

Eliminativism, interventionism and the Overdetermination Argument

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Abstract In trying to establish the view that there are no non-living macrophysical objects, Trenton Merricks has produced an influential argument—the Overdetermination Argument—against the causal efficacy of composite objects. A serious problem for the Overdetermination Argument is the ambiguity in the notion of overdetermination that is being employed, which is due to the fact that Merricks does not provide any theory of causation to support his claims. Once we adopt a plausible theory of causation, viz. interventionism, problems with the Overdetermination will become evident. After laying out the Overdetermination Argument and examining one extant objection to it, I will explicate the relevant aspects of an interventionist theory of causation and provide a characterization of overdetermination that follows from such an account. From this, I will argue that the Causal Principle that undergirds the Overdetermination Argument is false and hence the argument is invalid; and I claim that the only other available characterization of overdetermination would render a key premise in the argument false. Thus, the Overdetermination Argument fails to provide us with any reason to deny the causal efficacy of macrophysical objects, and therefore provides no reason to doubt their existence.

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A pre-theoretic conception of material objects would have us believe that there are such things as statues, baseballs, mountains, planets, and other artifacts and natural

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objects of the like. However, some have challenged this view, endorsing the following thesis:

Eliminativism There are no non-living macrophysical objects.¹

This view is consistent with the existence of some composite material objects such as human beings and some other living organisms, but it denies the existence of any composite object that is inanimate (or non-conscious²). Aside from living objects, eliminativists also claim that the only other material objects that exist are material simples.³

In trying to establish Eliminativism, Merricks (2001) has produced an influential argument—the Overdetermination Argument—against the causal efficacy of composite objects. Analogous to exclusion arguments concerning mental causation, Merricks argues that worries about epiphenomena plague macrophysical objects. He claims that macrophysical objects, if they existed, would be causally redundant with the causal work of the microphysical particles (appropriately arranged) that compose them. And if macrophysical objects are epiphenomenal, then it seems that we lack good reason to posit their existence.

My aim is to defend the existence of macrophysical objects from this argument. I suspect that a serious problem for the Overdetermination Argument is the ambiguity in the notion of overdetermination that is being employed, which is due to the fact that Merricks does not provide any theory of causation to support his claims. I suggest that once we adopt a plausible theory of causation, *viz. interventionism*, problems with the Overdetermination Argument will become evident.

After laying out the Overdetermination Argument in Sect. 1 along with a brief examination of one extant objection to it in Sect. 2, I will explicate the relevant aspects of an interventionist theory of causation and provide a characterization of overdetermination that follows from such an account in Sect. 3. From this, I will argue in Sect. 4 that the Causal Principle which undergirds the Overdetermination Argument is false and hence the argument is invalid; and I claim that the only other available characterization of overdetermination would render a key premise in the argument false. Thus, the Overdetermination Argument fails to provide us with any reason to deny the causal efficacy of macrophysical objects, and therefore provides no reason to doubt their existence.⁴ Since the Overdetermination Argument should be given up, eliminativists will have to turn to alternative arguments if their view is to be maintained as tenable.

¹ For instance, van Inwagen (1990), Merricks (2001). van Inwagen and Merricks have different reasons for endorsing Eliminativism—though both want to maintain the existence of you and me (and some other biological organisms). There is a related view, sometimes labeled ‘nihilism’, which argues that there are no macrophysical objects at all, whether living or non-living.

² Although van Inwagen would endorse the existence of plants, trees and the like, Merricks is agnostic as to whether there are such objects since his argument for the non-causal-redundancy of composite objects extends only to *conscious* entities such as human beings and some other animals.

³ By ‘material simple’, I mean a material object which has no proper parts.

⁴ Of course, one could argue for Eliminativism by other means, e.g. van Inwagen’s claim that it is the only viable answer to the Special Composition Question in (1990), or that it is the only plausible answer to puzzles concerning material constitution (e.g., Ship of Theseus, Tibbles-Tib, Goliath/Lumpl, etc.).

1 The Overdetermination Argument

Merricks' Overdetermination Argument is an argument against the causal efficacy of macrophysical objects. Here is how he formulates the argument:

- [1] The baseball—if it exists—is “causally irrelevant”⁵ to whether its constituent atoms, acting in concert, cause the shattering of the window.
- [2] The shattering of the window is caused by those atoms, acting in concert.
- [3] The shattering of the window is not overdetermined.
- [4] Thus, if the baseball exists, it does not cause the shattering of the window (Merricks 2001, p. 56).

And the argument generalizes to all macrophysical objects that are composed of atoms.⁶

Several remarks need to be made. First of all, the term ‘atoms’ need not refer to the atoms discussed in contemporary physics, but rather is a generic term that refers to material simples (e.g., the fundamental particles of physics, whatever they may be) which compose the baseball.⁷ Secondly, Merricks uses ‘shattering of the window’ as a plural referring expression—an abbreviation for the many scatterings of the atoms that composed the window. So the ‘shattering of the window’ is not meant to be taken as a single entity (such as a token event), nor is it identical to the many scatterings since he rejects the view that composition is identity (Merricks 2001, 56 fn. 1). Thirdly, “causal irrelevance” in premise (1) is a term of art used by Merricks to imply the following:

- [i] The baseball is not one of the atoms.
- [ii] The baseball is not a partial cause of the shattering of the window alongside the atoms.
- [iii] None of the atoms cause the baseball to cause the shattering of the window.
- [iv] The baseball does not cause any of the atoms to cause the shattering of the window.

Given this understanding of “causal irrelevance”, premise [1] seems to be correct. For the baseball is not one of the atoms, and the relation between the baseball and the atoms is not causal. Moreover, it seems right to say that the atoms are a sufficient cause for the shattering of the window, and so the baseball would not be a

⁵ Merricks' use of ‘causal relevance’ and ‘causal irrelevance’ does not follow standard usage; instead he employs it as a term of art, which he provides a characterization (see below). This terminology is regrettable since such use can make the discussion a bit confusing. To alleviate some of the confusion, I will put double quotation marks around it when I intend to use it with Merricks' meaning, and I will leave it bare when I use it in its more standard usage.

⁶ This argument would seem to result in the causal redundancy of even living material objects; however, Merricks later provides an argument claiming that conscious objects are not causally redundant, cf. Merricks (2001, Chaps. 4 and 5).

