefore not be a first cause. In order to understand why it is important to notice first that the argument does not exclude the existence of objects that exist in every possible world and that are caused in every possible world. In fact, there seems to be no good reason for denying the existence of such objects. Surely, such objects could not exist if every metaphysically necessary object exists because of its own nature²⁴. But why should all necessarily existing objects exist by virtue of their own nature? Earlier in this paper a necessarily existing object is defined as an object that could impossible not exist, i.e. that exists in every possible world. Now, this definition does not exclude the existence of objects that exist necessarily and that are caused in all possible worlds²⁵. So, the fact that an object is metaphysically necessary does not imply that it is uncaused. There is thus no good reason why object A should be uncaused. Consequently, since every first cause is uncaused, there is no good reason why A must be a first cause. Because of this, and the former problematic aspect, premise (9) is not cogent and should therefore be refuted.

Evaluation

From the five premises of the second paradigmatic form of a first cause argument only premise (3) and premise (7) are sufficiently justified. Premise (1^{*}), (4) and (9) are too problematic. From this it follows that the second form is not a good argument either. In what follows the renewed version of a first cause argument is presented and discussed. It is shown that the proposed renewed version of a first cause argument is not vulnerable to any of the above discussed objections to (the premises of) the two paradigmatic forms.

A renewed version

The proposed renewed version of a first cause argument consists of seven premises and one final conclusion, i.e. the conclusion that there is a first cause. Before this argument is advanced some further terminology has to be introduced. A composite object, also called a composite, is an object that has at least one proper part. Another concept is that of composition. Composition is not the same concept as the concept of sum. Some objects $\{O_i\}_i$ compose an object O if and only if object O is the sum of the O_i and all the O_i are mutually disjoint (Sider 1993). Further, some objects $\{O_i\}_i$ are called a composition of an object O in case the $\{O_i\}_i$ compose O . The proposed renewed argument is based on the mereological supplementation principle. According to this principle every proper part of an object is 'supplemented' by another disjoint part of that object (Varzi 2009). From this principle it immediately follows that every composite object has a composition consisting of two or more objects. Note that a composite can have more than one composition. Now, a simple object, also called a simple, a mereological atom, or an atom, is an object lacking proper parts. So, a simple object is not a composite object and a composite is not a simple. Obviously, every object is either a simple or a composite.

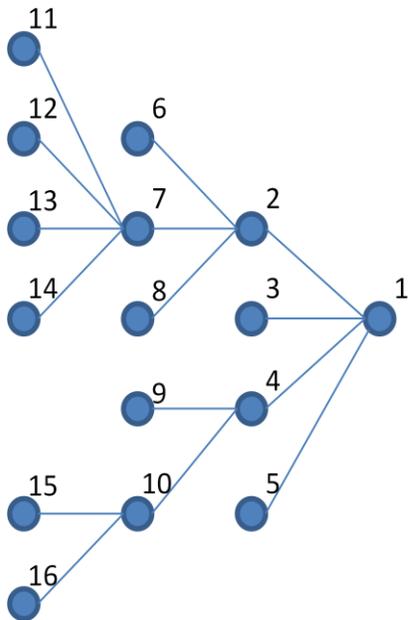
As mentioned before the sum of some objects is those objects taken together, i.e. the sum of some objects is a term to refer to those objects as a totality. A sum is thus ontologically neutral, innocent or harmless, that is, the sum of some objects introduces nothing beyond these objects themselves. Thus, a commitment to sums is not a further commitment, since sums are nothing over and above their objects. Now, compositions are sums. This implies

that the same holds for the ontological relation between an object and its compositions, i.e., if some objects compose an object, then that composed object is those objects taken together. Thus, the composite simply *is* the composition. This principle is often referred to in the literature as Composition-as-Identity (Koslicki 2008). It should not be confused with mereological universalism. According to mereological universalism every arbitrary sum of objects is itself an object. Composition-as-Identity does not imply universalism. After all, even if all composites are identical to their compositions, it might be the case that some sums are not objects, e.g. because these sums do not stand in the proper causal relationships with other objects²⁶. Further, universalism does not imply Composition-as-Identity, because, even if all sums are objects, it might be the case that composites are something above and beyond their compositions. The proposed renewed argument is based on Composition-as-Identity. However, the proposed renewed argument does *not* assume universalism. In fact, universalism is a quite implausible position. Surely, the sum of some piece of wood in Italy, the left front wheel of some car and the Statue of Liberty does not count itself as an object. It is a sum of objects and nothing more. For amongst others, it was not caused *as a whole*, nor does it, *as a whole*, causes anything else²⁷.

Mereological universalism is also referred to as unrestricted composition. The denial of universalism is either nihilism or restricted composition. According to nihilism sums of two or more objects are not objects. Nihilism therefore implies that composition does not occur. Restricted composition is a position between nihilism and universalism. According to restricted composition some sums are objects and some sums are not. It is important to note that restricted composition does not imply that there are only a few concise natural necessary and sufficient conditions for composition to occur. After all, for all we know it might be a brute fact that some sums are objects and other sums are not. So, the cases in which composition occur might be quite irregular. In other words, restricted composition does not imply that the Special Composition Question²⁸, i.e. the question under what circumstances some objects compose a further object, has a concise natural answer²⁹. The defense of one of the premises of the renewed argument is based upon the acceptance of the following sufficient condition for composition to occur: some objects compose another object if they together make up a “demarcated natural kind”. This sufficient

condition is explained and argued for later on in this paper. Note that the validity of this (or any other) sufficient condition for composition to occur does not imply that the Special Composition Question has a concise natural answer. As becomes clear later on, the renewed argument does not depend on this question having a concise natural answer.

