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Atomism, Causalism, and the Existence of a First Cause

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Abstract

This paper argues that, under some specific background assumptions, mereological atomism (the thesis that every composite object is composed of simple objects) and causalism (the thesis that every object is caused by or is the cause of another object) together imply the existence of a first cause of reality. The argument relies neither on the principle of sufficient reason nor on any restricted version of it. It also does not depend on modal notions such as necessary or contingent truths or necessarily or contingently existing objects. In these respects, the proposed argument differs from other contemporary first cause arguments, notably those of Koons (1997), Gale and Pruss (1999), and Rasmussen (2011). Although the paper introduces a new first cause argument, its primary aim is not particularly to argue for the existence of a first cause, but to show that anyone who embraces both atomism and causalism cannot deny it.

Keywords

atomism – causalism – first cause – metaphysics – mereology – objects

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1 Introduction

Theorizing about causation is perhaps as old as philosophy itself. Moreover, arguments for the existence of a first cause have a long and rich history.[1] Ever since Plato, philosophers have developed first cause arguments. Well-known examples include Aristotle's argument in *Physics* and *Metaphysics* for the existence of a first unmoved mover, the second of the "Five Ways" of Aquinas in the *Summa Theologiae*, and Leibniz's argument for the existence of a necessary being who accounts for the existence of the universe as a whole.[2] With the rise of positivism in the second half of the nineteenth century and the decline of metaphysics that went with it, the interest in first cause arguments faded away, but the last decades of the twentieth century witnessed a "resurgence of metaphysics" (Craig and Moreland 2009, ix).[3] The recent revival of interest in first cause arguments (Alexander 2008) can be understood against this background. Several new first cause arguments have been developed, notably those by Koons (1997), Gale and Pruss (1999), and Rasmussen (2011).

This paper provides a new first cause argument by showing that *atomism*, which is the thesis that each composite object is composed of simple objects, together with *causalism*, understood in this paper as the thesis that every object is a cause or has a cause,[4] logically implies the existence of a first cause *if* some additional general premises regarding the interplay between parthood, composition, and causation are accepted. Thus, it is shown that a

1 In this paper, a first cause argument is understood to be an argument for the existence of a first cause that reasons from the existence of (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 and from the claim that the cosmological constants are fine-tuned. Second, they only establish that the physical universe is caused and not that there is an origin of everything (including, possibly, "nonphysical" objects).

2 Leibniz presents his argument in *The Monadology*, in *On the Ultimate Origin of Things*, in *The Theodicy*, and in *The Principles of Nature and of Grace, Based on Reason*. See Craig (1980) for an overview.

3 In the introduction to *The Blackwell Companion to Natural Theology*, W. L. Craig and J. P. Moreland (2009, ix) write: "The collapse of positivism and its attendant verification principle of meaning was undoubtedly the most important philosophical event of the twentieth century. Their demise heralded a resurgence of metaphysics, along with other traditional problems of philosophy that verification had suppressed."

4 Surely, the thesis of causalism as understood in this paper does not rule out there being objects that are caused *and* that are the cause of another object.

commitment to atomism, causalism, and the additional premises results in a commitment to there being a first cause.

This paper starts with some required preliminary stage setting. Next, a number of definitions and two basic principles regarding the mereological nature of parthood and composition are presented. Subsequently, additional premises of the new argument are introduced, and the conclusion that there is a first cause is logically derived from them. The paper ends with a justification of the new argument's premises, some of which appeal to the aforementioned two principles. Although this paper provides a new first cause argument, its aim is not particularly to argue for the existence of a first cause but, instead, to show that, under some specific conditions on parthood, composition, and causation, one cannot reasonably be both an atomist and a causalist and at the same time deny that there is a first cause.[5]

The argument presented in this paper does not rely on the principle of sufficient reason—that is, the principle that there is an explanation for every contingent truth. Second, it also does not depend on any weaker variant of this principle, such as the restricted variants of Gale and Pruss (1999) and Pruss (2004).[6] Third, the first cause argument as proposed in this paper does not depend on the presumption that every contingent object has a cause for its existence. Fourth, it does not rely on any weaker variant of this presumption, such as the restricted variants of Koons (1997) and Rasmussen (2011).[7] Fifth, the proposed new argument does not depend on the notions of necessary truths and contingent truths. Sixth, the argument also does not rely on the notions of necessarily existing and contingently existing objects. Hence, the new argument as proposed in this paper does not depend on any metaphysical modal notion or principle. In this respect, it is entirely different from the aforementioned contemporary first cause arguments of Koons, Gale and Pruss, and Rasmussen, which all do, in fact, rely upon metaphysical modal concepts and corresponding metaphysical modal principles.