⁷ Now Merricks is open to the possibility of a gunky world such that matter is infinitely divisible; nevertheless, he suspects that there may still exist the fundamental particles posited by physicists even if there are no macroscopic composite objects (though this might be a dubious claim).

partial cause but would itself be a sufficient cause. Fourthly, Merricks takes premise [2] for granted, a claim that seems fairly innocuous.⁸

Merricks supports [3] by the intuitive resistance to systematic and widespread causal overdetermination. If the baseball is a cause of the shattering of the window, then the shattering is causally overdetermined by the baseball and the atoms acting in concert. But since the argument generalizes, it seems that we would be stuck with overdetermination in every case of causation involving macrophysical objects. However, Merricks claims that such overdetermination is objectionable, relying on mostly the intuitive implausibility of granting the existence of such systematic and widespread overdetermination. He draws on a similar intuition shared by Jaegwon Kim in his discussion of mental causation: “It is at best extremely odd to think that each and every bit of action we perform is overdetermined in virtue of having two distinct sufficient causes” (Kim 1993, p. 247). Likewise, Merricks thinks that it would be just as odd if every case of causation that involved macrophysical objects were a case of overdetermination. So given [1]–[3], Merricks concludes that macrophysical objects, such as baseballs, do not cause the shattering of the window.

Obviously the Overdetermination Argument does not prove Eliminativism but merely argues that macrophysical objects are causally inefficacious. However, Merricks adopts a modified form of Alexander’s dictum, which states that “to be is to have causal powers” (Kim 2005, p. 159). Alexander’s dictum is contentious if applied to all entities (such as abstracta); however, Merricks states that it may be plausible if we restrict the principle to apply only to material objects, thereby getting the following principle:

Merricks’ Dictum For macrophysical objects, to be is to have causal powers (Merricks 2001, pp. 81, 115).

So the conjunction of the Overdetermination Argument and Merricks’ Dictum entails the non-existence of macrophysical objects, and thus Eliminativism is true.

I won’t take issue with Merricks’ Dictum; however one should pause at the inference from [1]–[3] to [4], for [4] does not seem to immediately follow from such premises. To support the inference, Merricks proposes a principle that he claims underlies the Overdetermination Argument, which he dubs as the ‘Causal Principle’:

⁸ One possible problem for [2] is that there may be no scientific justification for it. Merricks cannot simply brush aside scientific claims since he himself appeals to the “scientific attitude” with respect to justifying [iv]:

This rejection of ‘downward’ causation is part of the ‘scientific attitude’ and ‘bottom-up’ metaphysics, according to which the final and complete causal stories will involve only the entities over which physics quantifies...but I think few would resist taking the ‘scientific attitude.’ (Merricks 2001, p. 60)

However, his reliance on such scientific attitudes may render [2] problematic since some have argued that there is no concept of causation at the level of fundamental physics (the level of Merricks’ atoms), cf. Loewer (2001), Hitchcock (2007), Elga (2007), and for an early source of this, Russell (1912). So if there is no such concept, then perhaps it is problematic to claim that the atoms cause the shattering of the window. However, I leave such worries aside (since my focus will be on [3]) and will accept [2].

[CP] Suppose: O is an object. The x s are objects. O is causally irrelevant to whether the x s, acting in concert, cause a certain effect E (i.e. O is not one of the x s, O is not a partial cause of E alongside the x s, none of the x s cause O to cause E , and O does not cause any of the x s to cause E). The x s, acting in concert, do cause E . And E is not overdetermined. It follows from all this that O does not cause E (Merricks 2001, p. 58).

CP is a strange principle since it seems to be merely a generalized version of the Overdetermination Argument. Merricks, however, takes CP to be an unobjectionable principle, which he attempts to support by offering the following example:

The Mob: Suppose some individuals, such as the members of an unruly mob, cause the vandalism of a park. Suppose also that the vandalism of the park is not overdetermined. And, finally, suppose that I am ‘causally irrelevant’ to whether those members cause the vandalism...First, I am not myself one of the members. Second, I am not a ‘partial cause’ of the vandalism alongside the members...Third, I am not an intermediate in a causal chain between the members and the vandalism; that is, the members do not cause the vandalism by causing me to do something by which I, more proximately, cause the vandalism. And, finally, I do not cause any of the members to cause the vandalism...It should be clear, given the above suppositions, that I do not cause the park to be vandalized (Merricks 2001, pp. 57–58).

Given *The Mob* case, Merricks takes CP to be “obviously and demonstrably true” (Merricks 2001, p. 58). And if CP is true, then the move from [1]–[3] to [4] is licensed, and the Overdetermination Argument is valid.

So Merricks concludes that macrophysical objects are causally redundant given that the atoms acting in concert are causally sufficient for the effect, leaving no causal work for macrophysical objects. Tyler Burge, in attacking the Exclusion Argument, notes that the notion of “causal work” adopts a *hydraulic model* of causation that is suspect (Burge 2007, p. 380). Causal metaphors are often given, rendering the notion of causation as including an “infusion of energy” or involving “causal liquid” (many of such notions stemming from a *generative* or *productive* account of causation). Burge claims that such metaphors are ungrounded and should be held with little regard since they lack any merit given what we know from scientific or explanatory practice.⁹ But the real problem, I take it, is that Merricks offers no account of causation by which we can make sense of the notion of “causal work” or even of overdetermination. Before moving on to such criticism, I want to first examine an extant objection to the Overdetermination Argument since I will later argue that better sense can be made of such an objection once an interventionist framework of causation is laid out.

⁹ I should note that I am not as hostile to such notions, and there seems to be promising work in the recent revival over what might be considered a version of the generative/productive account of causation, viz. powers theory.

2 An objection to the Overdetermination Argument

Various criticisms have been mounted against the Overdetermination Argument,¹⁰ but I want to focus on an extant objection to premise [3]. Some have argued that widespread overdetermination is not only acceptable but is to be expected. As Jonathan Schaffer puts it, “overdetermination is *everywhere*” (Schaffer 2003, p. 26). Sider (2003) and Olson (2002) have also argued that the kind of overdetermination involved in cases of macrophysical objects is not problematic, especially since the causes (*viz.*, the baseball and its constituent atoms) are not *independent* of each other. Merricks, anticipating such responses, claims that the lack of independence of such objects does not resolve the worry, for we can compare the situation with the Exclusion Argument, where the instances of mental properties are not independent from instances of physical properties (given a supervenience relation), and yet both instances of mental properties and instances of physical properties are (arguably) considered as causally overdetermining their effect if mental properties are not reduced or eliminated.

