GROUNDING THE MENTAL: AN EVALUATION OF COMPATIBILIST REPLIES TO THE EXCLUSION ARGUMENT

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ABSTRACT

Assuming that there are different levels of reality (e.g., the mental and the physical) how are those levels related to each other if not causally? This thesis is devoted to an investigation of this question in relation to a specific metaphysical notion, *grounding*. In particular, I use accounts which, as a response to the objections about overdetermination, analyze inter-level causation in terms of a synchronic non-causal component and a diachronic causal component to argue for a levels of reality view. Moreover, I argue that the non-causal component can understood best from the perspective of Grounding Physicalism.

Keywords: grounding, mental causation, exclusion, overdetermination, non-reductive physicalism, fundamentality

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Introduction

Assuming that there are different levels of reality (e.g., the mental and the physical) how are those levels related to each other if not causally? This thesis is devoted to an investigation of this question in relation to a specific metaphysical notion, *grounding*. In particular, I use accounts which, as a response to the objections about overdetermination, analyze inter-level causation in terms of a non-causal component and a causal component to argue for a levels of reality view.

In order to make something more conceivable, we often try to give an explanation of it in terms of the things we already understand better. This intuitive method makes it possible for us to have a more unified understanding of what there is to understand. For instance, physicists have been searching for a so-called theory of everything which will supposedly explain all the different natural forces comprehensively. On the other hand, the phenomena we come across in the world are of many different kinds. While some things seem to be essentially explained on the basis of the data we get through our senses, other things give an impression that they cannot be exhaustively captured by such explanations. Various versions of physical phenomena are of the former kind while what we call mental phenomena seem, at least initially, to be of the latter kind. Besides the variety between physical and mental phenomena, there are further diversities within those groups of phenomena as well. For instance, though describing events happening inside a cell as physical phenomena has an initial plausibility, they seem very difficult from some other physical phenomena, like the ones happening within an atom. The diversity between and within those kinds of phenomena seems to be resisting unification attempts.

One way to overcome this resistance is to use a hierarchical understanding of the diverse phenomena. We can figuratively regard the kinds of phenomena about which we have been talking as being divided into levels. So, mental phenomena reside on the mental level while physical phenomena reside on the physical level. We can divide the physical level into further levels like the chemical level, the biochemical level, the biological level etc.

This way of understanding has the advantage of capturing a wide variety of entities through a somewhat unified picture. For instance, according to David Blitz's interpretation (2013, p. 126), defenders of emergent evolution (i.e., the view that some completely new kind of entities emerged throughout the course of evolution) had such a perspective in the first half of 20th century. Though there were differences among their accounts as to what those specific levels are, they shared a common hierarchical understanding of what there is in the world.

Similarly, in an attempt to propose a hypothesis in favor of unification of sciences, Oppenheim and Putnam (1958) proposed another ontological and scientific perspective according to which there are entities hierarchically organized as sets corresponding to different scientific disciplines. So, they proposed a correspondence between the ontological and scientific columns. According to this model, each column have six levels corresponding to a level in the other column. The levels of the ontological column are societies, organisms, cells, molecules, atoms, sub-atomic particles while the levels of the science column ae Economics, Psychology, Cytology, Chemistry, Physics, Quantum Mechanics. For instance, Quantum Mechanics was at the bottom level in the scientific column and it corresponded to the ontological level containing elementary particles. Furthermore, they extended this correspondence to theories within those sciences and formed a "layer-cake model" of ontology, sciences, and theories.

Another influential account which used the level metaphor was proposed by Wimsatt (1976). In this account, as opposed to Oppenheim and Putnam's six-layered cake, a tree model in which higher levels branch from bottom ones is used. This tree model allowed them to propose a more complex structure of sciences and ontology since it was possible to branch more than one levels from the lowest level.