Now, the notion of a grounding sequence needs to be introduced. A grounding sequence for a composite object X is a finite or infinite sequence of sets of sets of objects $\{\Omega_i\}_i$ that starts with object X , i.e. $\Omega_0 = \{X\}$, and then moves on to a composition of X , and then terminates or moves on to compositions of one or more of the objects in the composition of X , and then terminates or moves on to compositions of one or more of the objects in the compositions of one or more of the objects in the composition of X , and so on, and so on, while at the same time the objects that are not ‘decomposed’ are kept, so to speak, at every step, ‘on board’ in the sequence. Note that the phrase ‘one or more’ in this definition ensures that for every grounding sequence $\{\Omega_i\}_i$ and natural number i the complement $\Omega_{i+1} \setminus \Omega_i$ is not empty. Thus, grounding sequences do not become constant after a while, i.e., if $\{\Omega_i\}_i$ is a grounding sequence, then it is not the case that there is a natural number n and a set of sets of objects Ω such that $\Omega_i = \Omega$ for all i greater or equal to n . The following diagram provides an example of a grounding sequence.



Objects 2, 3, 4 and 5 compose object 1, objects 6, 7 and 8 compose object 2, objects 9 and 10 compose object 4, objects 11, 12, 13 and 14 compose object 7 and objects 15 and 16 compose object 10. Whether the objects 3, 5, 6, 8, 9, 11, 12, 13, 14, 15 and 16 are simple or composite is not shown by the diagram. Each of these objects might be either a simple or a composite object. In this example a grounding sequence for object 1 would be a finite sequence consisting of four sets, i.e. the sets $\Omega_0 = \{\{1\}\}$, $\Omega_1 = \{\{2,3,4,5\}\}$, $\Omega_2 = \{\{6,7,8\}, \{9,10\}, \{3\}, \{5\}\}$ and $\Omega_3 = \{\{11,12,13,14\}, \{15,16\}, \{6\}, \{8\}, \{9\}, \{3\}, \{5\}\}$. Intuitively, the objects in Ω_1 provide a ground³⁰ for the object in Ω_0 , the objects in Ω_2 provide a (further) ground for the objects in Ω_1 , and the objects in Ω_3 provide a (further) ground for the objects in Ω_2 . It is important to remark that it is not required for a grounding sequence to be as lengthy as possible, i.e. to move on as long as it is possible to do so. Thus, in the current example the sequence $\Omega_0 = \{\{1\}\}$, $\Omega_1 = \{\{2,3,4,5\}\}$ and $\Omega_2 = \{\{6,7,8\}, \{9,10\}, \{3\}, \{5\}\}$, consisting of three sets, is also a grounding sequence for object 1. The same holds for the two-set sequence $\Omega_0 = \{\{1\}\}$ and $\Omega_1 = \{\{2,3,4,5\}\}$. But, Ω_0 itself is not a grounding sequence.

After these preliminary definitions and remarks the seven premises and the conclusion of the renewed argument can be presented. They are enumerated in the list below.

1. There are objects (premise),
2. The grounding sequence for every composite object is finite (premise),
3. Every object is caused or³¹ is the cause of one or more other objects (premise),
4. The sum of all caused simple objects, if not empty³², is an object (premise),
5. The cause of an object is disjoint with that object (premise),
6. The cause of a caused part of a caused object is part of that object's cause (premise),
7. Every caused composite object contains a caused proper part (premise),
8. There is a first cause (conclusion).

In order to transform the above list of seven premises and one conclusion into a logically valid argument, i.e. a demonstration that the conclusion follows logically from the seven premises, the appropriate intermediate conclusions would have to be added to the list.

Now, transforming the above enumeration into a scheme of a logically valid argument would result in a large inconveniently arranged scheme consisting of long-threaded statements. Therefore, below an in-text defense of the claim that the conclusion that there is a first cause can be logically deduced from the seven premises is provided, that is, that if the premises are true, the conclusion, that there is a first cause, is true as well. Subsequently, it is argued that each of the seven premises is sufficiently plausible and thus reasonable. In any case, it will be maintained that each of the above premises is more likely true than false. The derivation of the conclusion that there is a first cause from the seven premises consists of five main steps. First, from (2) and (7) a metaphysical principle is derived, i.e. the principle that every caused composite contains a caused simple. Second, this principle is used to infer that the sum of all caused simples, denoted by M , is an object. Third, it is shown that M is not a cause. Hence, according to premise (3), M is caused by some object A . Fourth, it is shown that object A is itself uncaused, and, fifth, it is shown that object A is in fact a first cause.

Now, as stated, the first step of the deductive derivation of the final conclusion, i.e. that there is a first cause, is to show that the second and the seventh premise together imply that every caused composite object contains a caused simple object, i.e. that each caused composite has at least one caused simple as a part. This metaphysical principle is referred to as principle (p). To show that principle (p) indeed holds, let C be a caused composite object and consider the following step by step algorithmic procedure:

- 1) Let $i := 0$ and $C^{(0)} := C$,
- 2) According to the seventh premise $C^{(i)}$ contains a caused proper part $C^{(i+1)}$,
- 3) If $C^{(i+1)}$ is a simple object, then STOP the procedure,
- 4) Let $i := i+1$ and proceed with the second step.