It seems that Merricks and his detractors are talking past each other regarding whether widespread and systematic overdetermination is metaphysically acceptable. Now Merricks endorses the following principle:

[A] Everything else being equal, an ontology free of systematic causal overdetermination is preferable to one that implies systematic causal overdetermination. (Merricks 2003, p. 742)

Sider, Olson and Schaffer obviously reject [A] as a general principle since not all types of overdetermination may be considered objectionable. But what can adjudicate this dispute? One difficulty regarding the truth of [A] is due to the fact that Merricks provides no theory of causation that would lend support to [A]. Olson makes such a complaint:

What sort of overdetermination principle is the right one is presumably bound up with the nature of causation in general. So it would seem natural to proceed by asking what sort of principle fits with the best overall account of causation. Surprisingly, Merricks never discusses causation in general, and offers no theoretical support for his crucial principle. I think we ought to be suspicious. (Olson 2002, p. 298)¹¹

Although Olson provides a brief sketch of his preferred account, no one in the dialectic has offered a satisfactory framework of causation.

¹⁰ For some examples, see Lowe (2003), Baker (2001), and Thomasson (2006).

¹¹ Olson is referring to another principle here, but for our purposes, they are relevantly similar such that his complaint regarding the lack of a causal theory also applies. Olson then proposes a “chance-raising” account of causation and suggests that overdetermination is unproblematic from such an account (though I worry whether his account would also permit cases of objectionable overdetermination).

Analyzing overdetermination has proven quite difficult to accomplish, and it is often characterized by providing several examples. Here is a standard case of overdetermination:

Two-bullets: A man is standing in front of a firing squad. After the signal, two shooters fire and both bullets hit and enter the man's heart at the same time.

Either bullet was sufficient for having killed the man.

Such cases seem to be very unlikely, and if they occur at all, they would be extremely rare. Cases such as *Two-bullets* are then given as a reason to avoid systematic and widespread causation since such coincidences having massive occurrences are highly unlikely. And if all cases of overdetermination were like *Two-bullets*, then perhaps [A] should be considered to be true.

But perhaps there are distinct types of overdetermination. Funkhouser (2002) provides a distinction between several kinds of overdetermination, the two that concern our purpose being independent overdetermination and incorporative overdetermination. The case of *Two Bullets* is a good example of independent overdetermination. And given the unlikelihood of such cases, many have the intuition to permit only occasional occurrences of independent overdetermination in one's overall ontology. On the other hand, examples of incorporative overdetermination involve multiple causes that are related by "supervenience", "realization", or "constitution" or some other relation that intimately links the causes. So cases of mental causation seem to be a prime candidate for incorporative overdetermination. And unlike independent overdetermination, such cases do not immediately come across as oddly coincidental but instead would be "necessarily systematic" (2002, p. 341).

One common problem is that once we categorize these two distinct types of overdetermination, it is not obvious whether a response to one type is appropriate for the other. As Funkhouser notes,

[the] most common worries regarding overdetermination fall within the incorporating overdetermination camp...Often times a "no overdetermination" principle is supported by citing the oddness of independent overdetermination examples...However, this principle is then used against theories that countenance *incorporating overdetermination*...it is not clear that both types are problematic in the same way (2002, p. 348).

Merricks himself falls into the same line. For after he provides *The Mob* case, which is a case intended on ruling out independent overdetermination,¹² he argues that such widespread and systematic overdetermination is an implausible option, thereby

¹² *The Mob* rules out independent overdetermination since the two competing objects, viz. the individuals that make up the mob and me, do not bear any of the relations that are involved in cases of incorporative overdetermination (such as the relation of supervenience, constitution, realization, etc.). So if I were also a cause of the vandalism, then the vandalism would be independently overdetermined by the individuals in the mob and me. For now, it suffices to merely have an intuitive grasp of the kind of independence that is holding between the two causes, but I will later argue that interventionism provides a better understanding of that independence (as a preview for the sequel, the causes in a case of independent overdetermination are such that these causes are independently manipulable and so can be represented in a single causal model).

ruling out overdetermination of the window shattering by the baseball and its constituent atoms. However, the latter case is an example of incorporative overdetermination given the kind of relation that holds between the baseball and the matter that composes (where the relation of composition is often construed as a necessary relation, but more on this later). If Merricks is to provide an example that is parallel with the case of the baseball and its parts, it would have been better for him to query about the causal competition between the *mob* (taken as an entity in its own right) and the individuals that make up the mob (which would then be a case of incorporative overdetermination), with CP ruling out the *mob* as being causally efficacious.¹³ But it is not at all obvious that such overdetermination is problematic in that example. Perhaps Merricks can object by claiming that merely making a distinction and providing a label for two types of overdetermination does not help since it is not clear why independent overdetermination is supposed to be “bad” and incorporative overdetermination is supposed to be acceptable. Moreover, Merricks drives home the comparison with issues in mental causation, arguing that the case of incorporative overdetermination of a mental property instance and a physical property instance to some effect has been considered problematic given the Exclusion Argument. Merely claiming that incorporative overdetermination would be systematic if it occurred does not make it unobjectionable (even others, such as Paul (2007), have worries about constitutive overdetermination, which is a case of incorporative overdetermination regarding material composition¹⁴). So even if Sider, Olson, and Schaffer are correct in considering incorporative overdetermination as unobjectionable, Merricks can request a principled reason to explain why incorporative overdetermination is not as objectionable as independent overdetermination. I hope to fulfill this request, and I suggest that the interventionist framework is capable of providing such a principled reason once overdetermination is properly characterized. To that end, I turn now to laying out the relevant aspects of such a theory.

3 Interventionism and Overdetermination

Woodward (2003) has developed an account of causation (and causal explanation) that attempts to capture causal relationships as understood from our scientific and experimental practice where one can distinguish genuine causal relations from mere correlations. His account is quite promising since it avoids various objections to similar theories (such as anthropocentric-manipulationist theories and counterfactual theories). An important feature of his account is the employment of a causal system as a means for representing the counterfactual relationships that hold between the causal relata. The basic idea of his theory is to ask what would occur to

¹³ Thomasson makes this point (2006, p. 342).