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5 It might perhaps be worthwhile to note that, traditionally, the viewpoints of atomism and causalism are predominantly associated with materialistic or naturalistic worldviews that categorically deny the existence of a first cause. Thus, the argument developed in this paper shows that such an association is problematic.

6 Respectively, "For any proposition, p, if p is true, then it is possible that there exist a proposition, q, such that q explains p" (Gale and Pruss 1999, 463) and "All explainable true propositions have explanations" (Pruss 2004, 165).

7 Respectively, "Normally, a wholly contingent fact has a cause" (Koons 1997, 197) and "Normally, for any intrinsic property p that (i) can *begin* to be exemplified and (ii) can be exemplified by something that has a cause, there can be a cause of p's beginning to be exemplified" (Rasmussen 2011, 351).

2 Stage Setting

Some initial stage setting is indispensable before advancing the new first cause argument. First, in this paper, anything that exists is called an object, and an object is something that exists. There may be different kinds of objects —for example, abstract objects in addition to concrete objects and necessary objects in addition to contingent objects. However, discerning kinds of objects is not relevant for the proposed argument: A first cause, if it exists, is an object of some kind.

Second, for purposes of this paper, causality is plausibly understood as a relationship between two objects: the cause and the effect. Thus, this paper adopts an objective—that is, object-oriented—conception of causality where causation is a two-place relation whose relata are objects.

Third, the concept of causation as deployed in this paper is limited to causation with respect to bringing about an object's existence. Thus, in what follows, an object is 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 just in case it is the cause of *the existence of* that other object. This conception of causation is not intended as a general theory of causation *simpliciter*. Rather, it reflects a deliberate restriction of scope to the type of causation that is directly relevant to first cause arguments, which are specifically concerned with the coming into existence of objects.

Fourth, for purposes of this paper, a *first cause* is defined as an uncaused cause whose effect is ontologically prior to every other caused object.[8] From this definition it follows immediately that there can be at most *one* first cause. For suppose to the contrary that there is more than one first cause. Let A and B both be first causes. In that case, since A is a first cause, the effect of A is ontologically prior to the effect of B. But because B is a first cause as well, the effect of B is ontologically prior to the effect of A, which contradicts the asymmetry of being ontologically prior. Thus, only one object can be a first cause. So, if there is a first cause, it is properly described as the ultimate origin of all other objects.

Fifth, the new argument is deductive in nature. The conclusion that a first cause exists follows logically from the premises; that is, if the premises are true, then the claim that there is a first cause is also true.

8 The concept of being ontologically prior is difficult to explicate. In this paper, an object X is considered to be ontologically prior to an object Y if the existence of Y is not required for the existence of X, but the existence of X is required for the existence of Y. It is taken that the cause is ontologically prior to its effect and that a part is ontologically prior to the whole.

3 Parthood and Composition

The proposed first cause argument consists of six premises and one conclusion, which is the conclusion that there is a first cause. Before the argument is presented, the nature of parthood and composition, on which the justification of some of its premises is based, must be clarified. For this purpose, some mereological definitions are required.

In this paper, the 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 identical to B. Object A is called an *improper* part of object B just in case A is identical to B. Furthermore, object A is said to *contain* object B if and only if B is a part of A. Parthood is taken to be a transitive relation: If A is a part of B and B is a part of C, then A is a part of C.

Another mereological concept employed in this paper is *disjointness*, defined here in terms of parthood. Two objects are disjoint just in case they do not share a (proper or improper) part. Furthermore, the *sum* of two or more objects is a concept to denote the totality of those objects—that is, those objects taken together. If an object is among those from which a sum is taken, and the sum itself does not qualify as an object, no parthood relation between the object and the sum is intended. In such cases, references to an object as being "part of" a sum are intended in a nonmereological sense, merely indicating that the object is one of the objects from which the sum is taken.