Once one admits that there are different levels of reality, a question regarding the relation between those different levels arises: are they dependent on each other? Oppenheim and Putnam (1958, p. 6) took every level to be dependent on the level beneath that one. This made it possible for them to keep a reductive materialist position (i.e., the view according to which all facts are reducible to physical facts without remainder) together with the levels of reality view. In a similar vein, entities on higher levels are made up of those at lower levels in Wimsatt's (1976) account. It would not be false to say that, whether or not their accounts are reductive, the dependency perspective is widely assumed among defenders of the levels of reality view (Rueger & McGivern, 2010, p. 379). It seems intuitive to accept that inhabitants of the physical level, whatever they are, determine the inhabitants of the levels above the physical one. Given this bottom up determination, making sense of cases which seemingly involve top-down determination is challenging. This challenge will require a detailed investigation of the notion of dependence.

Though the two influential models mentioned above propose a correspondence between ontological levels and distinct sciences, the correspondence between them is not always clear. As Craver (2015, pp. 6–7) rightly points out, many sciences are multilevel (i.e., they contain entities from different levels). Therefore, the dependence between ontological levels is only roughly and

indirectly related to the dependence between different sciences. My main focus here will be the former dependence.

Ontological dependence has been a hot topic in analytic philosophy for the last two decades. Jonathan Schaffer, one of the prominent figures in that debate, provides us with a good ontological template to make sense of the level metaphor. Schaffer (2009a) distinguishes two different ways of doing metaphysics: Quinean metaphysics, which has dominated analytic philosophy for a long time, and Aristotelian metaphysics. The basic task of Quinean metaphysics is to state what exists in the world. This is to say, to list the beings in the world, which form the domain of quantification. This is done by extracting existence commitments from the best theory we have (i.e., science) and translate them into the language of logic. Schaffer (2009a, pp. 347–349) appreciates the role of Quinean metaphysics in reviving metaphysic after the logical positivist attack on it. Yet, he thinks that it is not well suited for important metaphysical tasks which can be better handled by another way of doing metaphysics, namely Aristotelian metaphysics.

The basic task of Aristotelian metaphysics according to Schaffer is not to state what exists but to state what grounds what (or what depends on what). This task is done by identifying the fundamental entities in the world and diagnosing the dependence relations between these fundamental entities and other (i.e., derivative, non-fundamental) entities. By focusing on the dependence relation between the fundamental and derivative entities, Aristotelian metaphysics commits to a "hierarchical view of reality ordered by priority in nature" (Schaffer, 2009a, p. 351). While Quinean metaphysics is *flat* (i.e., works on "an unstructured list of existents" (Schaffer, 2009a, p. 354)) Aristotelian metaphysics is *ordered* (i.e., works on a hierarchy ordered by priority/dependence relations).

Schaffer favors ordered ontology over a flat one by providing three claims. Firstly, the basic question posed by Quinean metaphysics is not significant. That is, existence questions are trivial. Whether numbers, fictional entities, or minds exist is not a significant topic. They obviously exist. What matters is whether they are fundamental or derivative. Hence comes the second claim: Aristotelian metaphysics questions are interesting. For instance, Schaffer (2009a, p. 362) claims, in most of the prominent metaphysical discussions (e.g., metaphysical realism vs idealism, realism about numbers vs constructivism, realism about universals vs nominalism, bundle theories of object vs substratum, dualistic vs materialistic theories of the mind) one will find that existence questions are often dismissed but fundamentality questions take the central stage. Third, he claims that Quinean metaphysics already supposes Aristotelian metaphysics. Identifying the best theory we have, then translating it to the language of logic, and diagnosing the domain of quantification which will render that translation as true are steps which, Schaffer claims, presuppose dependence relations between those steps.