According to the second premise every grounding sequence for C is finite. Hence the sequence $C, C^{(1)}, C^{(2)}, \dots$ does not proceed to infinity, i.e., there is a natural number n such that $C^{(n)}$ is a caused simple object³³. Due to the transitivity of the part-of relation, it follows that $C^{(n)}$ is a part of C . Thus, C contains a caused simple object. So, (p) is derived.

Second, it is shown that the sum of all caused simple objects is an object. Let M be the sum of all caused simple objects. According to the first premise there is an object. The third premise implies that this object is caused or the cause of another object. So, in any case, there is a caused object N . Object N is simple or composite. It is now shown that in both cases M is not empty. If N is simple, then N is a caused simple, and thus M is not empty. If N is composite, then, according to principle (p), N contains a caused simple object, and thus M is not empty. It follows that in both cases M is not empty. Therefore, since one of both cases obtains, M is not empty. But then the fourth premise implies that M is an object.

Third, it is shown that M is not a cause. Suppose, for reductio, that M is the cause of another object, i.e. K . According to the fifth premise object M is disjoint with object K . Thus, K is not a caused simple. Object K is a caused composite. From principle (p) it follows that K contains a caused simple K^* . Object K^* is a part of M . From this it follows immediately that M and K share K^* as a part. But this is contradictory since M and K are disjoint. So, the assumption that M is the cause of one or more other objects needs to be rejected.

According to the third premise M is caused. Let object A be the cause of M . It is now shown that A is uncaused. Suppose, again for reductio, that A is caused. From the fifth premise it follows that A and M are disjoint. So, A is not a caused simple, i.e. A is a caused composite. Principle (p) then implies that A has a caused simple A^* as one of its parts. So, the objects A and M share A^* as part. But this is surely in conflict with the disjointness of A and M . Therefore, the assumption that A is caused is incorrect. Object A is uncaused.

Now, object A is the cause of the sum of all caused simples, i.e. M , and therefore A contains also the cause of each caused simple object according to the sixth premise. Does it follow from this that A is a first cause? To show that A is indeed a first cause it also needs to be demonstrated that A is the cause or an indirect cause of everything besides

itself, i.e. that there is no uncaused object disjoint with A. Thus, suppose, once again for reductio, that object B is uncaused and disjoint with A. According to the third premise B is the cause of another object C. Object C is either simple or composite. Suppose that C is simple. In that case C is a part of M and thus, according to the sixth premise, the cause of C, i.e. B, is a part of the cause of M, i.e. A. Thus, B is a part of A. But this conflicts with the assumption that A and B are disjoint. Suppose, on the other hand, that C is composite. In that case principle (p) implies that object C contains a caused simple object C^* . Thus, again according to the sixth premise, the cause of C^* is a part of B. However, the cause of C^* is also a part of A due to the same premise and the fact that C^* is a part of M. From this it follows that B and A share C^* as a part. This again contradicts the assumption that A and B are disjoint. Therefore, the assumption that A and B are disjoint is incorrect, i.e. there simply is no uncaused cause disjoint with A. From this it follows that object A is a first cause, i.e. A is the cause or an indirect cause of everything besides itself.

The above shows that the renewed argument is logically valid, that is, the conclusion that there is a first cause follows logically from the seven premises. Now, are there good reasons to think that the premises of the renewed argument are true? In what follows it is argued that each of the seven premises is sufficiently plausible and therefore reasonable.

Premise (1)

The first premise seems to be self-evident. Surely there are objects. The claim that there are objects is so much obvious that it is not even clear how to derive this claim from claims that are intuitively more evident than the claim to be argued for. This shows that the first premise is sufficiently plausible. The first premise is also an empirical datum. So, the renewed version of a first cause argument is an a posteriori argument instead of an a priori argument. In this respect the proposed renewed version is not different from the first and second paradigmatic form of a first cause argument. On the other hand one could maintain that the claim that there are objects is to such an extent basic or fundamental that it is more properly described as being an a priori principle. After all, is there being at least one object not a necessary condition for the activity of rational discourse itself? If so, the truth of the first premise is already taken for granted once one starts to consider

the plausibility of that premise, i.e. without objects there would be no question of whether the first premise is plausible and thus that very question implies that premise (1) is true.

Premise (2)

According to the second premise no grounding sequence proceeds to infinity. In what follows it is argued for that there is a good reason for claiming that the second premise is true. Suppose, for reductio, that $\{\Omega_i\}_i$ is an infinite grounding sequence for a composite X. Now, there is no kind of ontological surplus for X above Ω_1 , i.e. object X simply *is* the objects in Ω_1 taken together. From this it follows that no being is added once one passes from Ω_1 to X. The same holds once one passes from grounding Ω_2 to grounding Ω_1 , i.e. the transition from Ω_2 to Ω_1 is ontologically neutral, that is, no being is added once one passes from Ω_2 to Ω_1 . More generally, for all natural numbers n greater than zero, the transition from Ω_{n+1} to Ω_n is ontologically innocent or harmless, i.e., no being is added once one passes from Ω_{n+1} to Ω_n . In other words, the influx of being is nil all the way down to infinity³⁴. But this is surely absurd. It would imply that there is no being associated with X itself and therefore object X would in fact not be a being at all! So the assumption that there is an infinite grounding sequence is not tenable. Hence, the second premise is warranted, i.e. the claim that all grounding sequences are finite is definitely a reasonable claim about the ontological structure of the world. It is justified because an infinite downward regress in the part-of relation is, taking into account the above, highly counter-intuitive. After all, as argued above, in case of an infinite downward regress of compositions the composite does not actually come into being. Its existence does not truly obtain. Thus, the reality of an object inducing an infinite regress of compositions would, so to speak, be left hanging in the air. The idea of that object actually being there would be a sheer delusion, i.e. its existence would be a sweeping illusory fantasy. So, every sequence of downward compositions for some given object terminates, which is precisely what is claimed by the second premise.