¹⁴ Paul takes the worry of constitutive/incorporative overdetermination seriously, and resolves the problem by claiming that the composite object and its matter share a part (viz., a property-instance) that is the literal cause, and so there is no causal competition between the object and its matter since neither as a whole are considered to be the actual causal relata.

some effect given an intervention on some putative cause. If an intervention on the putative cause results in a change in the effect, then the former can be regarded as a genuine cause. And the interventionist framework is capable of representing these counterfactual dependencies that hold between variables in a variable set, where the variables represent the causal relata.¹⁵

So Woodward analyzes causation in terms of an intervention.¹⁶ He formulates his definition as such:

[M] A necessary and sufficient condition for X to be a (type-level) *direct cause* of Y with respect to a variable set \mathbf{V} is that there be a possible intervention on X that will change Y or the probability distribution of Y when one holds fixed at some value all other variables Z_i in \mathbf{V} . A necessary and sufficient condition for X to be a (type-level) *contributing cause* of Y with respect to variable set \mathbf{V} is that (i) there be a directed path from X to Y such that each link in this path is a direct causal relationship... and that (ii) there be some intervention on X that will change Y when all other variables in \mathbf{V} that are not on this path are fixed at some value. (Woodward 2003, p. 59)

Thus, X is a cause of Y if and only if there is at least one variable set \mathbf{V} such that X is a direct or a contributing cause of Y . The notion of an intervention is crucial for his analysis of causation, which Woodward defines as follows:

[IV] I is an intervention variable for X with respect to Y iff

- (1) I causes X
- (2) I acts as a switch for all other variables that cause X . That is, certain values of I are such that when I attains those values, X ceases to depend on the values of other variables that cause X and instead depends only on the value taken by I
- (3) Any directed path from I to Y goes through X . that is, I does not directly cause Y and is not a cause of any causes of Y that are distinct from X except, of course, for those causes of Y , if any, that are built into the I - X - Y connection itself; that is, except for (a) any causes of Y that are effects of X (i.e., variables that are causally between X and Y) and (b) any causes of Y that are between I and X and have no effect on Y independently of X
- (4) I is (statistically) independent of any variable Z that causes Y and that is on a directed path that does not go through X . (2003, p. 98)

¹⁵ Woodward leaves open as to what entities can serve as the value of these variables, e.g. objects, events, properties, etc.

¹⁶ Woodward uses 'cause' and 'causally relevant' interchangeably. This may be turn out to be problematic; however, I will loosely go back and forth as well since Woodward does, although I take the crucial notion here to be that of causal relevance.

Several remarks need to be made. Unlike anthropocentric-manipulationist accounts, [M] and [IV] do not require any actual human intervention. Moreover, it is evident that causation and intervention are being inter-defined in Woodward's account, which he takes to be unproblematic since he is offering a non-reductive analysis of causation (2003, pp. 104–105). And given [M], specifying a variable set \mathbf{V} is required in order to make judgments about causal relationships.¹⁷

According to [M], there is a necessary condition for X to cause Y relative to \mathbf{V} , which has sometimes been labeled *fixability*¹⁸:

[FIX] The variables in \mathbf{V} that are not located on a causal path from X to Y can be held fixed while $I = z_i$ is performed on X .

If FIX cannot be satisfied, then X and Y are not causally connected with respect to \mathbf{V} . Now FIX involves a matter of independence between two distinct variables, for if one variable changes in value, then any other variable in the set (that is neither Y nor any other variable in the causal chain from X to Y) must be independent in the sense that its value does not change by the intervention. However, FIX is problematic, for although it requires some independence to hold between variables in the set, there is no restriction for what can count as distinct variables.

What is missing in Woodward's original account is a principle that provides a proper constraint on what variables are permitted in a variable set and which variables can be represented as distinct. Even if properties are actually distinct, there may be some reason why they should not be permitted to belong to the same variable set or why they should not be represented as distinct variables. Thus, FIX should be supplemented with a further condition such that distinct causes can be represented in a variable set only if the variables representing the causes are independently manipulable, i.e. the value of other variables is independent of any intervention performed on one of the variables in the set.¹⁹ Independent manipulability does not follow from FIX (or anything else from [M]) since nothing in FIX restricts what counts as distinct variables in a variable set. So it is better to think of independent manipulability as a supplementary condition.²⁰

Although a condition of independent manipulability is not implied by his original theory, Woodward does accept it in his later writings (Woodward 2008a, c). This condition is crucial since distinctness in the world does not entail that there is

¹⁷ This relativization of causation to some variable set \mathbf{V} has been a source of criticism against interventionism—cf. Strevens (2007). Although Woodward seemed to back away from the claim of causal relativity to a variable set (2008b)—and for a reply, see Strevens (2008)—Weslake rightly notes that causal relativity need not be construed as a form of anti-realism, since causal claims are not made true by the representational models employed in an interventionist framework but are “made true by the counterfactuals regarding experimental interventions that are represented by those models” (Weslake, unpublished, 4–5 typescript). Perhaps Woodward would agree here since he states that the relativity is regarding the causal judgments and representations and that the relativity is not over causation that is out in the world (2008b, pp. 202–203). However, in Woodward's later papers, he moves away from talk of variable sets and rather focuses on background conditions (2008a).

¹⁸ I borrow this terminology from Baumgartner (2010, p. 365).

¹⁹ For more on independent manipulability, see Weslake (unpublished), 15 typescript.

²⁰ I thank Michael Rescorla for this point.

distinctness in the way it is represented in a causal claim. And cases where there is some tight connection (e.g., logical, conceptual or metaphysical) between distinct entities may prevent them from being construed as distinct variables in a causal system since FIX (and so [M]) would be violated if these distinct entities were to be considered as distinct variables. With this in mind, if independent manipulability cannot be satisfied, then FIX cannot be satisfied by two variables X and Y relative to V ; and so X and Y would not be causally connected relative to V .

One further note should be made. Woodward seems to modify his position in his later works such that FIX is construed not as a necessary condition for a causal claim but as a precondition for a causal claim to be well-defined.²¹ Hence, if independent manipulability cannot be satisfied for the variables in a variable set, then any causal claim that includes such a set will be ill-defined since FIX would be violated. Since Woodward's latest approach (2008a, c) treats FIX as a precondition for a well-defined causal claim, I will follow suit by treating FIX and independent manipulability in the same manner throughout the paper.

