

# Grounding mental causation

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**Abstract** This paper argues that the exclusion problem for mental causation can be solved by a variant of non-reductive physicalism that takes the mental not merely to supervene on, but to be grounded in, the physical. A grounding relation between events can be used to establish a principle that links the causal relations of grounded events to those of grounding events. Given this principle, mental events and their physical grounds either do not count as overdetermining physical effects, or they do so in a way that is not objectionable.

**Keywords** Exclusion problem · Grounding · Mental causation · Non-reductive physicalism · Overdetermination

## 1 Introduction

We shall argue that the exclusion problem for mental causation can be solved if the mental is taken not merely to supervene on, but to be grounded in, the physical. The grounding relation can be used to establish a principle that links the causal relations of grounded events to those of grounding events. Given this principle, mental events and their physical grounds either do not count as overdetermining physical effects, or they do so in a way that is not objectionable.

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The plan is as follows. Section 2 introduces a variant of non-reductive physicalism about the mind in terms of grounding. Section 3 establishes a principle according to which causal properties of mental events are grounded in causal properties of the physical events that ground those mental events. Section 4 presents the exclusion problem. Section 5 argues that overdetermination can be defined in two different ways (one of which involves the notion of grounding) and that on each definition the exclusion problem can be defused.

## 2 Grounding physicalism

We assume a version of non-reductive physicalism about the mental. Non-reductive physicalism can be defined as the conjunction of the following two claims:<sup>1</sup>

*Non-Reduction.* All mental properties are distinct from physical properties.

*Supervenience.* All mental properties supervene on physical properties.

There are different ways of spelling out the relation of supervenience that is in play in Supervenience.<sup>2</sup> We shall take the relation to be that of *strong supervenience*. Thus, Supervenience says that for each mental property  $M$  there is a family of physical properties  $P_i$  such that (i) necessarily, if  $M$  is instantiated, then some member of  $P_i$  is instantiated and (ii) necessarily, if some member of  $P_i$  is instantiated, then  $M$  is instantiated (with respect to the same time, place, and subject).<sup>3</sup>

As it stands, non-reductive physicalism as characterised by Non-Reduction and Supervenience is silent on whether or not the physical realm is more fundamental than the mental realm. However, the idea that the physical is more fundamental than the mental is widespread among non-reductive physicalists. The supervenience claim is often even conceived of as an attempt to capture such a dependence of the mental on the physical. The purpose of this paper is to show that the non-reductive physicalist gains a lot of explanatory potential by making explicit use of the idea that the physical is more fundamental than the mental. Our work is thus part of a growing

<sup>1</sup> Compare (Kim 2005, pp. 33–34). For Kim, the non-reductive character of the position consists in the claim that mental properties are neither reducible to nor identical with physical properties. For simplicity, we take non-identity to entail non-reducibility. Whether supervenience suffices for physicalism has been a matter of some controversy (see Horgan 1993 and Wilson 2005 for arguments against the sufficiency; for replies, see Howell 2009 and Kim 2011). It is common in the debate about the exclusion problem to ignore problems with the sufficiency of supervenience for physicalism. We shall follow this practice, because our ultimate concern is the comparative merits of the supervenience and grounding relations rather than the characterisation of physicalism.

<sup>2</sup> See Steinberg (2013) for a detailed survey of the various existing notions of supervenience and their logical relations.

<sup>3</sup> As it stands, our characterisation of non-reductive physicalism makes it metaphysically necessary if true. If one preferred a characterisation that allows non-reductive physicalism to be contingent, one could restrict the universal quantifiers over mental properties to mental properties that are actually instantiated. This would yield the contingency of non-reductive physicalism on the assumption that (i) some mental properties are not actually instantiated and (ii) some of those mental properties fail to supervene on physical properties in some worlds where they are instantiated. Similarly for our formulation of Grounding Physicalism below.

trend in contemporary metaphysics of tackling problems by using notions of relative fundamentality or grounding.<sup>4</sup>

The idea that the physical is more fundamental than the mental can be expressed by saying that the physical *grounds* the mental. Over the last decade or so, the notion of grounding has been the subject of an increasing amount of research in metaphysics. Since there are already various introductions<sup>5</sup> and more advanced treatments of the notion,<sup>6</sup> our exposition will be brief. We shall not attempt to dispel scepticism about the notion of grounding.<sup>7</sup> However, to the extent that fruitful applications provide evidence for a concept's integrity, the present paper can be seen as a contribution to a defence of grounding.