It is important to note that the second premise should not be confused with mereological atomism, i.e. the thesis that every object is either a simple object or composed of simple objects. Atomism, in its broadest sense, is the position according to which reality is

ultimately grounded in a lowest fundamental level, i.e. the level of simple objects, which is ontologically prior to any other level of reality. Now, it is surely not difficult to see that the premise that every grounding sequence is finite implies mereological atomism³⁵. However, mereological atomism does not imply that every grounding sequence is finite³⁶.

Premise (3)

The premise that every object is caused or is the cause of at least one other object is also premise (9) of the first paradigmatic form of a first cause argument that is presented and examined earlier on in this paper. There it is shown that this premise is surely plausible enough to be accepted. Therefore it suffices here to refer to that discussion.

Premise (4)

The premise that sum of all caused simple objects, if not empty, is itself an object seems certainly justified. To argue for its plausibility some further terminology is needed. Koslicki (2008) defines *kinds* as ‘categories or taxonomic classifications into which particular objects may be grouped on the basis of shared characteristics of some sort’. In her book Koslicki provides examples of kinds, such as ‘objects that are currently in my visual field’, ‘children born on a Tuesday’, ‘objects that can be used either as doorstops or as cleaning supplies’, ‘chairs’, ‘bachelors’, ‘janitors’, ‘hunters’, ‘electrons’, ‘water’, ‘planets’, ‘diamonds’, ‘tigers’, ‘cats’ and ‘gold’. Now, some kinds are *natural kinds*. Natural kinds are kinds rooted in some underlying structural uniform regularity out there in nature. There is no single conclusive answer to the question how to decide which kinds are natural. Still, in the literature criteria are proposed for the identification of kinds plausibly thought of as being natural. In what follows the criteria examined in Koslicki (2008) are captured. First, a natural kind is not ‘arbitrary, heterogeneous or gerrymandered’. Second, the members of a natural kind have much more features in common than just the features already present in (or logically implied by) the definition of that kind. So, natural kinds are such that we continuously discover previously unforeseen common features. In other words, a natural kind is a kind for which its specification does not capture everything that is true about its members. Third, natural kinds ‘provide grounds for legitimate inductive inferences concerning the members in question’. Fourth, natural kinds are expected to

figure in the laws and in the explanations of science. These criteria are best understood as follows. The more criteria are met by a given kind, the more plausibly that kind is thought of as being a natural kind. Let's have a look at the earlier mentioned examples from Koslicki (2008). The kinds 'the objects that are currently in my visual field', 'children born on a Tuesday' and 'the objects that can be used either as doorstops or as cleaning supplies' meet none of the above criteria and are thus plausibly rejected as being examples of natural kinds. The kinds 'chair', 'bachelor', 'janitor' and 'hunter' meet the first criterion, but not the other three, and are therefore not plausibly thought of as being natural either. On the other hand, the kinds 'electron', 'water', 'planet', 'diamond', 'tiger', 'cat' and 'gold' all meet the first three criteria. Besides, most (if not all) of them also satisfy the fourth criterion. So, these seven examples are definitely plausibly understood as being natural kinds.

Now, the notion of a *demarcated natural kind* is introduced. A demarcated natural kind is a natural kind for which it holds that membership is not vague, i.e. the specification of that natural kind is such that it is never unclear whether a given object is a member of that natural kind or not. With respect to kind membership there are no indeterminate cases if the natural kind in question is a demarcated natural kind. The boundaries of a demarcated natural kind are not vague, i.e. we can draw a clear unambiguous principled line between what counts as a member and what does not count as a member. Of our seven examples of natural kinds only 'electron', 'water' and 'gold' seem to be demarcated natural kinds. After all, biological species such as tigers and cats are, according to Darwinism, not demarcated. Also, there is no explicit definition of what counts as a planet or a diamond.

The mereological sum of the members of a demarcated natural kind is properly defined since there is a clear unambiguous line between what does and what does not count as a member of the kind in question. Such a sum is also quite regular and transparent since the objects in that sum do not overlap each other, i.e., they are all mutually disjoint. Now, the sum of all the members of a demarcated natural kind is best understood as being an object itself, i.e. the relation between the totality of members of a demarcated natural kind and each of the individual members of that kind is best understood as a relation between a

whole and its parts³⁷. As an example one could take the case of water. The totality of all water molecules in the universe counts plausibly as an object that can be referred to as 'the water in the universe' or 'the universe's water'. Surely, the fact that currently the water molecules are spatially spread across the universe does not make the totality of all water molecules any less a concrete particular whole than if all the water molecules would be coagulated. Thus, the spatial structure of the universe's water might change, but it is still 'the water of our universe', or, 'the universe's water', i.e. an object amongst other objects.