Now interventionism provides us with a framework to understand when overdetermination occurs. As Woodward states,

in cases involving symmetric overdetermination, the relationship between each of the overdetermining cause variables and the effect is such that given the actual value of the cause, the counterfactual dependence of the effect on the other overdetermining cause variable is masked. Fixing one of the cause variables at nonfactual values allows the actual-causal relationship involving the other cause to reveal itself in a relationship of counterfactual dependence. (Woodward 2003, p. 84)

Without going into the details of an account of overdetermination according to interventionist lines,²² the intuitive idea has been adequately stated by Raatikainen:

From the interventionist perspective, however, somewhat surprising consequences follow for the whole overdetermination issue. That is, even raising the question...*requires that we consider a causal system which includes a variable for both.* However, this in turn commands that one can, at least in principle, vary their values independently of each other. (Raatikainen 2010, p. 360) [italics mine]

So according to interventionism, overdetermination occurs when there are two sufficient actual causes of some effect in the *same* causal system. That is, the two (or more) variables that are the overdetermining causes of an effect must be members of the same variable set, where the causes are sufficient actual causes. Thus, overdetermination is a *system-internal* notion according to interventionism, and the mere existence of two separate causal models that involve sufficient actual causes does not entail that some effect is overdetermined.

²¹ In fact, in Woodward's later papers, he alters his definition of a cause, and moves away from language involving variable sets and focuses rather on background conditions (perhaps to distance himself from the charge of relativity to a variable set).

²² For Woodward's account of overdetermination, see (2003, pp. 77–86 (esp. 84)). Weslake provides a nice explication of overdetermination in an interventionist framework in (unpublished), 7–9 typescript.

4 Against the Overdetermination Argument

4.1 No Genuine Overdetermination

With this general understanding of overdetermination, let us return to the Overdetermination Argument. As mentioned earlier, Merricks provides us with no causal theory by which to construe his notion of overdetermination. However, given the plausibility of interventionism as an account of causation, I argue that such a framework shows that CP is false, and hence that the Overdetermination Argument is invalid (since CP's truth is required for the inference from [1]–[3] to [4]).

According to Merricks, the atoms acting in concert are a sufficient cause for the shattering of the window. In order to avoid widespread and systematic overdetermination, Merricks endorses premise [3]. He assumes that since the baseball would also be a sufficient cause if it existed, he argues that it is causally inefficacious because the atoms acting in concert are also sufficient for the shattering of the window. However, even if the baseball were a sufficient cause, we would not necessarily get a case of overdetermination by interventionist lights. For merely having two sufficient actual causes does not entail overdetermination, for these two causes may not be part of the same causal system. And given interventionism, there is a causal system that cites the baseball as a sufficient cause of the window shattering, and there is also another causal system that specifies the atoms (acting in concert) as a sufficient actual cause of the window shattering. So let 'B' stand for the baseball, 'A' for the atoms (acting in concert), and 'W' for the shattering of the window. Then we can represent the causal relationship with a system that incorporates a variable set $\mathbf{V}' = \{\dots, B, \dots, W, \dots\}$ (and where \mathbf{V}' does not contain A), and a distinct causal system with the variable set $\mathbf{V}'' = \{\dots, A, \dots, W, \dots\}$ (and where \mathbf{V}'' does not contain B) such that an intervention on either B or A would result in a change of value for W (e.g., an intervention on B is such that if we were to prevent the baseball from being thrown, then the window would not shatter; and the same goes for an intervention on A).

In order for this case to count as genuine overdetermination, there must be a causal relationship that can be represented by a causal system that incorporates the sufficient actual causes in the same variable set, e.g., some variable set \mathbf{V}^* such that $\mathbf{V}^* = \{\dots, B, \dots, A, \dots, W, \dots\}$. And since B and A are taken to be sufficient actual causes, then under such a system we would have a case of genuine overdetermination. But from an interventionist framework, such a causal system is not possible. In order to demonstrate this, a brief remark on the composition relation between the baseball and the atoms must be laid out.

One question of composition asks when it is the case that several objects compose some other object.²³ Although answers to this question vary, most agree that the composition relation holds as a matter of necessity (in some metaphysical sense of necessity). As Sider (who endorses unrestricted composition) notes, "it is

²³ This is just one composition question, the Special Composition Question, popularly formulated by van Inwagen (1990).

necessary that appropriately arranged atoms compose a baseball” (Sider 2003, p. 722). Elsewhere, he also says,

What are [the] synthetic necessary truths? Many would cite mathematical examples. I would cite also the laws of mereology, whatever those are. There are some conditions, *C*, such that it is necessarily true that whenever objects satisfy conditions *C*, there exists an object that is composed of those objects. (Sider 2001, pp. 202–203)

Ned Markosian (who endorses brutal composition and rejects unrestricted composition) would agree with Sider at least in this, as he claims that it is “impossible for two worlds to be duplicates with respect to non-mereological universals but differ with respect to composition” (Markosian 1998, pp. 216–217). Even Sosa (1987), Armstrong (1997) and Sidelle (2002) seem to agree with Sider and Markosian on this matter. So many opponents in the debate regarding composition agree that there is a metaphysically necessary relation that holds between a composite object and its parts.

Granting the necessity of composition, it should be evident that given an interventionist framework, a causal system that includes the variable set V^* is not possible. Recall that interventionism (according to Woodward’s latest construal) requires that *FIX* be satisfied as a precondition for a well-defined causal claim. But given the case of the baseball and its constituent atoms, no such causal system is possible. Since composition is a relation that holds with metaphysical necessity, *B* and *A* cannot be independently set to different values, for any change in the value of *B* invariably results in a change in the value of *A*; and therefore *B* and *A* are not independently manipulable. So if there is a causal model with the variable set V^* , *A* cannot be held fixed when an intervention is performed on *B*, and so such a causal system would violate *FIX*.

Independent manipulability, then, ensures that there can be no distinct variables *B* and *A* in the same variable set. And any causal claim that includes V^* cannot adequately represent any causal relationship between variables because *FIX* would not be satisfied, rendering such a causal claim as ill-defined. Since no causal claim involving V^* can be well-defined, and since genuine overdetermination in the case considered in the Overdetermination Argument requires a causal system with V^* , then the case of the shattering of the window by the baseball and the atoms that compose it is not a case of genuine overdetermination. In fact, it is not even a case of a genuine causal *claim* since no causal claim can be legitimately made from a system that incorporates V^* . As Woodward states,

I also assume that if a candidate causal claim is associated with interventions that are impossible for (or lack any clear sense because of) logical, conceptual or perhaps metaphysical reasons, then that causal claim is itself illegitimate or ill-defined. I take it to be an implication of [M] that a legitimate causal claim should have an intelligible interpretation in terms of counterfactuals the antecedents of which are coherent or make sense. (Woodward 2008a, pp. 224–225)

An intervention on B in V^* would be impossible for metaphysical reasons (e.g., the necessity of composition) because it is not possible for B to undergo an intervention while keeping fixed the value of A (and where A is not on the causal chain from B to W, which is ensured by Merricks claim that B is “causally irrelevant” such that B does not cause A and A does not cause B). For any intervention on the baseball would result in some change of value of the atoms. The typical (though not only) way of stipulating an intervention is by supposing what would happen if such a putative cause were to be prevented; however, any such intervention of that sort on the baseball would result in the prevention of the atoms from shattering the window since it is necessary that the atoms compose the baseball.²⁴ Thus, it is not possible to directly cause B without directly causing A, and any such intervention on B relative to V^* would be regarded as impossible given that it violates FIX.