Besides the above reasons, there is one further motivation for choosing an Aristotelian metaphysics over a Quinean one. As we have already seen, to have a unified, comprehensive sense of the sciences and what there is in the world, hierarchical accounts promise a good way to understand the reality. Both in scientific and metaphysical debates, instead of asking trivial existence questions, discussing how the levels are related to each other will produce a more fruitful debate. Now, supposing those levels exist, the notorious mind-body problem construed here as a problem for physicalism turns into a fundamentality problem as well. For the last three decades, non-reductive physicalists argued that the basic entities in the world are physical, but there are entities which cannot be exhaustively reduced to physical entities. From an Aristotelian metaphysics perspective, the latter kind of entities are derivative as opposed to physical entities

which are fundamental. Then, both mental and physical entities exist but only the physical ones are fundamental. Then remaining task for the metaphysician is to diagnose the features of the dependence relation between them.

The above suggestion enjoys a lot of initial plausibility. Nonetheless, there is a question lurking as to the place of the supposedly top-down determination relations (e.g., top-down causation) in that bottom-up hierarchical fundamentality structure. If the entities at the fundamental level determine happenings at other levels, is this to say that there is no way for a happening at a higher level to determine a happening at a lower level? Both scientific commonsense and commonsense proper would say that there are such top-down determination relations. This is what makes it possible for us to conduct experiments at sub-atomic levels though the level we operate on is not sub-atomic. Furthermore, given there is a mental level, the idea that the happenings in our minds somehow determine things in the world (e.g., mental causation) has a strong plausibility for most people. Therefore, it seems difficult to deny such top-down determination relations.

However, there are arguments against top-down causation. One such argument is the notorious exclusion argument against mental causation. Proposed influentially by Jaegwon Kim (1989, 1993, 1995, 2005). Very briefly, this argument can be taken to state that if every physical event has sufficient physical causes and if mental causation is not overdetermined, then there would be no place for a non-physical mental cause since there should already be a physical cause of the effect at hand. Therefore, the mental must be either identical to a physical cause or epiphenomenal (i.e., it does not have any causal influence on the physical happenings in the world). Hence, non-reductive physicalism would be untenable.

The exclusion argument against mental causation have been very influential, yet it is not decisive enough to close the case. Especially the sense of the notion of overdetermination used in the argument is questioned by scholars (Árnadóttir & Crane, 2013; Bennett, 2008). The argument might work against dualist accounts of mind-body relationship. However, the intimate relationship between mental and physical entities in non-reductive physicalist accounts creates a problem for the exclusion argument. The main aim of this dissertation is to show that the notion of grounding in Aristotelian metaphysics provides us with a useful metaphysical tool to save mental causation from the exclusion argument by presenting a strong formal account of that intimate relationship between mental and physical entities.

The structure of the remaining of the dissertation will be like the following: in the first chapter, I will present the notion of grounding. I will show what it is, what its formal features are, and how it is different from other notions of metaphysical dependence. In the second chapter, I will present and analyze the exclusion argument against mental causation. I will show how compatibilist accounts of mental causation can be used to argue against the exclusion argument. Then, I will present the grounding solution to the problem raised by the discussion about the exclusion argument in the third chapter. This chapter will include why grounding affords a better solution than the ones offered by other metaphysical notions like supervenience. Finally, before concluding the paper, I will mention a very similar problem in another context (i.e., philosophy of science) and show that we can employ a grounding solution there as well.

I. Grounding and Non-Reductive Physicalism

Physicalism (i.e., the view that the fundamental entities are physical) has the plausibility of providing a unified ontological view. However, this is not the whole story. There is a further question: are there properties/states which are not identical nor completely reducible to physical properties/states? Defenders of non-reductive physicalism about the mental will answer this question affirmatively. Their view is based on two major claims: (1) Mental properties are not identical or reducible to physical properties, and (2) Mental properties are determined by physical properties.