Now, the caused simples are a kind, its definition being 'the objects that are both caused and simple'. Surely, this kind is a natural kind. First, it is not arbitrary or gerrymandered. Second, the properties of the caused simples are not exhausted by being simple and being caused. After all, the discipline of string theory (or any future discipline having the basic building blocks of reality as its subject) is concerned with nothing less than an in-depth understanding of all the properties of the ultimate constituents of our universe. Thus, if the common features of the caused simples would be nothing more than being caused and simple, string theory (or any subsequent future discipline having the ultimate constituents of the world as its object) would be a rather empty idle discipline, which it surely is not. Third, the kind of caused simples is plausibly not a conventionalistic or nominalistic type of classification, since being caused and being simple refers to some realistic regularity or uniformity in nature. Therefore, the kind of caused simples provides sufficient ground for inductive inferences. Fourth, as already mentioned, the kind of caused simples plays a quite important role in science, i.e. in the quest for the most fundamental laws of nature, and in scientific explanations (such as, nowadays, within string theory). It follows that the caused simples adhere to all four discussed identification criteria for natural kinds. So, it is sufficiently reasonable to maintain that the caused simples are a natural kind.

It is now shown that the caused simples are in fact a demarcated natural kind. Consider the definition of the natural kind in question, i.e. 'objects that are both caused and simple'. This specification is unambiguously clear. After all, the existence of each given object is either caused or uncaused, and every given object either does or does not contain a proper part. Thus, according to the aforementioned principle, that is, the principle that

the sum of all the members of a demarcated natural kind is an object, the sum of the caused simples, if not empty, is an object, which is what is stated by the fourth premise.

Premise (5)

The fifth premise is actually the same as premise (7) of the second paradigmatic form of a first cause argument. As part of the discussion of the second paradigmatic form it was argued for that the premise that the cause of an object is disjoint with that object is indeed unproblematic, since, within the context at issue, i.e. causing an object's existence, its negation would have highly counter-intuitive, if not to say rather absurd, consequences.

Premise (6)

The sixth premise states that the caused parts of a caused object have a cause that is part of the cause of that object. So, if object A causes object B and object C is a caused part of B, then the cause of C is a part of object A. This premise is a direct consequence of the conception of causality under consideration, i.e. causation within the context of bringing about the existence of an object. Causality with respect to producing an object's existence is an all-inclusive all-encompassing conception, that is, the cause of the existence of an object includes everything that is responsible for the existence of that object and all of its caused parts. For example, the cause of a painting contains not just the painter but also the object that caused the paint used by the painter, the object that caused the frame of the painting, the object that caused the molecules of the paint and frame, etc. Thus, each caused object has precisely *one* all-inclusive cause (that is why it is for us so natural to speak about *the* cause of an object) and, therefore, the cause of each of the caused parts of that object is contained in (or equal to) this single all-encompassing cause. So, due to the all-inclusive conception of causality at hand, the sixth premise is indeed justified.

Premise (7)

According to the seventh premise each caused composite object contains a caused proper part. This seems to be a reasonable premise. Surely, at last one of the proper parts of a caused composite is itself caused. It is now shown that the seventh premise is indeed justified. Suppose, for reductio, that there is some caused composite, let's call it N, for

which none of its proper parts are caused. Thus, each and every proper part of N is an uncaused object. In that case N's proper parts taken together, i.e. the totality of the proper parts of N, is not caused either. Now, the mereological sum of the proper parts of object N simply *is* object N. This implies that N is also uncaused, which contradicts the initial assumption. Therefore, this assumption needs to be rejected, i.e. every caused composite contains at least one caused proper part, which is what is stated by the seventh premise.

Conclusion

From the above it is concluded that each of the seven premises of the renewed argument is justified. They are all at least more plausibly true than false for the context in question, i.e. causation with respect to bringing about the existence of an object. It was already shown that the conclusion that there is a first cause follows logically from these seven premises. Thus, the renewed argument seems a good argument, i.e. its conclusion follows deductively from sufficiently justified premises. In any case the renewed argument is far more adequate than the two paradigmatic forms of a first cause argument. Now, it might be possible to obtain the conclusion that there is a first cause from even fewer or weaker plausible premises. Whether this is indeed the case remains a topic for further research. Finally, as mentioned in the introduction of this paper, the proposed renewed argument does indeed not depend on metaphysical modal notions, such as those of metaphysical or broadly logical possibility and necessity. This is an advance because hitherto there is no consensus of opinion on the meaning of these metaphysical modal concepts³⁸.

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¹ In this paper a first cause argument is understood as an argument for the existence of a first cause that reasons from there being (caused or contingent) objects. The Kalam argument and the fine-tuning argument are not first cause arguments. First, they reason respectively from the claim that the universe began a finite time ago or that the cosmological constants are fine-tuned. Moreover, they only establish that the physical universe is caused and not that there is an origin of everything (including possibly ‘non-physical’ objects).

² Paradigmatic in the sense that both forms are derived from what the received view considers to be exemplary principal versions of an argument for a first cause, i.e. the second of the ‘Five Ways’ of Thomas Aquinas and Leibniz’s argument in his *The Monadology*. Surely, there are other exemplary versions.

³ A caused object has only one cause. It has however zero, one or more than one indirect causes. The cause of the cause of an object is an indirect cause of that object. The cause of the cause of the cause of an object is one of its indirect causes as well. More generally, an object A is considered an indirect cause of object B if and only if there is a causal chain of two or more causes starting with A and ending with the cause of B.

⁴ In this paper the concept of ‘being’ is taken to be the same as the concept of ‘existence’. Similarly, the words ‘being’ and ‘object’ are understood as having identical meaning. Further, it is not assumed that there is a kind of fundamental (Heideggerian) ontological difference between being and beings. Thus, being is understood as ‘all beings taken together’, i.e. being is considered to be identical to the totality of all beings.