Grounding claims are about objective relations of metaphysical priority. There are various locutions which can be used to express, or at least partially to illuminate, this notion. We shall focus on the connective 'because'. Other locutions are 'in virtue of', 'makes it the case', 'explains' and, in a more limited range of cases, 'by'.

Here are some prominent examples of grounding claims:

- (1) The sentence 'Snow is white' means that snow is white because it is used in such-and-such a way.
- (2) That snow is white is true because snow is white.
- (3) The set of the natural numbers exists because the natural numbers exist.

The first claim is an instance of the idea that facts about meaning are grounded in facts about use. The second claim is an instance of the traditional view that truth is grounded in being. The third claim is an instance of the idea that the existence of (impure) sets is not fundamental: sets exist because their members do.

A few more preliminary remarks about grounding are in order. One difficulty in characterising grounding in terms of 'because' is that this locution can also be used to express other relations of priority, most notably causal ones. For this reason, we stipulate that, throughout this paper, 'because' is to be read in a metaphysical sense, not a causal one. Another complication is that 'because' is a two-place sentential connective while 'grounds' is a relational predicate whose relata are standardly taken to be facts. As was already implicit in our explanation of claims (1)–(3), we take 'because'-statements and 'grounds'-statements to be interchangeable for the purposes of this paper. Thus, we assume that ' $p$  because  $q$ ' is equivalent to 'The fact that  $q$  grounds the fact that  $p$ '. Lastly, it is standardly assumed that the grounding relation is factive, asymmetric and transitive.<sup>8</sup> We shall follow this assumption, but, as far as we can see, our main point would not be affected if transitivity did not hold universally.

<sup>4</sup> In the context of the philosophy of mind, see, for example, the recent paper by Barnes (2012). Wilson (2014) holds that non-modal relations of relative fundamentality have taken centre stage for non-reductive physicalists for quite some time, albeit in the form of relations more specific than grounding, such as the realizer-realizee relation or the determinate-determinable relation.

<sup>5</sup> For instance, Fine (2012a), Correia and Schnieder (2012), and Trogdon (2013a).

<sup>6</sup> See, for example, Audi (2012a, b), Fine (2001), Rosen (2010), and Schaffer (2009).

<sup>7</sup> Defending the notion of grounding is the main focus of Audi (2012a, b), Raven (2012), and Rosen (2010). For scepticism about grounding, see Daly (2012), Hofweber (2009), and Wilson (2014).

<sup>8</sup> For more on the logic of grounding and related notions, see Fine (2012b), Rosen (2010), and Schnieder (2011).

Views about the nature of mind are often formulated in terms of mental and physical properties and their instances. The problem of mental causation, like causal claims in general, is typically formulated in terms of events. In order to bridge this gap, we shall assume that events *are* instances of properties at a certain time (and with respect to a certain place and subject, if applicable).<sup>9</sup> While this view, which is due to Jaegwon Kim (1966), is not entirely uncontroversial, we take its advantages, inasmuch as it allows for an easy transition between claims about the nature of mind and causal claims, to outweigh any problems.<sup>10</sup> Still, there remains the problem of squaring causal claims, which are formulated in terms of property instances, with grounding claims, which are formulated in terms of facts. For our purposes, we allow property instances to enter the grounding relation too.<sup>11</sup> The extension to property instances may be achieved by associating a property instance, consisting of an instantiating object  $x$  and an instantiated property  $F$ , with the fact that  $x$  instantiates  $F$ . Should this turn out to be problematic—owing to divergence that might occur between the criteria of identity for events and property instances, on the one hand, and facts, on the other—we would need to go back to the original ‘because’-statements on which the respective claims are based. But with this simplification in place, we can ignore a number of complications that do not affect the core of our argument.

Following common practice, we call a fact *fundamental* if it is not grounded by any other fact. A fact which has a ground is called *derivative*. Grounds can be *partial* or *complete*. A partial ground can be defined as a part of some conditions which jointly constitute a complete ground. It is a standard assumption that a complete ground necessitates what it grounds.<sup>12</sup> So, if ‘ $p$  because  $q$ ’ is true and ‘ $q$ ’ specifies a complete ground, then ‘ $q$ ’ strictly implies ‘ $p$ ’. In what follows, a ground will always be taken to be a complete ground.

With the notion of grounding in place, we can now define our preferred version of non-reductive physicalism, which we call ‘Grounding Physicalism’:

*Grounding Physicalism.* Necessarily, all instances of mental properties are grounded in instances of physical properties.<sup>13</sup>

<sup>9</sup> Alternatively, one could take facts to be the relata of causation, as Mellor (1995) does, or allow for grounding between events.