To return to the Overdetermination Argument, premise [3] claims that the shattering of the window is not overdetermined. Now interventionism permits a causal claim such that the atoms (acting in concert) causes the shattering of the window, and it also permits another causal claim that cites the baseball as a cause of the window shattering. There is reason to consider this case as one that does not involve genuine overdetermination, for there can be no causal model that includes V^* , which is necessary for an occurrence of genuine overdetermination by the baseball and its constituent atoms. For within an interventionist framework, there can be more than one sufficient actual cause of some effect and yet the effect not be genuinely overdetermined. If so, then interventionism provides a reason to deny Merricks' CP. Take the different features of CP in the case of the baseball and the atoms that compose it. The baseball is “causally irrelevant” to whether the atoms acting in concert cause the shattering of the window, and the atoms acting in concert do cause the shattering of the window. So far, this is consistent with interventionism, and thus we can accept premise [1] and [2]. And even within an interventionist framework, one can claim that the shattering of the window is not overdetermined, for even if the baseball is a sufficient actual cause of the window shattering, such an effect is not genuinely overdetermined since the baseball and the atoms acting in concert are not cited in the same causal system. Thus, the interventionist will also accept premise [3]. However, it does not follow, contrary to CP, that the baseball does not cause the shattering of the window; moreover, we have reason to suppose that the baseball *is* a cause of the window shattering since there is a well-defined causal claim that follows from the causal system that incorporates the variable set V' . Hence, CP is false. And given that the validity of the Overdetermination Argument required the truth of CP, we can judge the argument invalid. Unlike the typical objection to the Overdetermination Argument that denies [3], the interventionist can accept [3] since there is no genuine overdetermination given that there is no well-defined causal system that incorporates a variable set V^* , and hence there is no genuine overdetermination even if the baseball and its constituent atoms are both

²⁴ Although any alteration in the value of B would result in the change in the value of A, it may be the case that an intervention on A would not result in a change of value for B if the baseball can be “multiply realized” by different atoms, which Sosa (1987) seems to suggest. But it is adequate for my argument that there can be no intervention on B while keeping the value of A fixed, for then B and A won't be independently manipulable and hence any causal model with V^* violates FIX.

sufficient causes. By falsifying CP, we undermine the validity of the Overdetermination Argument.

This response to the Overdetermination Argument goes hand in hand with Amie Thomasson's recent critique of it, where she similarly argues that we can accept [1]–[3] and yet deny [4]. According to Thomasson, the problem with the Overdetermination Argument is its employment of an unrestricted conjunctive claim.²⁵ It is quite odd to include in a list of things purchased at the store with the items: a right-handed glove, a left-handed glove, *and* a pair of gloves. The reason that such a list is odd, according to Thomasson, is that typical conjunctive claims “normally presuppose that the items conjoined are separate and independent” (presuppositions that bear a similarity to Grice's conversational maxim of brevity).²⁶ Thomasson claims that taking the conjunction of the baseball *and* its constitutive atoms as *both* being causes of the window shattering is problematic since such a claim presupposes that the baseball and the atoms that compose it are *separate* and *independent*. But again, given the necessity of the composition relation, it is clear that they are not. Thus, she concludes that “it is not at all obvious that in cases in which independence does not hold between objects x and y , x and y either provide double the amount of causation or are causal rivals”.²⁷ She further argues that the baseball and its constituent atoms are not independent because ‘the atoms arranged baseball-wise caused the shattering of the window’ analytically entails ‘the baseball caused the shattering of the window’ (where she construes analytic entailment as an entailment “in virtue of the meanings of the expressions involved and rules of inference”²⁸); and given this analytical entailment, the atoms and the baseball cannot both be included in a conjunctive causal claim.

I am not sure what to make of the claim that the one causal claim is “analytically entailed” by the other.²⁹ Nevertheless, interventionism is helpful here in providing additional reason why some conjunctive causal claims cannot be intelligibly made. For the baseball and the constituent atoms cannot be members of a conjunctive causal claim since any such claim would be ill-defined given that it would violate independent manipulability and FIX (for such a conjunctive causal claim would make use of a causal system with the variable set \mathbf{V}^*). Moreover, I take the real problem behind Merricks' argument as not merely resting on some linguistic or conceptual error (such as a Gricean presuppositional failure), but rather the lack of a causal theory that can determine whether CP is true or whether every case that

²⁵ Thomasson (2006, pp. 344–346; 2007, pp. 13–14).

²⁶ *Ibid.*, p. 344. She provides arguments inspired by the reasoning of Grice (1989) and Ryle (1949) in their arguments against such conjunctive claims.

²⁷ Thomasson (2006, p. 347).

²⁸ Thomasson (2007, p. 16). The basic idea is that if ϕ analytically entails ψ , then both ϕ and ψ have the same truth-makers and so do not require “anything more in the world...[ψ] does not require any extra causal action beyond what was averted to in ϕ ”. So Thomasson concludes that there is no additional causal occurrence nor any causal competition. And since the atoms arranged baseball-wise is causally relevant to the shattering of the window, then the baseball is also causally relevant to the window shattering.

²⁹ Though Thomasson provides an extended treatment of her understanding of analytical entailment in chapter 2 (2007).

involves more than one sufficient cause is a case of genuine overdetermination. And given interventionism, we have no reason to suppose that CP is true and good reason to believe that an effect can have more than one sufficient cause while not being genuinely overdetermined.

Now some may worry that CP should be considered false only if we accept an interventionist account of causation. However, we can also deny CP in what I take to be other plausible accounts of causation and overdetermination. For instance, consider the following counterfactual account of overdetermination, which is due to Bennett (2008):

c1 and c2 overdetermine an event e only if it is nonvacuously true that

[O1] $(c1 \ \& \ \sim \ c2) > e$, and

[O2] $(c2 \ \& \ \sim \ c1) > e$.