⁵ In a sense the comprehensive concept of causality employed includes what is traditionally referred to as the material cause (*causa materialis*) and the efficient cause (*causa efficiens*). The material cause of a thing equals the matter out of which that thing is formed. According to Aristotle: ‘We call a cause [...] that from which (as immanent material) a thing comes into being, e.g. the bronze of the statue and the silver of the saucer’ (*Metaphysics* 1013a). Thus, the material cause of a wooden table would be its wood. Yet, for the

conception of causality as employed in this paper the material cause is best thought of as *the cause of the wood out of which the table is formed*, instead of the wood itself. Another difference is that the Aristotelian material cause is restricted to physically tangible matter (e.g. wood or bronze), whereas for the notion of causality at issue in this paper this restriction is not assumed. Indeed, the possibility of there being abstract objects is left open. The same holds for there being abstract objects that together form another object.

⁶ Suppose there is more than one first cause. Let A and B both be first causes. From the definition of first cause it follows that A is the cause or an indirect cause of everything besides itself. Thus A is the cause or an indirect cause of B. Now, this contradicts the assumption that B is a first cause and therefore uncaused.

⁷ *Summa Theologiae*, First part, Question 2, Article 3.

⁸ It could be that Aquinas refers to temporal priority, i.e. being earlier than something else, instead of the broader conception of ontological priority. Still, his remark applies plausibly to the context of ontological priority as well. The remark ‘nothing precedes itself’ can adequately be understood as the a-temporal claim that it is incoherent to presuppose the existence of a thing in order to establish the very fact of its existence.

⁹ Rowe (1998) provides an interesting analysis of the second way argument of Aquinas. According to Rowe Aquinas’s reasoning in the second way against an infinite regress of causes appears to be question-begging. Aquinas seems simply to assume that every series of causes has a first member. Rowe does not try to avoid the conclusion that Aquinas reasoning is question-begging. Instead Rowe searches ‘for something more substantial beneath the surface that may have been poorly expressed [by Aquinas] but, nevertheless, may represent his real view on the subject’. Rowe’s approach is based upon the thought that Aquinas might be concerned in his second way with the *present existence* of a thing and not with the *coming into existence* of a thing. Therefore, as Rowe argues, Aquinas is limiting himself to a specific kind of series of causes (i.e. so-called ‘essentially ordered’ series of causes) for which it can according to Rowe be argued that they do have a first member. The scope of this paper however is causation with respect to the bringing about of existence. The bringing about of existence is not limited to causing the present existence of a thing. Hence Rowe’s approach does not help to obtain a justification for the more general claim that no series of causes of objects proceeds to infinity.

¹⁰ The sum of two or more objects is a mereological term to denote the totality of those objects, i.e. those objects taken together.

¹¹ In this paper the mereological notion of parthood is taken to be a relationship between two objects. One object can be a part of another object. Parthood is taken to be a basic concept and thus not definable in terms of other more basic concepts. Object A is called a proper part of object B if and only if A is a part of B and A is not equal to B. Object A is called an improper part of object B in case A is equal to B. Further, object A is said to contain object B if and only if B is a part of A. Another mereological conception used in this paper is the concept of disjointness. Disjointness is defined here in terms of parthood. Two objects are disjoint in case they do not share a (proper or improper) part.

¹² UC is *maximal* in the sense that it is the unique uncaused cause that contains each other uncaused cause.

¹³ This principle is mentioned and accepted already by Aristotle: “Everything has an origin or is an origin” (Physics 203b6). A variant of it can be found in Plato’s *The Sophist*. In this dialogue the stranger says: ‘My notion would be, that anything which possesses any sort of power to affect another, or to be affected by another, if only for a single moment, however trifling the cause and however slight the effect, has real existence’ (Project Gutenberg, Benjamin Jowett translation). The principle that everything that exists is a cause or has a cause is related to a contemporary position within the philosophy of science known as causalism. Causalists such as N. Cartwright argue ‘that we are entitled to speak of the reality of [objects] because we know that they have quite specific causal powers’ (Hacking 1983). The exact opposite of the principle that everything that exists is caused or a cause is the principle of existence from Parmenides of Elea. Parmenides maintains that something exists if and only if it is uncaused and not itself a cause. The intuition behind Parmenides’ principle is that something can only exist if it is completely changeless and that being caused or being a cause implies change. The principle of existence from Parmenides is surely problematic since it implies that none of the regular objects in our world, such as tables and chairs, exist.

¹⁴ It is not difficult to show that this is indeed the case if we assume that the cause of the existence of an object is mereologically disjoint with that caused object. Later on in this paper, when the second form is discussed, it is argued that this assumption is sufficiently reasonable. Now, the sum of all objects cannot be caused and can neither be the cause of another object because such a cause or effect would have to be disjoint with all objects taken together. This is impossible since there is nothing outside the sum of all objects.

¹⁵ Both Rene van Woudenberg and Jeroen de Ridder indicated a specific objection to this premise. Abstract objects, as this objection goes, are causally inert, that is, they are uncaused and they do not cause anything. As such they falsify premise (9). Now, this objection does not have sufficient force. First, there might not be abstract objects, that is, nominalism with respect to abstract objects could be true. Nominalism regarding abstract objects, i.e. the position that all objects are concrete objects, is surely a defensible position. Due to space limitations this point is not further discussed. Second, even if there are abstract objects, one could argue that they are all caused and therefore do not falsify premise (9). After all, concepts and propositions are examples of abstract objects. Abstract objects such as 'bicycle', 'elevator' and 'The bicycle is in the elevator' are certainly plausibly understood as being the product of human thought and therefore as being caused. The same can be maintained for other classes of abstract objects, such as the objects of mathematics. One could plausibly argue that mathematical objects are caused by a specific activity of human thought, namely *abstraction from* or *idealization of* the concrete objects in nature. This line of thought can be further extended, that is, it can be defended that all abstract objects are man-made artifacts and thus caused. Note that this line of thought collapses into a defense of nominalism with respect to abstract objects if one contend that humans can only cause concrete objects, i.e. mental contents or material states of affairs. Third, even if some abstract objects, such as sets, are uncaused, it might be the case that they are the (logical or sustaining) cause of other abstract objects. One could for example argue that sets are the (logical or sustaining) cause of numbers since numbers are mathematically produced from sets. So,