<sup>10</sup> Those readers who prefer a different account of events, but acknowledge that there can also be causal relations between property instances, may interpret the remainder of the paper as discussing causal relations between property instances.

<sup>11</sup> Compare Schaffer (2009), who allows entities that belong to different ontological categories to enter the grounding relation.

<sup>12</sup> For a dissenting view, see Skiles (forthcoming); see also Leuenberger (2014a, b). See Trogon (2013b) for a defence of the standard view.

<sup>13</sup> Yablo (1992) holds that the psychophysical relation is that between determinables and determinates. If the relation between determinables and determinates is an instance of the grounding relation (as Rosen 2010 argues), Yablo counts as an adherent of Grounding Physicalism. Grounding Physicalism need not assume that the psychophysical relation is that between determinables and determinates, however, so it is not touched by objections, such as those of Funkhouser (2006), to Yablo’s specific account. Similar remarks would apply to Shoemaker’s (2007) conception of physical realization to the extent that it can be taken to be a species of the grounding relation. Since Grounding Physicalism as we have formulated it is not a physicalist thesis about everything, the question of whether and how the grounding facts themselves are grounded need not concern us here, but see Sider (2011) and Dasgupta (2014) for discussion.

Grounding Physicalists might claim, for instance, that

- (4) Jane’s headache at noon is grounded in such-and-such a neural activity in Jane’s brain at noon.

If we wish to express the grounding relation by the connective ‘because’, we get:

- (5) Jane has a headache at noon because there is such-and-such a neural activity in Jane’s brain at noon.

As was explained above, we treat claims like (4) and (5) as interchangeable.

We would like to highlight that Grounding Physicalism asserts the necessity of a grounding relation between the mental and the physical and not merely its actuality. This might seem redundant given our assumption that grounds necessitate what they ground. However, that a physical event  $p$  grounds a mental event  $m$  only implies that, necessarily, whenever  $p$  occurs,  $m$  occurs. This alone would leave it open whether  $m$  is grounded in any physical event at some worlds at which  $p$  does not occur. Requiring the necessity of the grounding claim rules this possibility out.

Bearing these considerations in mind, Grounding Physicalism is easily seen to entail the two conditions Non-Reduction and Supervenience. By the asymmetry constraint on grounding, each mental property instance is distinct from the physical property instance that grounds it.<sup>14</sup> By the claim that grounding yields metaphysical necessity between the grounding fact and the grounded fact combined with the necessity of the grounding claim itself we get that, necessarily, a physical property is instantiated whenever a mental property is instantiated, and that, necessarily, whenever one of the grounding properties of a mental property is instantiated, that mental property is instantiated.

We need not assume that, besides grounding mental facts, physical facts are fundamental. But in order to avoid unnecessary complications, we shall make this assumption, which enjoys a lot of initial plausibility.

### 3 Grounding causation

The main idea behind the notion of grounding is that a grounded layer of reality behaves the way it does because its grounds behave in a certain way. Thus, entities in a non-fundamental realm of reality have (most of) their properties because of certain more fundamental facts outside that realm.<sup>15</sup> Applied to the case at hand, the idea would be that mental events have (most of) the properties they have because of certain

<sup>14</sup> Strictly speaking, this leaves open the possibility that a given mental property instance is identical to a physical property instance distinct from any of the physical property instances that ground it. This possibility seems implausible to us, but should it turn out to be a live option after all, we could always fall back on characterising Grounding Physicalism *inter alia* by Non-Reduction. Further, the inference from a difference of the property instances to a difference of the corresponding properties (in terms of which Non-Reductionism is characterised) requires that the property instances be different because of their property component and not only because of a difference in the instantiating objects. Again, we take the latter possibility to be implausible.

<sup>15</sup> The parenthetical qualification is needed because certain highly unspecific properties such as being self-identical may be possessed by grounded entities independently of their grounds.

more fundamental physical facts. This idea can be made more specific by further delineating the kind of physical facts which ground the mental events' having such-and-such properties. A natural conjecture would be that the relevant physical facts are facts about the physical events which ground the corresponding mental events. There are alternatives to this conjecture, but in our view it is the best principled answer to the question of what the relevant physical facts are. With respect to causal properties—that is, the properties of causing or being caused by such-and-such events—we get that mental events have their causal properties because the physical events that ground them have those causal properties. Focusing on the *effects* of mental events, we can formulate the following principle:

*Causal Grounding.* Let  $m$  be a mental event, and let  $e$  be a physical effect of  $m$ . Then there is a physical event  $p$  such that  $p$  grounds  $m$  and  $m$  causes  $e$  because  $p$  causes  $e$ .