Once one accepts an Aristotelian way of doing metaphysics as defined in the introduction, the first claim of non-reductivists seems easy to accept. In an ordered ontology, there are different levels of reality which contain distinct entities that are related to each other through a determination relation. Yet, how should we understand the notion of determination in the second claim? The first response to this question is *supervenience*. The basic idea can be taken as the claim that if A supervenes on B, there cannot be a difference in A without there being a difference in B (McLaughlin & Bennett, 2018). Then, supervenience claim regarding our topic is that there cannot be a mental difference without there being some relevant physical difference (Davidson, 1980, p. 214). The notion of supervenience of the mental on the physical is usually defined in terms of Lewis' possible worlds: if a world is the minimal physical duplicate of the actual world, then it is a complete duplicate of the actual world (Jackson, 1998; D. Lewis, 1994; D. K. Lewis, 1986).

Supervenience as defined above, however, is not a sufficiently strong notion for a physicalist task, because it does not state anything about whether the physical is more

fundamental than the mental. As such, the supervenience thesis can be accepted by even defenders of emergentism (i.e., the view that there are basic, unexplained facts which are not physical) which, according to the usual interpretation, is not a physicalist view (See Crane, 2010, p. 29; Horgan, 1993, p. 560). In fact, even identity entails supervenience. If the mental is identical to the physical, which is obviously against a non-reductive account of mind-body relation, both the mental and the physical supervene on the other. Given the identity thesis, once you fix the facts about one of them, you get the facts about the other. Supervenience is a merely modal notion which falls short of the ontological dependence task at hand. This is why Horgan (1993) thinks that a physicalist account needs a stronger notion of dependence which will make physicalist explanations possible. But if the account is supposed to be a *non-reductive* physicalist one, then this explanatory notion of dependence should not entail the reduction of the mental to the physical as well.

Another metaphysical notion of dependence, *grounding* (i.e., the metaphysical relation expressing the sense of locutions like 'in virtue of', 'because'), seems to be a good candidate for this job (Bliss & Trogdon, 2014). Indeed, grounding theorists use this notion to explain priority relations between different ontological categories (Schaffer, 2009b). For, from an Aristotelian perspective, which is more permissive than the mainstream analytic metaphysics when it comes to existence questions, the interesting ontological problem is the fundamentality relation between groups of entities like the mental and the physical.

What makes grounding better for the task than supervenience is that grounding is essentially asymmetrical whereas supervenience is not. That is, supervenience of the mental on the physical does not require the physical being ontologically prior to the mental. On the other hand, if the mental is grounded on the physical, the latter is more fundamental than the former

and not vice versa. This difference is due to the fact that the two notions work according to different ontological presuppositions. Neo-Aristotelian talk supposes an *ordered* ontology where entities fall under categories which depend on other categories, whereas the mainstream metaphysics uses supervenience to capture such relations in a *flat* ontology where the dependence is not implied. As Schaffer (2009, p. 363) puts it, the notion of supervenience is employed for a problematic task: trying to account for ordering relations in a flat ontology. Grounding comes with an ordered ontology baggage: the relata of grounding relation are not identical to each other. They are entities residing on different levels in that ordered ontology. Hence, comes non-reductivism. Namely, the first requirement of *non-reductivist* physicalism is satisfied. Moreover, though those relata reside on different levels, they do not float freely. The entities on the fundamental level, in this case the physical, ontologically determine the entities on other (i.e., derivative) levels. Hence, the second requirement of non-reductivist *physicalism* is satisfied as well: mental entities are ontologically determined by physical entities.

Another relevant point is that though, reductive or non-reductive, physicalism claims to entail explanations of mental phenomena (which is the main motivation behind the idea that emergentism is not physicalism), supervenience and any other modal correlation notion does not provide such explanations (Kim, 1993, p. 367; Trogdon, 2013, p. 4). On the other hand, grounding is essentially an explanatory relation explaining how phenomena which exist at nonfundamental levels are related to the fundamental phenomena. Therefore, unlike supervenience, grounding has the necessary features for realizing the non-reductive physicalist task. With this toolkit, we can now propose sentences like "Jane's headache at noon is grounded in such-andsuch a neural activity in Jane's brain at noon" (Kroedel & Schulz, 2016, p. 1913).