A composite object, also called a *composite*, is an object that has at least one proper part. In contrast, a simple object, also called a *simple*, a mereological atom, or an atom, is an object lacking proper parts. Thus, simples and composites are mutually exclusive. Obviously, every object is either a simple or a composite. Another relevant mereological 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). In addition, some objects $\{O_i\}_i$ are called a composition of an object O just in case the $\{O_i\}_i$ compose O. Note that a composite can have more than one composition.

Now, the nature of parthood and composition, on which the justification of some of the premises of the new argument is based, accords with two mereological principles: *supplementation* and *composition-as-identity*. First, the *supplementation* principle states that 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.

Second, as previously mentioned, the sum of objects is those objects taken together; that is, the sum of some objects is a term that refers to those objects as a totality. A sum is thus ontologically neutral, innocent, or harmless: 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: If some objects compose an object, then the 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).

The principle of composition-as-identity 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—for example, because these sums do not stand in the proper causal relationships with other objects.[9] 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. Whereas the proposed new argument is based on composition-as-identity, it does *not* assume universalism.

One could argue that mereological universalism is counterintuitive. Plausibly, the sum of some piece of wood in Italy, the left front wheel of some car, and the Statue of Liberty is itself not an object. It is a sum of objects and nothing more. In particular, this example of a sum of three objects has no causality *as a whole*: It is not caused *as a whole*, nor does it, *as a whole*, cause anything else.[10] Still, an anonymous reviewer of this paper objected that, given the conception of causation employed here, even such an arbitrary sum could be said to cause something, namely, the mental object that is the thought of that sum. On this view, the example might therefore fail to show that arbitrary

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

10 Here, the same intuition is applied as mentioned in the previous note.

sums are causally inert. However, on the deployed conception of causation, the cause of that mental object need not be the sum itself. Rather, the relevant causal sequence may be located wholly within the mental domain. More specifically, one mental object—an intentional awareness of the sum—may be understood as giving rise to another mental object, namely, the mental representation or thought of that sum. The arbitrary sum of extramental objects then figures as the intentional correlate of this mental episode, without itself being the cause of the thought of it.

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 objects. It is important to note that restricted composition does not imply that there are only a few concise and natural necessary and sufficient conditions for composition to occur: 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 occurs might be quite irregular. In other words, restricted composition does not imply that the Special Composition Question (i.e., the question under what circumstances some objects compose a further object) has a concise natural answer.[11]

The defense of one of the premises of the new 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

11 The Special Composition Question concerns the nature of composite objects. It was raised by Van Inwagen (1990, 21–32) and can be formulated as follows: For any collection of objects, what are the necessary and sufficient conditions for there being an object composed of those objects? Now, an enumeration of all the sets of objects for which it is true that they compose a further object, for example, 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). Another concise natural answer to Van Inwagen's Special Composition Question is suggested by the earlier-mentioned principle according to which a sum of objects counts as an object just in case it causes *as a whole* another object or was caused *as a whole* by another object.

has a concise natural answer. As will become clear, the proposed argument does not depend on this question having a concise natural answer.

4 The Argument

Following the preliminary remarks, definitions, and basic principles above, the six premises and the conclusion for the new argument are presented:

1. There are objects.
2. Every composite object is ultimately composed of simple objects (atomism).
3. Every object is caused by or is the cause of another object (causalism).[12]
4. The sum of all caused simple objects, if not empty,[13] is an object.
5. The cause of an object is disjoint with that object.
6. Every caused composite object contains a caused proper part.
7. There is a first cause (conclusion).

Below, a logical derivation of the conclusion from the premises is provided; that is, it is shown that, if the premises are true, the conclusion that there is a first cause is true as well. The derivation of the conclusion consists of five main steps. First, from premises (2) and (6) a principle is derived, namely, 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 (and, thus, the unique first cause).