The principle expresses the idea that causation between physical events is more fundamental than causation of physical events by mental events<sup>16</sup> and that mental events that have physical effects inherit the corresponding causal properties from their physical grounds. Thus, mental causation turns out to be a non-fundamental phenomenon.<sup>17</sup>

The principle Causal Grounding does not imply that some or even all specific causal properties of physical events are passed on to the mental events that are grounded by those physical events. The principle merely says that *if* a mental event possesses properties of causing such-and-such physical events, then they are due to a physical event that grounds the mental event. Now, one could consider stronger hypotheses which would force some causal properties of physical events to be inherited. A bold conjecture would be that all causal properties of a physical event are passed on to the grounded mental event. But this is probably too risky a bet, since the grounding events may well pass on only some but not all of their causal properties. Taking this possibility into account, one might still claim that at least some causal properties are inherited by the grounded mental event. This weaker idea seems more promising, but it would still be false if some mental events were epiphenomenal in the sense of not having any physical effects. Since we should leave this possibility open, it is a virtue of Causal Grounding that it makes no commitments to the effect that causal properties are passed on from physical events to the mental events they ground.

It should also be pointed out that Causal Grounding merely makes an existence claim. Under the specified assumptions, it states that *there is* a physical event grounding the mental event such that the mental event's having a certain physical effect is

<sup>16</sup> Since Russell (1912), the claim that there is (fundamental) causation in the physical realm has not been entirely uncontroversial. For a recent discussion, see Hitchcock (2007).

<sup>17</sup> Ney (unpublished-a, unpublished-b) applies Fine's (2001) framework of ground and factuality to causation in general and to mental causation in particular, arguing that derivative causal claims, including claims about mental causation, may either be real or unreal depending on whether they tightly correspond to a fundamental physical process or additionally invoke facts about counterfactual dependence. Given that for Ney unreal causal facts are grounded in more than physical processes, she might not be inclined to endorse a principle akin to Causal Grounding, though it is clear that she is sympathetic to its overall spirit. Kim (2005, p. 20), on the other hand, endorses a principle similar to, but significantly stronger than, Causal Grounding that is formulated in terms of supervenience rather than grounding.

grounded in the physical event's having that effect. First of all, note that the principle is compatible with a mental event's having more than one physical ground. The physical realm may itself be further structured by the grounding relation, such that some physical facts ground other physical facts. For instance, facts about elementary particles might ground facts about macroscopic physical objects. Moreover, it is in principle conceivable that a mental event could have more than one physical ground even at the most fundamental physical level, especially in cases where the grounding physical events partly overlap. If these possibilities are real, it makes a difference whether we assume that there is a physical event with the desired feature or whether we assume that *all* physical grounds of the mental event have the desired feature. As put forward here, we are committed only to the weaker existence claim (when we occasionally speak casually about *the* physical ground of a mental event, we are not assuming uniqueness). On this weaker construal, Causal Grounding does not imply that all physical effects of a given mental event  $m$  are effects of a single physical event which grounds  $m$ . In principle, these effects could be effects of various different physical events which all ground  $m$ .<sup>18,19</sup>

An immediate consequence of the Causal Grounding principle is the following claim:

*Double Causation.* Let  $m$  be a mental event, and let  $e$  be a physical effect of  $m$ . Then there is a physical event  $p$  that grounds  $m$  and causes  $e$ .

This claim follows from Causal Grounding by the factivity of 'because': if  $m$  causes  $e$  because  $p$  causes  $e$ , then  $p$  causes  $e$ .<sup>20</sup> Thus, Causal Grounding, via Double Causation, makes for a proliferation of causal relations given that there is causation of physical events by mental events. Physical effects of mental events always have two simultaneous causes, for we may assume that grounding physical events occur simultaneously with the grounded mental events.

<sup>18</sup> This flexibility could help to dispel worries that Causal Grounding might be in tension with Yablo's proportionality constraint (1992, pp. 277–279).

<sup>19</sup> One could also consider further weakenings of the principle (for one suggestion see the following footnote), which might disentangle the physical event which grounds the mental event from the physical event which causes the physical effect of the mental event. But we decided to work with a principle which stays closest, in our eyes, to the idea that the causal properties of mental events are passed on to them via the grounding relation.