Given the necessity of the composition relation, the antecedent of either [O1] or [O2] would be impossible; and hence, the condition would be vacuously true and so not a case of genuine overdetermination. Thus, even in Bennett's counterfactual account, we should not consider the case with the baseball and its constituent atoms as one of genuine overdetermination, though it is a case of two sufficient causes of the window shattering. However, interventionism avoids several objections that beset standard counterfactual theories. But what I hope my argument has shown is that anyone who endorses a counterfactual account or a modified version such as interventionism should deny CP and hence reject the epiphenomenal conclusion of the Overdetermination Argument.

Of course one may object and suppose that if we deny the necessity of composition, then perhaps we don't have a reason to reject CP since independent manipulability and FIX were violated given the assumption of the necessity of composition. Indeed, some philosophers have attempted to argue that composition is a matter of contingency.³⁰ I think that this ultimately won't lead to a problem. Several have argued against the Exclusion Argument independently of supervenience (which is the necessary relation that leads to the violation of FIX) by way of focusing on the contrastive nature of causation in an interventionist framework (which is an aspect of interventionism I have not laid out).³¹ Likewise, a similar move that emphasizes the contrastive aspect of interventionism can be made even if one rejects the necessity of composition. Moreover, even if composition is contingent, there may yet be some close relation between a macrophysical object and its constituent parts such that an intervention on the object might not be independent of its parts. At worst, an argument for the necessity of composition might need to be established in order to maintain the rejection of CP; however, I am content to show that we do have reason to deny CP given the standard view of composition, and hence we have reason to consider the Overdetermination Argument as invalid.

³⁰ For some examples, see Cameron (2007) and Nolan (1997).

³¹ See Menzies (2008) and Raatikainen (2010) for such responses against the Exclusion Argument.

4.2 Objectionable/unobjectionable overdetermination

The discussion so far has been to develop overdetermination along interventionist lines, such that the overdetermining causes must be members of the same variable set. Given this account, we have reason to accept [3] (and the other premises) and yet deny the inference from [1]–[3] to [4]. The overdetermination that we have been discussing is evidently independent overdetermination. Independent overdetermination counts as a genuine case of overdetermination according to interventionism since the variables satisfy the constraints of FIX and independent manipulability. Take again the *Two-bullets* case. Since there can be an intervention on one of the shooters without any change in the other even when both shooters are represented in a single causal system, the two shooters are independently manipulable and hence can both be cited as overdetermining causes. And if Merricks merely wants to avoid this sort of overdetermination, then we can endorse premise [3] and yet retain the causal efficacy of the baseball.

Now suppose instead that Merricks takes the kind of overdetermination to avoid as *incorporative* overdetermination. According to interventionism, incorporative overdetermination is not problematic since it is not a case of genuine (independent) overdetermination. Unlike independent overdetermination, incorporative overdetermination would be characterized as involving more than one sufficient actual cause, though *not* in the *same* causal system. Given an interventionist characterization, the baseball and the atoms are both sufficient causes of the shattering of the window (for well-defined causal claims can be made from two distinct causal systems, one employing the variable set V' and another with V''). Yet this is not worrisome because such “overdetermination” merely involves cases in which the causes are represented as members of *distinct* causal systems, and where the variables cannot be members of the same causal system since FIX would be violated. Moreover, the interventionist would even hesitate to label such a case as being a case of “overdetermination”; however, people are licensed to put a label on to whatever they want, and we can permit the use of ‘incorporative overdetermination’ to pick out those cases that involve multiple sufficient actual causes, where the causes are not members of the same causal system.

So we can say that incorporative overdetermination does indeed occur in the case of the baseball and its constituent atoms, and hence premise [3] turns out false. That is, the shattering of the window is incorporatively overdetermined since the baseball is a sufficient actual cause along with the atoms acting in concert, which are also a sufficient actual cause. But merely citing two sufficient causes is not an objectionable kind of overdetermination according to interventionism (since the interventionist wouldn't really consider it a case of genuine overdetermination).

So premise [3] is false if overdetermination is merely characterized as having two sufficient causes where each cause can only be represented in distinct causal systems—that is, if it is characterized as being incorporatively overdetermined. A problem with Merricks' account, then, is that he argues by providing an example

that rules out independent overdetermination—viz., *The Mob* case³²—and then proceeds to use such reasons to support [3]. But which kind of overdetermination are we talking about? If Merricks construes it as independent overdetermination, then the Overdetermination Argument would be rendered invalid since I have argued that interventionism leads to the falsity of CP. On the other hand, if Merricks construes overdetermination as incorporative, then premise [3] is false; for such overdetermination is not objectionable within interventionism, for interventionists wouldn't deem these occurrences as cases of genuine overdetermination anyway.

Finally, recalling the request for a principled reason to distinguish independent overdetermination as objectionable and incorporative overdetermination as unobjectionable, the interventionist framework does provide such a principled reason. For independent overdetermination would be a case of genuine overdetermination under interventionist terms, and hence would be a case of objectionable overdetermination since such cases would be highly unlikely and extremely coincidental. However, cases of incorporative overdetermination are not regarded as genuine cases of overdetermination in an interventionist framework but are instead construed as innocuous cases that involve multiple sufficient actual causes, where the causes are not members of the same causal system.³³ So we can now make better sense of Sider and Olson's objection to [3]: the type of overdetermination they are considering, viz. incorporative overdetermination, is permissible in one's ontology since interventionism does not consider such causal relationships to be problematic.

5 Conclusion

So I leave the Overdetermination Argument with a dilemma. If overdetermination is characterized as independent causal overdetermination, then the argument is invalid since CP is false. If overdetermination is characterized as incorporative causal overdetermination, then the argument is unsound since [3] is false. And since there seems to be no other plausible way of characterizing overdetermination (that is relevant to the issue at hand³⁴), the Overdetermination Argument should be rejected as a means of arguing against the causal efficacy of macrophysical objects.

Now one may object that this criticism of the Overdetermination Argument hinges on the truth of interventionism. However, Merricks is guilty of not providing an adequate theory of causation and merely assuming a framework that is congenial to CP. But given the rising influence of interventionism, one can take this paper as a

³² It should be clearer now why *The Mob* is a case that rules out independent overdetermination since the individuals that make up the mob and me can both be represented in the same causal model (such that if I were a cause of the vandalism, then the vandalism would be independently overdetermined by me and the members of the mob). Given that the individuals of the mob and I are independently manipulable, both can be included in the same variable set without violating FIX.