We have seen that grounding is intellectually a stronger relation than supervenience is, but what is grounding? What are its formal features besides asymmetry? Grounding is usually taken to be a primitive (i.e., non-analyzable)¹, irreflexive (i.e., an entity cannot ground itself), and transitive² (i.e., if A grounds B and B grounds C, then A grounds C as well) relation (Fine, 2012; Rosen, 2010; Schaffer, 2009b, 2016). Although some take the relata of grounding as events, I am going to take relata of grounding and of causation to be facts (i.e., property instantiations).

One thing to be distinguished from grounding is the notion of truthmaking which seems to be another notion expressing an *in virtue of* relation (See MacBride, 2016). According to the truthmaking theory, there needs to be a truthmaker in virtue of which a truthbearer is true (Armstrong, 1989, p. 88). The relata of this relation, a truthmaker (sometimes an object) and a truthbearer (i.e., a proposition or a sentence), can be of different kinds, whereas the relata of grounding, namely facts, are of the same kind. This formal difference shows that the two notions are distinct.

Furthermore, from an Aristotelian metaphysical perspective, not only are these two notions distinct from each other, but also, in order to make sense of truthmaking, one needs to employ an ontological dependence relation, i.e., grounding (Schaffer, 2009b, p. 365, 2010). Schaffer thinks that grounding is the primitive notion truthmaker theorists need to make sense of truthmaking relation. One argument for this idea comes from the application of Schaffer's *priority monism* (i.e., the universe as a whole is the only fundamental entity grounding others) to the problem of negative existentials (i.e., if every truth has a truthmaker, what is the truthmaker

¹ (Schaffer, 2009)

² Schaffer (2012) does not accept that grounding is transitive. I follow the others and take grounding to be transitive, but it would not be a problem for the task of this paper even if grounding was taken to be nontransitive.

of a true proposition denying the existence of an entity?) in truthmaking (Schaffer, 2010). I will not go into details of this topic here. For the purpose of this paper, it is sufficient to see that truthmaking and grounding are two distinct notions.

There is another significant distinction to be made about grounding. The phrases 'grounding relation' and 'grounding explanation' are mostly used as if they are interchangeable. However, this is not to say that a choice between the two phrases does not make any difference. According to Schaffer (2016, p. 83) such an indifference to the choice between 'relation' and 'explanation' reflects a conflation as to what grounding is. Some people regarded grounding essentially as a form of explanation (Audi, 2012; Fine, 2001; Rosen, 2010). In this understanding, grounding is taken as a sentential operator. At this point, it is crucial to think about Schaffer's (2016, p. 85) distinction between "the image of explanation" and "the image of explanation". According to this distinction, explanations are epistemological entities which are backed by ontological relations in the world—e.g., causation. Understood in the image of explanation, grounding is an abstract pattern over true propositions as opposed to "a concrete relation in the world," which is revealed by the image of causation (Schaffer, 2016, p. 84). In this understanding, grounding, regimented as a sentential operator, is apt for the image of explanation but not for that of causation.

There is a problem with the grounding in the image of explanation, which becomes apparent with the following question: if grounding is not a relation in the world but a kind of explanation about it, what is the ontological relation that backs (or underwrites) grounding explanations (Moran, Forthcoming; Schaffer, 2016, p. 88)? Assuming that if there is an explanation about the world, there must be a real relation in the world backing it, Schaffer (2016) claims that, just as causation, grounding is among ontological dependence relations which back

explanations about the world. So, instead of different kinds of explanation, there is explanation simpliciter which can be backed by ontological relations like causation and grounding.