<sup>20</sup> It would suffice for our purposes in the following sections to endorse, instead of Causal Grounding, the following weaker, but somewhat less intuitive, principle:

*Weak Causal Grounding.* Let  $m$  be a mental event that is grounded by physical event  $p$ . Let  $e$  be a physical effect of  $m$ , and let  $p$  cause  $e$ . Then  $m$  causes  $e$  because  $p$  causes  $e$ .

Unlike Causal Grounding, Weak Causal Grounding does not entail Double Causation, so anyone who is sceptical about Double Causation but sympathetic to the general idea that the causal properties of mental events are grounded could still accept the solution to the overdetermination problem that we shall present.

## 4 The exclusion problem

The *exclusion problem* (also known as the *overdetermination problem*) can be presented as a set of five inconsistent assumptions.<sup>21</sup> The first assumption is simply a version of the non-reductivist position:

(A1) All mental events are distinct from physical events.

The second assumption,

(A2) Some mental events are causes of physical events,

states that there is mental causation of physical events. Although non-reductivists who endorse epiphenomenalism deny this, we shall not take issue with it, as we consider it an advantage of a non-reductivist position if it can take what look *prima facie* like ascriptions of mental causation at face value. The third assumption,

(A3) All physical events which have a cause have a physical cause that is simultaneous with that cause,

expresses the idea the physical world is causally *complete* or *closed*. Although this is a substantial metaphysical assumption, it seems strongly supported by the natural sciences. We see no reason to doubt it.

The final two assumptions are the ones which are most likely to be contested by non-reductivists. The penultimate assumption states a sufficient condition for overdetermination:

(A4) Any event with two simultaneous causes is overdetermined.

On the face of it, this principle seems plausible and might even be taken to partially define overdetermination. Yet there will be more to say about it. The last assumption is an instance of the idea that no part of the physical world is systematically overdetermined:

(A5) Not all physical effects of mental events are overdetermined.

This assumption is clearly in need of justification, but derives its initial plausibility from the observation that cases of overdetermination do not seem to abound in other areas of the physical world, which strongly suggests that they do not abound where there is mental causation either.

There is a minor defect in the statement of the exclusion problem in terms of (A1)–(A5). As it stands, (A5) implies (A2), for if there were no physical effects of mental events, then the embedded universal quantification ‘all physical effects of mental events are overdetermined’ would be vacuously true, and so (A5) would be false. In order to remove this interdependence, we could weaken (A5) appropriately, for instance, by conditionalizing on (A2):

(A5′) If some mental events are causes of physical events, then some such physical effects are not overdetermined.

<sup>21</sup> For an overview of the recent debate about the overdetermination problem, see [Bennett \(2007\)](#).



As was indicated above, the last two assumptions [i.e., (A4) and (A5)/(A5')] seem to be the only viable culprits for non-reductivists. In the following section, we shall have a closer look at possible conceptions of overdetermination. It will turn out that there are two sensible ways in which overdetermination can be defined. On the first one, (A5) and (A5') are acceptable, but (A4) turns out to be false. On the second one, it follows that mental causation involves overdetermination, but (A5) and (A5') can plausibly be denied. Thus, on either definition, Grounding Physicalism has a satisfying response to the exclusion problem.

## 5 Overdetermination and independence

In order to address the exclusion problem, we must clarify the concept of overdetermination that is in play. Overdetermination is standardly introduced by way of paradigm cases such as the following: two members of a firing squad simultaneously fire at their victim; the two bullets simultaneously penetrate the victim's heart; and the victim dies. In this case, (a) the overdetermining events (i.e., the two firings) are distinct; (b) each of the overdetermining events causes the overdetermined event (the victim's death); (c) the overdetermining events are simultaneous; (d) the overdetermining events are *causally independent* of each other, where we define two events as causally independent just in case neither event causes the other (although they may have a common cause, such as an officer's command);<sup>22</sup> and (e) the overdetermining events are *metaphysically independent* of each other, where we define two events as metaphysically independent just in case neither event grounds the other.