4.1 *First Step: Every Caused Composite Contains a Caused Simple*

As just stated, the first step is to show that premises (2) and (6) together imply that every caused composite object contains a caused simple object—that is, that each caused composite has at least one caused simple as a part. In what follows, this metaphysical principle is referred to as principle P. To show that

12 The truth-functional connective *or* in "is caused by or is the cause of" 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 another object.

13 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 nonempty.

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 sixth 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 premise (2), the sequence C, $C^{(1)}$, $C^{(2)}$, . . . does not proceed to infinity: There is a natural number n such that $C^{(n)}$ is a caused simple object. 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.

4.2 *Second Step: The Sum of All Simples (Called M) Is an Object*

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 premise (1), there is an object. Premise (3) implies that this object is caused by or is 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 premise (4) implies that M is an object.

4.3 *Third Step: M Is Not a Cause*

It is shown that M is not a cause. Suppose, for reductio, that M is the cause of another object, K. According to premise (5), object M is disjoint with object K. Thus, K is not a caused simple but 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 another object must be rejected. Therefore, object M is not a cause.

4.4 *Fourth Step: The Cause of M (Called A) Is Uncaused*

According to premise (3), 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 premise (5) it follows that A and M are disjoint. So, A is not a caused simple: 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 a part. But this surely

conflicts with the disjointness of A and M. Therefore, the assumption that A is caused is incorrect. Therefore, object A is uncaused.

4.5 *Fifth Step: A Is a First Cause*

Now, object A is the uncaused cause of the sum of all caused simples, M. Does it follow that A is a first cause? Showing that A is indeed a first cause requires demonstrating that the effect of A—that is, M—is ontologically prior to every other caused object. Thus, let B be a caused object. In that case, B is either a caused simple or a caused composite. Principle P implies that, in either case, B has at last one caused simple as a part. But then, M is indeed ontologically prior to B. So, it follows that A is a first cause.

5 In Defense of the Premises

The above derivations show that the new argument is valid—that is, that the conclusion that there is a first cause follows logically from the premises. Now, are there good reasons to believe that the premises are true? In what follows, a justification of each of the six premises is provided.

5.1 *There Are Objects*

The first premise seems to be evident. Surely there are objects. The claim that there are objects is so 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. One could argue that the premise that there are objects is an empirical datum. If so, the argument is *a posteriori*. On the other hand, one could argue that the claim that there are objects is basic or fundamental to such an extent that it is more properly described as being an *a priori* principle. After all, is the existence of 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 begins to consider the premise's plausibility: Without objects, there would be no question as to whether the first premise is plausible, and thus, that very question implies that premise (1) is true.

5.2 *Every Composite Object Is Ultimately Composed of Simple Objects*

This premise is known as atomism. A thorough defense of atomism is surely beyond the scope of the present paper. However, in what follows, an initial justification of atomism is given as a response to Schaffer's criticism of atomism (Schaffer 2003). Schaffer argues that there is no evidence in favor of atomism.[14] He first discusses and justifiably rejects some *a priori* arguments for atomism (2003, 501–2). After that, he rejects the view that science indicates atomism (2003, 502–5). He understands this view as the claim that somewhere in the future, there will be a complete microphysics that postulates mereological atoms. Schaffer rejects this claim because, according to him, there is no good reason to assume that there will ever be a complete microphysics, let alone one that postulates atoms.

Now, Schaffer correctly rejects this claim. There are, indeed, no good reasons to claim that there will ever be a complete microphysics that postulates atoms. However, this claim is not the only rendering of the view that science is indicative of atomism. Here, a Quinean rendering is proposed, according to which it is justified to commit to the ontology presupposed by our best scientific theories, particularly by physics. Thus, following this dictum, since physics presumes the existence of a fundamental level of basic building blocks (nowadays called *strings*), it is justified to accept atomism as a premise. In fact, a fundamental level of basic entities is presupposed by all mainstream microphysical theories developed in the past 200 years. This makes a commitment to atomism perhaps somewhat more justified than if only the latest generally accepted physical theory would presuppose a fundamental level of basic building blocks.