uncaused abstract objects are causes and therefore they do not falsify premise (9). Fourth, suppose that there are causally inert abstract objects after all. In that specific case one could recast the renewed first cause argument presented in this paper by replacing all occurrences of 'object' by 'concrete object', i.e. by limiting the ontological domain to concrete objects. The conclusion of the renewed argument would then be that there is a unique concrete object that is the direct or indirect cause of each and every other concrete object. This unique object definitely qualifies as a first cause in a metaphysically quite interesting non-trivial sense. This fourth suggestion was suggested by Jeroen de Ridder.

¹⁶ An object is contingent if it exists but could not have existed, i.e. if it exists in the actual world and there is a possible world in which the object does not exist. Take for example the chair on which one is sitting. This chair is a contingent object since it exists and there are possible worlds without it. The chair, although it happens to exist, could, if things would have gone differently, not have existed. Further, a metaphysically necessary object is an object that could not possibly not exist, i.e. it exists in every possible world.

¹⁷ This fragment is a slightly abridged version of Leibniz' argumentation as quoted in Craig (1980). Leibniz provides similar arguments in his *On the Ultimate Origin of Things, The Theodicy* and *The Principles of Nature and of Grace, Based on Reason* (Craig 1980).

¹⁸ Later on in this paper it is argued that there might be necessary beings that do not exist by virtue of their own nature. If there indeed are such objects, then, from the fact that a given object exists necessarily, one cannot conclude that this particular object exists by virtue of its own nature, as Leibniz appears to be doing.

¹⁹ See Craig (1980) for a comprehensive overview of Leibniz' various formulations of the PSR.

²⁰ This summary follows Pruss (2009) in which van Inwagen's objection to the PSR is discussed in detail.

J. Ross, W. Rowe and P. Francken and H. Geirsson defend similar objections to the PSR (Pruss 2009).

²¹ Hereby it is assumed that the notion of explanation includes logical entailment, that is, if a proposition P explains a proposition Q then Q is logically implied by P. Hence, no necessarily true proposition explains a contingent proposition since all logical consequences of a necessarily true proposition are necessarily true.

²² In reality objects sometimes fuse, i.e. come together to constitute a third object. There is thus no reason to hold that a cause could not fuse with the object that it causes. Some of these fusions between a cause and its effect are indeed plausibly thought of as being contingent. For example in case the cause or effect is itself an contingent object that belongs to the fusion essentially, i.e. without one of these parts the fusion object ceases to exist. Therefore, it is justified to claim that there is at least one contingent object that is the sum of two objects, one cause and the effect of that cause. This is precisely what is claimed by (b).

²³ Note that a maximally inclusive conception of causality is implicitly assumed here. In other words, the cause of the existence of an object includes everything that is responsible for the existence of that object and all of its parts. The cause of a painting contains for example not just the painter but also the object that produced the paint used by the painter, the object that produced the frame of the painting, etc.

²⁴ An object that exists in every possible world and that is caused in every possible world would be a necessary object that does not exist by virtue of its own nature. It would not exist because of its intrinsic features but because of the external fact that it is caused in each and every possible world.

²⁵ One could for example conceive an object A that (1) exists by virtue of its own nature, and (2) that, again by virtue of its own nature, causes another object B. Since A exists by virtue of its own nature it follows that A exists in every possible world. Further, since A causes B by virtue of A's own nature, it follows that B is caused, and hence exists, in every possible world. Object B is thus an example of a necessarily existing object that is caused in every possible world.

²⁶ A principle that could be assumed here is that a sum of objects only counts as an object in case it causes *as a whole* another object, or, if it was caused *as a whole*. In fact, this seems to be an intuitively plausible principle. Moreover, the third premise of the proposed renewed argument that is presented later on in this paper does actually amount to a closely related (yet slightly different) principle.

²⁷ Here the same intuition is applied as mentioned in the previous footnote.

²⁸ The Special Composition Question concerns the nature of composite objects. It was raised by van Inwagen and can be more precisely formulated as: 'For any collection of objects, what are the necessary and sufficient conditions for there being an object composed of those objects?'. (van Inwagen 1990)

²⁹ For example, an enumeration of all the sets of objects for which it is true that they compose a further object would certainly not count as a concise natural answer. Examples of concise natural answers include the view that some objects compose a further object if and only if they are 'fastened together' and the view that some objects compose a further object if and only if 'their activities constitute a single life'. Van Inwagen discusses both views. He rejects the former view and argues for the latter. (van Inwagen 1990)

³⁰ Grounding is understood here to mean: some objects $\{O_i\}_i$ ground an object O if and only if each of the objects O_i is ontologically prior to O and O exists by virtue of the existence of the O_i 's, i.e. object O exists because of the fact that the objects $\{O_i\}_i$ exist. The concept of being ontologically prior is difficult to explicate. Intuitively, an object X is ontologically prior to an object Y just in case X could exist without Y but object Y could not exist without X. From these definitions it follows that a composite is grounded in its compositions, i.e. each and every composition of a composite grounds that composite. Further, nothing is ontologically prior to a given simple. Thus, simple objects are ontologically the most fundamental entities.