Which of the features (a)–(e) should be taken to be definitional features of overdetermination? On the face of it, it might seem that overdetermination just is causation by two distinct causes, so that (a) and (b) together are necessary and sufficient for overdetermination. This would, however, have the consequence that too many events are overdetermined. For most events have causes which themselves have causes. Even if causation is not generally transitive, there are many cases where an event  $c_1$  causes a later event  $c_2$ ,  $c_2$  causes a later event  $e$ , and  $c_1$  also causes  $e$ . It seems that such cases should not all count as cases of overdetermination.<sup>23</sup>

Cases of the kind just described would no longer qualify as cases of overdetermination if, instead of (a) and (b), we took (a)–(c) to be individually necessary and jointly sufficient for overdetermination, for in the example just discussed,  $c_1$  and  $c_2$  were assumed not to be simultaneous. There are, however, cases where the simultaneity requirement is violated which nonetheless seem to qualify as cases of overdetermination. Suppose that two groups of kids are playing football. At two different points in time a kid of each group happens to kick the ball in the direction of a window. The two balls reach the window at the same time and smash it. This seems to be a case of overdetermination, but the two causes—the two kickings of the ball—are not

<sup>22</sup> Sometimes the causal independence of two events  $a$  and  $b$  is defined as follows:  $a$  does not cause  $b$ ;  $b$  does not cause  $a$ ; and  $a$  and  $b$  do not have a common cause. Friends of this definition could re-label the notion we have defined as, say, 'conditional causal independence', which would yield an analogy to the distinction between statistical independence and conditional statistical independence.

<sup>23</sup> Carey (2011, p. 255) makes a similar point.

simultaneous. They are, however, causally and metaphysically independent of each other.

We therefore suggest identifying overdetermination with what we shall call ‘strong overdetermination’, to be defined as follows (the point of the attribute ‘strong’ will become clear below):

Events  $c_1$  and  $c_2$  *strongly overdetermine* event  $e$  if and only if

- (i)  $c_1$  and  $c_2$  are distinct;
- (ii)  $c_1$  and  $c_2$  each cause  $e$ ;
- (iii)  $c_1$  and  $c_2$  are causally independent; and
- (iv)  $c_1$  and  $c_2$  are metaphysically independent.<sup>24</sup>

Before returning to the exclusion problem, we would like to show how our definition applies to two further cases. First, take a variation of the football example where the kicking of the first ball causes the kicking of the second ball (perhaps because the second kid sees that the first ball is going to smash the window and wants to emulate the first kid’s mischief). Are we still dealing with a case of overdetermination? This seems *prima facie* unclear. Our definition can account for this unclarity nicely. On the one hand, the definition delivers the verdict that the window’s being smashed is not overdetermined by the two kickings, as they no longer satisfy condition (iii). On the other hand, it also delivers the verdict that the window’s being smashed is overdetermined by a different pair of events. Just take the event of the first ball’s having such-and-such a momentum sometime after the second ball was kicked. This event and the second kicking are causally independent. Both events also satisfy (i) and (ii); hence they overdetermine the window’s being smashed.<sup>25</sup> So the answer to the question ‘Is the window’s being smashed overdetermined?’ is ‘Yes and no, depending on the candidate overdetermining events’, which explains why we might initially find it unclear how to answer the question.<sup>26</sup>

A second case involves backward causation. Suppose that events  $c_1$  and  $c_2$  are distinct and simultaneous, and that both  $c_1$  and  $c_2$  cause a later event  $e$ . Suppose further that  $c_1$  causes an earlier event  $i$ , which in turn causes  $c_2$ , and that we are dealing with an instance where causation is transitive, so that  $c_1$  causes  $c_2$  (via  $i$ ). Like in the modified football example, it seems *prima facie* unclear whether we are

<sup>24</sup> Let us point out that what we define here is a notion of *event* overdetermination. Sider (2003) also allows entities belonging to other ontological categories, such as physical objects and facts, to enter the relation of causation. Our definition is not meant to cover this. If one were to broaden it, one might have to revisit our definition of metaphysical dependence in terms of grounding, for it could then be the case that both the *event* of a given object  $a$ ’s being  $F$  and the *fact* that  $a$  is  $F$  have a common effect without the event’s grounding the fact or *vice versa* (they may have a common ground, though). On the assumption that the event and the corresponding fact are distinct, one would not want to count such a case as a case of overdetermination.

<sup>25</sup> Bennett (2008, p. 289, n. 13) discusses a similar case (albeit in a different context) and commits herself to the possibility of cases of overdetermination where the overdetermining events have a common cause.