In what follows, a second argument for atomism is provided. This argument is not found in Schaffer (2003). Before it can be presented, some additional terminology is needed. Assume a formal additive measure of being that measures the amount of being contained in each object. Let O be an object, and denote the amount of being contained in object O by being(O). Thus, being(O) is zero in case there is no object O. Now, let the objects $\{O_i\}_i$ compose object O. Hence, $\{O_i\}_i$ is a composition of O. The additive nature of the involved measure implies, by definition, that $\text{being}(\{O_i\}_i) = \sum_i[\text{being}(O_i)]$. Now, according to the principle of composition-as-identity, object O simply *is* the objects $\{O_i\}_i$ taken together; that is, object O is nothing above or beyond the objects $\{O_i\}_i$ taken as a totality. From this

14 In fact, Schaffer argues that there is no evidence for the existence of a fundamental level. Yet, for him, this amounts to there being no evidence for atomism: "The question of the evidence for fundamentality is best understood as the question: What is the evidence for mereological atoms?" (Schaffer 2003, 500).

it follows that being(O) = $\sum_i$[being(O_i)]. Next, let O be an object, and let Ω and Ω* be two different compositions of O such that every object in Ω* is either identical to or a part of an object in Ω. In that case, Ω* is called a refinement of Ω. It follows that being(Ω) = [being(Ω) – being(Ω*)] + being(Ω*). This formula indicates that the amount of being at a certain level of composition is the arithmetical sum of the amount of being at the previous level and the incremental amount between both levels. Now, let $\{\Omega_n\}_n$ be a sequence of compositions of object O such that for all natural numbers n, composition Ω_{n+1} is a refinement of composition Ω_n. The sequence $\{\Omega_n\}_n$ is either finite or infinite. Suppose, first, that $\{\Omega_n\}_n$ is finite, and let Ω_N denote the final composition in the sequence. It follows that being(O) = $\sum_{(n=1 \text{ to } n=N)}$ [being(Ω_{n-1}) – being(Ω_n)] + being(Ω_N). How should this arithmetical formula be adapted to the case that $\{\Omega_n\}_n$ is infinite? This case is obtained if N proceeds to infinity and the final composition Ω_N vanishes from the sequence. Hence, the only natural answer appears to be that in this case, one obtains the formula being(O) = $\sum_{(n=1 \text{ to } n=\infty)}$ [being(Ω_{n-1}) – being(Ω_n)].

After these remarks, the second argument for atomism can be provided. Suppose, for reductio, that atomism is false. In that case, there is a composite object C that is not composed of simple objects. Due to the principle of supplementation, C is composed of two or more other objects. So, there is a composition of C. Now, since C is not composed of simple objects, there is an infinite sequence of compositions $\{\Omega_n\}_n$ of C such that for every natural number n, composition Ω_{n+1} is a refinement of composition Ω_n. Because of the aforementioned observations, it follows that being(C) = $\sum_{(n=1 \text{ to } n=\infty)}$ [being(Ω_{n-1}) – being(Ω_n)]. Further, the principle of composition-as-identity implies that being(C) = being(Ω_{n-1}) and being(C) = being(Ω_n). Hence, for all natural numbers n, it follows that being(Ω_{n-1}) – being(Ω_n) = 0. This implies that being(C) = $\sum_{(n=1 \text{ to } n=\infty)}$ [being(Ω_{n-1}) – being(Ω_n)] = $\sum_{(n=1 \text{ to } n=\infty)}$ [0] = 0. But then being(C) = 0, which, by definition, implies that there is no object C. This, however, directly contradicts the fact that C exists. Thus, the initial assumption that atomism is false needs to be rejected. Therefore, atomism is true.

As mentioned earlier, Schaffer (2003) does not contain this argument. Yet, perhaps surprisingly, he agrees that the assumption that "there are no composite macroentities at all, but only fundamental entities in various arrangements," *together with* a commitment to infinite descent, "would have the absurd consequence that all objects would dissolve into thin air" (2003, 509). In this respect, Schaffer approvingly cites R. W. Sperry, who writes: "The reductionist approach that would always explain the whole in terms of the parts leads to an infinite regress in which eventually everything is held to be explainable in terms of essentially nothing" (Sperry 1976, quoted in Schaffer 2003, 515). And this is, of course, the main point of the second

argument provided above. The reality of an object inducing an infinite regress of compositions would indeed be left hanging in the air, so to speak. Its existence would not truly be obtained: The idea of that object actually being there would be a sheer delusion, its existence an illusory fantasy. So, each sequence of downward compositions for a given object terminates, which is precisely the main conclusion of the second argument. Note that "the reductionist approach that would always explain the whole in terms of the parts" is basically the same assumption as composition-as-identity. Thus, it might be that Schaffer, in light of his approval of Sperry's point, avoids a commitment to atomism by withholding himself from a commitment to composition-as-identity. If so, it may be concluded that Schaffer actually accepts that composition-as-identity implies atomism, which is in accordance with the second argument.