³¹ The truth-functional connective 'or' is an inclusive disjunction instead of an exclusive one. Thus, the third premise does not rule out objects that are caused *and* that are the cause of one or more other objects.

³² If the mereological sum of all caused simple objects is empty (i.e. if there are no caused simple objects), then obviously this sum is not an object. Therefore, the fourth premise requires the sum to be non-empty.

³³ That the sequence $\{C^{(i)}\}_i$ is finite can be shown as follows. First, object $C^{(i+1)}$ is a proper part of object $C^{(i)}$. Therefore, according to the earlier mentioned supplementation principle, there exists a supplement part of $C^{(i)}$, i.e., the part of $C^{(i)}$ disjoint with $C^{(i+1)}$ that together with $C^{(i+1)}$ composes $C^{(i)}$. The supplement part of $C^{(i)}$ is denoted by $C^{(i)} \setminus C^{(i+1)}$. Second, a grounding sequence $\{\Omega_i\}_i$ for C can be constructed from the sequence $\{C^{(i)}\}_i$ in the following way. Let $\Omega_0 = \{C\}$, $\Omega_1 = \{C^{(1)}, C \setminus C^{(1)}\}$ and let Ω_{i+1} be equal to $[\Omega_i \setminus \{C^{(i)}, C^{(i-1)} \setminus C^{(i)}\}] \cup \{C^{(i+1)}, C^{(i)} \setminus C^{(i+1)}\} \cup \{C^{(i-1)} \setminus C^{(i)}\}$ for each natural number $i > 0$ for which $C^{(i)}$ is defined. The grounding sequence $\{\Omega_i\}_i$ is finite according to the second premise. Also, the infinity of $\{C^{(i)}\}_i$ would imply the infinity of $\{\Omega_i\}_i$. Thus, it indeed follows that the sequence $\{C^{(i)}\}_i$ is a finite sequence.

³⁴ Illustratively (but of course illegitimately) stated: $\sum_{(i=0 \text{ to } \infty)} [\text{being}(\Omega_i) - \text{being}(\Omega_{i+1})] = \sum_{(i=0 \text{ to } \infty)} [0] = 0$.

³⁵ That the premise that all grounding sequences are finite implies atomism can be shown as follows. Suppose, for reductio, that atomism is false, i.e. there is a composite object R that is not composed of simple objects. Object R is composed of two or more objects β_1 . Since R is not composed of simples, at least one of the objects in β_1 is a composite object. Let β_2 be a composition of that composite. Again, since R is not composed of simples it follows that at least one of the objects in β_2 is a composite object. Similarly, let β_3 be a composition of this composite and continue in the same way as in the previous step. Since R is not composed of simples, it follows that this stepwise process does not terminate. Hence, the sequence $\{\beta_i\}_i$ of downward compositions is infinite. Now, a grounding sequence $\{\Omega_i\}_i$ is straightforwardly constructed from $\{\beta_i\}_i$ (the details of this straightforward construction are left to the interested reader). This implies that the grounding sequence $\{\Omega_i\}_i$ is infinite as well. But this surely contradicts the premise that all grounding sequences are finite. Therefore, the assumption that atomism is false needs to be rejected, i.e. the second premise implies that atomism is true. This concise argument for atomism does not rely on any presumptions about the character of space or the relationship between objects and space occupancy, such as for example the ‘MaxCon+’-argument for atomism from Markosian (2005). In *A Materialistic Metaphysics of the Human Person* Hudson provides an argument for atomism that is quite similar to Markosian’s argument (Markosian 2005).

³⁶ To illustrate this point one could take the following example of a model for which mereological atomism is true but the second premise false. Consider the closed interval $[0,1]$ and let every subset of $[0,1]$ be an object. Further, the part-of relation for this model is defined as follows: An object X is part of an object Y if and only if X is a subset of Y. Now, for this model atomism is true. The simples of this model are the individual points in $[0,1]$ and each composite is composed of a set of individual points in $[0,1]$. Nevertheless, not all grounding sequences are finite for this model. It is straightforward to construct an infinite grounding sequence $\{\Omega_i\}_i$ from the infinite set $\{[0,1/i]\}_{i>0}$ of objects. Again, the exact details of this construction are left to the reader.

³⁷ It is required to restrict this metaphysical principle to demarcated natural kinds. In the first place, the sum of the members of non-natural kinds, e.g. ‘children born on a Tuesday’ or ‘objects that are currently in my visual field’ are not plausibly understood as objects. The claim that these sums are objects would imply that even more gerrymandered sums, such as the sum of the bottom of the statue of liberty and three atoms in the handlebar of some bicycle, or the sum of the handlebar of a bicycle and one or more atoms in someone’s left hand, etc., would also count as objects, which is unreasonably counterintuitive. Moreover, as is argued earlier in this paper, the principle that every object is either caused or a cause (which is also the third premise of the renewed argument) implies that universalism is false. Now, in the second place, the sum of the members of natural kinds such as tigers or cats (which are not demarcated due to Darwinism) is not plausibly understood as an object either. So, a restriction to natural kinds *merely* would not suffice.

³⁸ For example David Lewis, Alvin Plantinga and Theodore Sider offer significantly different accounts of the nature and characteristics of metaphysical or broadly logical possibility and necessity (Rocca 2010).