The entities to which we refer in discussions about mental causation are usually mental events. Since I take mental events to be actual entities in the world, grounding in the image of causation, rather than grounding in the image of explanation, fits better to the task at hand. Accordingly, relata of grounding will be things in the world: property instantiations. This will help us connect debates about mental causation and grounding easily, because events and facts can both be described in terms of property instantiations.

Bearing these distinctions in mind, an alternative non-reductive physicalism is defined as the following:

Grounding physicalism: All mental facts are grounded in physical facts (Kroedel & Schulz, 2016, p. 1912).

An example of an explanation based on grounding physicalism would be something like this: That I have pain in my knee now is grounded in a relevant fact regarding the physical (i.e., about my body and nervous system) state I am in now. In this case, the mental fact, since it is grounded, is derivative (i.e., non-fundamental) while the physical fact is fundamental.

Is this physical fact the ultimate ground in this case? The answer to this question is not necessarily affirmative, since there can be further physical (i.e., *micro*physical) facts grounding this physical fact (Kroedel & Schulz, 2016, p. 1913). Given transitivity, it can be claimed that a mental fact is grounded in more than one physical fact, depending on a hierarchical understanding of different physical levels (e.g., macro vs micro). In this dissertation, it suffices

to say that if one is committed to Grounding Physicalism, then one is necessarily committed to the idea that the fundamental level is physical.

Now, grounding physicalism seems to be a good choice for a non-reductive physicalist since its formal features and the ontological baggage it brings satisfies both conditions: this account is non-reductive since grounding is between distinct entities and it is physicalist since it takes the physical to be the fundamental. But it is time to see whether it is strong enough to deal with the notorious exclusion argument against mental causation, the aim of which is to render non-reductive physicalism untenable. In the following chapter, I will present the exclusion argument and analyze it.

II. The Mental Exclusion Argument and Compatibilism

According to folk psychology, mental causation, that a mental state/fact/event can cause a physical effect in the world, is a central idea. We believe that mental states we are in can make differences in the world through our behaviors. Special sciences like psychology and cognitive science are committed to mental causation as well, perhaps even more so. This might make us think that the notion is plausible, yet a closer look at mental causation makes things more complicated. Making sense of mental causation requires having compatible conceptions of both mind and causation in the physical world.

The discussion whether there is a tension between certain conceptions of physical causation and of the mind goes back at least to Descartes. Descartes, famously, regarded that mind and body are two different substances each of which is defined in terms of one characteristic property, thought and extension respectively. Furthermore, Descartes had a mechanical understanding of the physical world according to which causation is to be understood in terms of contact between bodies. Given that the mind is characterized by thought and not by extension, it seems that it is difficult to make room for a causal interaction between mind and body in his dualist metaphysics. For, there cannot be contact between the mind, which is non-extensional, and the body and causation requires contact. Descartes himself thought that the mind-body interaction needs to be understood not from a mechanical but a different conception of causation which is difficult to understand because of the differences between the natures of the mind and the body. His solution was difficult to understand and it did not settle the discussion (for more on this, see Richardson, 1982).

The contemporary discussion about the possibility of mental causation in the physical world focuses on a group of principles which are allegedly incompatible with each other although for many people they are all acceptable one by one. These principles can be briefly summarized as the following, as Árnadóttir and Crane (2013, p. 250) reconstruct them from Jaegwon Kim's works on the topic (1989, 1993, 2005):

Mental-Physical Efficacy: There are physical effects which have mental causes.

Physical Causal Closure: For any physical effect there are sufficient physical causes.

Non-Reductivism: Mental causes of physical effects are distinct from physical causes.

The tension is obvious. If one accepts that there are cases of mental causation as folk psychology and some special sciences suggest, then there must be some physical effects which have mental causes. If one is a non-reductivist, then those mental causes cannot be identical to some physical causes. So, if mental causation happens at all, there must be some mental causes as distinct from physical causes. But, the principle of physical causal closure states that all physical effects have sufficient physical causes. Therefore, it seems that there is no room for a non-physical cause. These three principles, at least at first sight, seem to be inconsistent with each other if we make some other assumptions, which I will mention below.