5.3 *Every Object Is Caused by or Is the Cause of Another Object*

This premise holds that everything that exists is caused by another object or is the cause of the existence of another object.[15] The disjunction is inclusive. It may be that an object is itself caused by another object and that it is also the cause of another object. Note that this premise implies that mereological universalism is untenable, since it follows that the sum of all objects is not an object.[16] Premise (3) is reasonable enough to accept as a premise. The intuition behind it is that something can only exist if it is part of "the causal fabric"

15 This principle is mentioned and accepted already by Aristotle (1991): "For everything is either a principle or derived from a principle" (*Physics* 203b6). A variant of it can be found in Plato's *Sophist* (1999). 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." 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 Parmenides of Elea's principle of existence. Parmenides maintains that something exists if and only if it is uncaused and not itself a cause. The intuition behind Parmenides's principle is that something can only exist if it is completely changeless, and that being caused or being a cause implies change. This principle of existence is surely problematic, since it implies that none of the regular objects in our world, such as tables and chairs, exist.

16 It is not difficult to show that this is indeed the case if we use premise (5)—the premise that the cause of the existence of an object is disjoint with that object. Now, the sum of all objects cannot be caused, nor can it 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.

of the world. Something that is neither caused nor the cause of anything else can not exist, simply because it does not take part in the *all-embracing* process of causation. Premise (3) is, thus, grounded in the viewpoint that the world is a causally intertwined totality. The world does not contain fully isolated, inert objects, since reality is a causally interweaved unity in which every object participates. So, indeed, as premise (3) holds, everything that exists is caused or is a cause because reality is a causally connected unity.

Now, one could object that abstract objects are causally inert—they are uncaused and do not cause anything.[17] As such, they falsify premise (3). This objection, however, 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—the viewpoint 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 (3). Consider, for example, concepts and propositions, which are paradigmatic examples of abstract objects. Concepts and propositions 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* concrete objects in nature. This line of thought can be further extended: It can be defended that all abstract objects are human-made artifacts and, thus, caused. Note that this line of thought collapses into a defense of nominalism with respect to abstract objects if one contends 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 originating cause of other abstract objects. One could, for example, argue that sets are the originating cause of numbers, since numbers are mathematically "constructed" from sets. So, in that case, uncaused abstract objects are causes, and therefore, they do not falsify premise (3).

Fourth, suppose that there are causally inert abstract objects after all. For that specific case, one could recast the new first cause argument presented in this paper by replacing all occurrences of *object* by *concrete object*—that is, by

17 Both René van Woudenberg and Jeroen de Ridder pointed to this specific objection.

limiting the domain of discourse to concrete objects.[18] The conclusion of the new argument would then be that there is a unique concrete uncaused cause whose effect is ontologically prior to every other concrete caused object. Such an object definitely qualifies as a first cause in a metaphysically interesting, nontrivial sense.

5.4 *The Sum of All Caused Simple Objects, If Not Empty, Is an Object*

Additional terminology is required to justify the premise that the sum of all caused simple objects, if not empty, is itself an object. Koslicki (2008, 201) 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, she 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 that are rooted in some underlying structurally uniform regularity out there in nature. There is no single conclusive answer to the question about 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 by Koslicki (2008, 201–10) are captured. First, a natural kind is not "arbitrary, heterogeneous or gerrymandered." Second, the members of a natural kind have many 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 explanations of science.