<sup>26</sup> The answer to the question would be unambiguously positive if, instead of the three-place predicate ‘ $c_1$  and  $c_2$  (strongly) overdetermine  $e$ ’, one explicitly used the one-place predicate ‘ $e$  is (strongly) overdetermined’ and defined the latter to be satisfied if and only if there are events  $c_1$  and  $c_2$  such that  $c_1$  and  $c_2$  (strongly) overdetermine  $e$ . The scope of the existential quantifier in the truth-conditions of this one-place predicate is likely to be subject to contextual restrictions, however, a detailed discussion of which would go beyond the scope of this paper.

dealing with a case of overdetermination. That  $c_1$  and  $c_2$  overdetermine  $e$  seems even less plausible than that the two kickings overdetermine the window's being smashed in the modified football example. Our definition accords with this, for  $c_1$  and  $c_2$  fail to satisfy (iii). But again, the definition at least leaves it open that  $e$  is overdetermined by a different pair of events. If there is a causal intermediary  $j$  that occurs later than  $c_1$  and that causes  $e$ , but does not cause  $c_2$ ,  $e$  counts as overdetermined by  $j$  and  $c_2$ . Whether backward causation happens in the actual world is of course a highly contentious issue. But our definition of overdetermination should also be applicable to merely possible cases. The example shows that it delivers plausible verdicts even in those cases.

If we identify overdetermination with strong overdetermination, the physical effect of a mental event does not count as overdetermined by its mental cause and the physical ground of this mental cause. By the Double Causation principle from Sect. 3, the physical ground is a cause of the physical effect as well. And since the grounding relation is synchronic, the mental cause and its physical ground are simultaneous. But since the mental cause and its physical ground are not metaphysically independent, they fail to satisfy condition (iv) of the definition of strong overdetermination. Thus, we can solve the exclusion problem by denying assumption (A4), according to which any event with two simultaneous causes is overdetermined.

Identifying overdetermination with strong overdetermination seems plausible, since the condition of metaphysical independence captures one feature of paradigmatic cases of overdetermination, such as the firing squad, through which overdetermination is standardly introduced. But of course not all the features of such cases should be taken to be definitional. No one would suggest that overdetermination has to involve firearms, for example. Within limits, at least, it is a matter of stipulation what we should understand by overdetermination. None of the cases we have discussed rules out the following weaker definition of overdetermination:

Events  $c_1$  and  $c_2$  *weakly overdetermine* event  $e$  if and only if

- (i)  $c_1$  and  $c_2$  are distinct;
- (ii)  $c_1$  and  $c_2$  each cause  $e$ ; and
- (iii)  $c_1$  and  $c_2$  are causally independent.

Obviously, strong overdetermination implies weak overdetermination. Cases of grounded mental causation show that weak overdetermination does not imply strong overdetermination, however.

Suppose that we identify overdetermination with weak overdetermination instead of strong overdetermination. In this case, one could still try to argue that assumption (A4) of the exclusion problem is false. The crucial question is whether there actually are cases where two simultaneous causes of an event are not causally independent. Perhaps there are such cases, if there are transitive instances of backward causation like in the case described above. Or perhaps there is causation between two simultaneous causes of another event in the quantum world.<sup>27</sup> In any event, denying (A4) would not solve the problem, for it still follows from the definition of weak overdetermination that the physical effects of mental causes are overdetermined. By the asymmetry of the

<sup>27</sup> On causation and simultaneity in quantum mechanics, see [Fenton-Glynn and Kroedel \(2015\)](#).

grounding relation, its relata are distinct. Since the grounding relation is non-causal, its relata are causally independent. By the Double Causation principle, the physical effect of a mental cause is also caused by the physical ground of this mental cause. Thus, conditions (i)–(iii) are satisfied; hence the mental event and its physical ground (weakly) overdetermine the physical effect. But assumptions (A5)/(A5') say that this not the case.

If we identify overdetermination with weak overdetermination, however, it becomes hard to object to the claim that mental causation involves overdetermination. In other words, assumptions (A5)/(A5') can coherently be denied. For widespread overdetermination of the physical effects of mental causes can now be explained on the basis of a general principle governing the causal properties of grounded events. By the Causal Grounding principle, causation at the non-fundamental mental level is grounded in causation on the fundamental physical level, so the non-fundamental mental causes generate cases of weak overdetermination. Thus, Grounding Physicalism can give a principled explanation of why the physical effects of mental events are weakly overdetermined. In particular, Grounding Physicalism can dispel the worry that the overdetermination of the physical effects of mental causes is a surprising coincidence.<sup>28</sup>

One might try to defend (A5)/(A5') on the basis of the claim that weak overdetermination does not abound in the physical world outside of the realm of possible causal effects of the mental. It is far from clear, however, that weak overdetermination is rare outside the realm of mental causation, for cases where grounded entities as well as their grounds stand in causal relations may be very common.<sup>29</sup> Events like someone's falling into a hole, someone's telling someone else to leave, or an army's attack all seem to be causally efficacious. Yet they are non-fundamental because they either involve non-fundamental objects like holes or armies, or else involve a non-fundamental property such as telling someone to leave.<sup>30</sup> If we identify overdetermination with strong overdetermination, the claim that overdetermination is rare might be plausible; not so for weak overdetermination.