³³ As Thomasson would agree, for even if the baseball and that atoms (acting in concert) are overdetermined in Merricks' sense (i.e., incorporatively), "they do not seem to provide a case of *real* overdetermination of a kind that was supposed to be worrying" (2006, p. 349).

³⁴ Funkhouser (2002) also mentions a third type of overdetermination, viz. Iterative Overdetermination; however, that kind does not seem to be relevant in this case.

challenge to the defender of the Overdetermination Argument to provide reasons for rejecting interventionism, or reasons for supporting CP, or to offer a plausible account of overdetermination that salvages the Overdetermination Argument (however, I mentioned earlier that a similar argument can be made against the Overdetermination Argument even from a counterfactual theory of causation and overdetermination). But since Merricks does not clearly indicate which type of overdetermination and causal theory are being employed, I have argued that the plausibility of interventionism counts against his argument, for depending on two ways of construing overdetermination, such an account either renders his argument invalid or unsound. Thus, the Overdetermination Argument does not provide us with a reason to deny the causal efficacy of non-living physical composite objects; and hence, we have no reason along these lines to doubt their existence.³⁵

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References

- Armstrong, D. (1997). *A world of states of affairs*. Cambridge: Cambridge University Press.
- Baker, L. R. (2001). Review of *Objects and persons*. *Australasian Journal of Philosophy*, 81, 597–598.
- Baumgartner, M. (2010). Interventionism and epiphenomenalism. *Canadian Journal of Philosophy*, 40, 359–384.
- Bennett, K. (2008). Exclusion again. In J. Kallestrup & J. Hohwy (Eds.), *Being reduced: New essays on reduction, explanation and causation* (pp. 280–305). Oxford: Oxford University Press.
- Burge, T. (2007). Postscript: Mind-body causation and explanatory practice. In T. Burge (Ed.), *Foundations of mind* (pp. 363–382). Oxford: Oxford University Press.
- Cameron, R. (2007). The contingency of composition. *Philosophical Studies*, 136, 99–121.
- Elga, A. (2007). Isolation and folk physics. In H. Price & R. Corry (Eds.), *Causation, physics, and the constitution of reality* (pp. 106–119). Oxford: Oxford University Press.
- Funkhouser, E. (2002). Three varieties of causal overdetermination. *Pacific Philosophical Quarterly*, 83, 335–351.
- Grice, P. (1989). *Studies in the way of words*. Cambridge: Harvard University Press.
- Hitchcock, C. (2007). What Russell got right. In H. Price & R. Corry (Eds.), *Causation, physics, and the constitution of reality* (pp. 45–65). Oxford: Oxford University Press.
- Kim, J. (1993). The nonreductivist's troubles with mental causation. In J. Heil & A. Mele (Eds.), *Mental causation*. Oxford: Oxford University Press.
- Kim, J. (2005). *Physicalism, or something near enough*. Princeton: Princeton University Press.
- Loewer, Barry. (2001). Review of Jaegwon Kim's *Mind in a physical world*. *Journal of Philosophy*, 98, 315–324.
- Lowe, E. J. (2003). In defense of moderate-sized specimens of dry goods. *Philosophy and Phenomenological Research*, 67, 704–710.
- Markosian, Ned. (1998). Brutal composition. *Philosophical Studies*, 92, 211–249.
- Menzies, P. (2008). Exclusion problem, the determination relation, and contrastive causation. In J. Kallestrup & J. Hohwy (Eds.), *Being reduced: New essays on reduction, explanation and causation* (pp. 196–217). Oxford: Oxford University Press.
- Merricks, T. (2001). *Objects and persons*. Oxford: Oxford University Press.
- Merricks, T. (2003). Replies. *Philosophy and Phenomenological Research*, 57, 727–744.

³⁵ What I believe the Overdetermination Argument does show is that non-living physical composites are not substances, not that such objects don't exist (cf. Toner 2008).

- Nolan, D. (1997). Impossible worlds: A modest approach. *Notre Dame Journal of Formal Logic*, 38, 535–572.
- Olson, E. (2002). The ontology of material objects. *Philosophical Books*, 43, 292–299.
- Paul, L. A. (2007). Constitutive overdetermination. In J. K. Campbell & M. O'Rourke (Eds.), *Topics in contemporary philosophy vol. 4: Causation and explanation* (pp. 265–290). Cambridge: MIT Press.
- Raatikainen, P. (2010). Causation, exclusion, and the special sciences. *Erkenntnis*, 73, 349–363.
- Russell, B. (1912). On the notion of cause. *Proceedings of the Aristotelian Society*, 13, 1–26.
- Ryle, G. (1949). *The concept of mind*. London: Hutchinson.
- Schaffer, J. (2003). Overdetermining causes. *Philosophical Studies*, 114, 23–45.
- Sidelle, A. (2002). Is there a true metaphysics of material objects. *Philosophical Issues*, 12, 118–145.
- Sider, T. (2001). *Four-dimensionalism*. Oxford: Oxford University Press.
- Sider, T. (2003). What's so bad about overdetermination? *Philosophy and Phenomenological Research*, 67, 719–726.
- Sosa, E. (1987). Subjects among other things. *Philosophical Perspectives*, 1, 155–187.
- Strevens, M. (2007). Review of Woodward, *Making things happen*. *Philosophy and Phenomenological Research*, 74, 233–249.
- Strevens, M. (2008). Comments on Woodward, *Making things happen*. *Philosophy and Phenomenological Research*, 77, 171–192.
- Thomasson, A. (2006). Metaphysical arguments against ordinary objects. *Philosophical Quarterly*, 56, 340–359.
- Thomasson, A. (2007). *Ordinary objects*. Oxford: Oxford University Press.
- Toner, P. (2008). Emergent substance. *Philosophical Studies*, 141, 281–297.
- van Inwagen, P. (1990). *Material beings*. Ithaca: Cornell University Press.
- Weslake, B. (unpublished). Exclusion excluded.
- Woodward, J. (2003). *Making things happen: A theory of causal explanation*. Oxford: Oxford University Press.
- Woodward, J. (2008a). Mental causation and neural mechanisms. In J. Kallestrup & J. Hohwy (Eds.), *Being reduced: New essays on reduction, explanation and causation* (pp. 218–262). Oxford: Oxford University Press.
- Woodward, J. (2008b). Response to Strevens. *Philosophy and Phenomenological Research*, 77, 193–212.
- Woodward, J. (2008c). Cause and explanation in psychiatry: An interventionist perspective. In K. Kendler & J. Parnas (Eds.), *Philosophical issues in psychiatry*. Baltimore: John Hopkins University Press.