These criteria are best understood as follows. The more criteria that are met by a given kind, the more plausibly that kind is thought of as being a natural kind. The earlier-mentioned 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 examples of natural kinds. The kinds *chair*, *bachelor*, *janitor*, and *hunter* meet the first criterion but not the other three, and they

18 This suggestion was provided by Jeroen de Ridder.

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, and most (if not all) of them also satisfy the fourth criterion. So, these seven examples are plausibly understood as being natural kinds.

Next, 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: 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; that is, we can draw a clear and unambiguous principled line between what counts as a member and what does not count as a member. Of the 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 not problematic in other ways either, because the objects in the sum do not overlap each other—they are all mutually disjoint. "We are simply aggregating concrete particulars," to use a phrase from Koons (1997, 204). Now, the sum of all the members of a demarcated natural kind is best understood as being an object itself; that is, 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 the relation between a whole and its parts.[19] 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

19 It is required to restrict this claim to *demarcated natural* kinds. First, the sums of the members of nonnatural kinds, such as "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, would also count as objects, which is unreasonably counterintuitive. Moreover, as is shown earlier in this paper, the third premise of the new argument implies that mereological universalism is false. Second, the sums of the members of nondemarcated natural kinds (such as tigers or cats, according to Darwinism) are not plausibly understood as objects either. So, a restriction to natural kinds *merely* does not suffice.

the universe" or "the universe's water." Surely, the fact that, currently, the water molecules are spatially spread across the entire universe does not make the totality of water molecules any less a concrete particular whole than if all the water molecules would be spatially "packed together." Thus, the spatial structure of the universe's water might change, but it is still "the water in the universe" or "the universe's water"—an object among 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 were nothing more than being caused and simple, string theory (or any 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, namely, 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 identification criteria for natural kinds. So, it is sufficiently reasonable to maintain that the caused simples are a natural kind.

Next, it is shown that the caused simples are, in fact, a *demarcated* natural kind. Consider their definition: "objects that are both caused and simple." This specification is unambiguously clear, for 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 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.

5.5 *The Cause of an Object Is Disjoint with That Object*

The premise that the cause of an object is disjoint with that object is justified because within the context at issue—causing an object's existence—its negation would have highly counterintuitive, if not rather absurd, consequences. Plausibly, the cause of the existence of an object is ontologically prior to that

object and to 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 impossible—nothing is prior to a part of itself. Therefore, the cause of an object is disjoint with that object. A caused object and its cause have a "separate existence" (Koons 1997, 196). Thus, they do not share a common part.

5.6 *Every Caused Composite Object Contains a Caused Proper Part*

According to the sixth premise, each caused composite object contains a caused proper part. This seems to be a reasonable premise as well. Surely, at least one of the proper parts of a caused composite is itself caused. It is now shown that the sixth premise is indeed justified. Suppose, for reductio, that there is some caused composite N none of whose proper parts are caused. Thus, each and every proper part of N is an uncaused object. In that case, the totality of the proper parts of N—N's proper parts taken together—is not caused either. Now, because of the principles of supplementation and composition-as-identity,[20] 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: Every caused composite contains at least one caused proper part, which is what is stated by the sixth premise.

6 Closing Remarks

As argued here, each of the six premises of the new argument is justified for the context in question, namely, causation with respect to bringing about the existence of an object. It was already shown that the premises logically imply that there is a first cause. Thus, the new argument seems to be a good argument: Its conclusion follows deductively from justified premises. As mentioned in the introduction of this paper, the proposed new argument does not depend on such modal notions as metaphysical or broadly logical possibility and necessity. In this respect, it is, as stated earlier, wholly different from other new first cause arguments such as those of Koons (1997), Gale and Pruss (1999), and Rasmussen (2011). One could argue that it is beneficial not to depend on metaphysical modal concepts because, hitherto, there is hardly consensus of opinion on their meaning. For example, David Lewis, Alvin

20 Both principles have been introduced and discussed earlier in this paper.

Plantinga, and Theodore Sider each offer different accounts of the nature and characteristics of metaphysical possibility and necessity (Rocca 2010). As explained in the introduction, the primary aim of this paper is to show that atomism and causalism together imply the existence of a first cause *if* some specific conditions regarding the nature of parthood, composition, and causality are accepted. Thus, to conclude, a commitment to a first cause comes quite naturally with a commitment to the viewpoints of atomism and causalism.

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