A similar response to the exclusion problem to the one we have suggested is available to non-reductive physicalists who do not endorse Grounding Physicalism. These non-reductive physicalists too can claim that, owing to the supervenience of mental events on physical events, the relation between a mental cause and its simultaneous

<sup>28</sup> On a similar issue, see Sider (2003).

<sup>29</sup> In a similar vein, Block (2003) worries that the argument from overdetermination might overgeneralize. Sider (2003) argues that a certain kind of overdetermination—which, in our terminology, qualifies as weak overdetermination—is common and acceptable. See also Carey (2011, p. 256).

<sup>30</sup> Admittedly, our claim that weak overdetermination is prevalent rests on cases involving causal relationships between events involving macroscopic composites such as armies or persons. Hence, it will not have much force against proponents of the view that such objects do not exist. As a matter of fact, Merricks (2001) uses precisely a variant of the exclusion argument to bolster this kind of eliminativism (somewhat curiously, though, he allows for the existence of one kind of macroscopic objects, namely persons). We contend, however, that the existence of macroscopic objects is *prima facie* the more plausible view as it does justice to more of our pretheoretic assumptions. As a result, we do not think that presupposing the existence of macroscopic objects constitutes a *petitio principii*. For a critical discussion of Merricks's generalization of the exclusion argument, see Sider (2003).

physical cause is much more intimate than in paradigmatic cases of overdetermination, so that either mental causation should not be taken to involve overdetermination or overdetermination should be accepted as harmless. A proponent of Grounding Physicalism can make a stronger case than a proponent of generic non-reductive physicalism, however.

First, the grounding of mental events by physical events entails the strong supervenience of mental events on physical events, but not vice versa.<sup>31</sup> Thus, the relation between mental events and physical events is more intimate on a Grounding Physicalist picture than on a generic non-reductive physicalist picture.<sup>32</sup> Consequently, cases involving both mental and physical causes are even less similar to paradigmatic cases of overdetermination on the Grounding Physicalist picture than on a generic non-reductive physicalist picture.

Second, while a generic non-reductive physicalist can merely point to the metaphysically necessary connection between the mental and physical *events* that simultaneously cause a physical event, Grounding Physicalists can point out that there is an intimate connection between the causal *relations* as well. Let physical event *e* be caused by mental event *m*. By the Causal Grounding principle, it follows that *m* causes *e* because a physical event *p*, which grounds *m*, causes *e*. Granted, a generic non-reductive physicalist could claim that, on her view, the causal relation between *m* and *e* at least supervenes on the causal relation between *p* and *m*. But the Grounding Physicalist position is still superior. Just as the grounding relation between *p* and *m* is more intimate than a mere supervenience relation, the grounding relation between *p*'s causing *e* and *m*'s causing *e* is more intimate than a mere supervenience relation; hence cases of mental causation are again even less similar to paradigmatic cases of overdetermination than generic non-reductive physicalism would have it.

In summary, there are two sensible notions of overdetermination, a weak one and a strong one. According to the strong notion, which requires metaphysical as well as causal independence of the overdetermining events, mental causation does not involve overdetermination. According to the weak notion, which merely requires causal independence, mental causation does involve overdetermination, but this consequence is unproblematic. Whichever notion of overdetermination a proponent of Grounding Physicalism endorses, she has a good response to the exclusion problem.

## 6 Conclusion

In this paper, we have developed the view that mental events are grounded in physical events. Mental causation itself has also turned out to be grounded, namely in corresponding instances of physical causation. We have shown that the present view has a viable response to the exclusion argument, because causation by two metaphysically dependent causes is unproblematic.

<sup>31</sup> For instance, properties that are necessarily instantiated by everything, such as being self-identical, supervene on, but are not grounded in, any other property. For further discussion, see [Steinberg \(2013\)](#).

<sup>32</sup> Indeed, Fine (2001, p. 15) holds that grounding is *the* most intimate (“the tightest”) explanatory relation.

Our view can be generalized beyond mental causation. In principle, any domain whose members are grounded in physical events and have a prima facie claim to have physical effects is amenable to the same treatment as physically grounded mental events. Events involving macroscopic objects and events involving evaluative properties are candidates for such a generalization. Our concern in this paper has been with mental causation, but we believe that investigating grounded causes in other domains in detail is a promising research programme.

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