As it stands, this is not in the form of an argument against mental causation. At this point it is just a problem to be dealt with. One way to deal with it would be denying one of the principles to resolve the tension. For instance, if one wants to hold on to a physicalist metaphysics of mind, one can simply deny non-reductivism principle to resolve the tension. If mental causes are not distinct from physical causes, then there will be no problem in accepting both the principle of physical causal closure and the principle of mental-causal efficacy. So, now

that the reductive physicalist admits that mental causes are identical to physical causes, she successfully avoids the problem.

However, many people find the idea that there are non-physical mental causes very appealing. For instance, as we have seen above, dualists would find the idea to be irrevocable. For, once one accepts that the mind and the body are two radically different substances, there is no way of identifying a mental cause with a physical one within such a conception of metaphysics. Then, for the dualist, resolution of the tension requires denying at least one of the other two principles. Denying that there is mental causation would be too much of a loss though many take this line (Chalmers, 1996; Jackson, 1982). This would render our folk psychology and relevant sciences illusory in that they would be admitting mental causation while there is no such causation in the world. But, there is one more principle which can be denied. The dualist can resolve the tension by denying the principle of physical causal closure.

Besides substance dualism, there is another kind of dualism about the mind-body problem. Property dualists, as Karen Bennett's (2008) classifies them, think that consciousness cannot be explained in physical terms. Therefore, at least some mental properties cannot be identical to physical properties according to property dualism. Given that it is plausible from folk psychological perspective to accept that the notion of mental causation includes conscious mental properties/states/facts as causes, the tension between the above principles might arise for property dualists as well. Property dualism already requires accepting the distinctness of mental causes from physical causes. Then, if a property dualist accepts that there are cases of mental causation, the only way for her to avoid the problem is denying the principle of causal closure of the physical. But if a property dualist accepts all three principles, then she is on the same boat with physicalists who do not accept the identity of mental causes with physical causes. They both

need to find another way of resolving the tension, without denying any of the seemingly inconsistent principles.

We have seen that physicalists could avoid the tension among those principles by identifying mental causes with physical causes. If this is possible, why a certain kind of physicalism would be in the same boat with property dualism? Although reductive physicalism can resolve the tension easily, it suffers from another problem. Reductive physicalism lost some of its appeal after Hilary Putnam (1967) introduced *the multiple realizability thesis* to philosophy of mind. Multiple realizability thesis, simply, means that mental states/facts/properties can be realized by distinct physical states/facts/properties. If this thesis is true, a mental fact cannot be identical to a physical (e.g., a neural) fact because that very mental fact can be realized by another physical fact.

Multiple realizability thesis has gained a wide acceptance. This is why reductive physicalism lost some of its appeal though it can avoid the tension among the principles above. But, non-reductive physicalism is still a viable option for the physicalist. Recall that nonreductive physicalism has two requirements: (1) accepting that although mental facts are not reducible to physical facts, mental facts globally supervene on physical facts, and (2) accepting that fundamental facts are physical facts. This formulation means that once you fix physical facts, you fix all mental facts as well.

Now, as the name of their account implies, non-reductive physicalists accept the nonreductivism principle. This is the reason why they are on the same boat with property dualists vis-à-vis the problem about mental causation. If they accept that physical effects have sufficient physical causes, it seems difficult for them to account for the idea that some physical effects have mental causes. Indeed, Jaegwon Kim's main conclusion in his discussions of the problem of

mental causation was to show that non-reductive physicalism is an untenable theory. To this end, there is some additional work to be done on the problem of mental causation.

The mental exclusion argument against non-reductivism.

We have seen that the problem arises from that there is an alleged tension among three principles. To turn this seemingly inconsistent group of principles into an argument against non-reductive physicalism, two more principles are needed. As Árnadóttir and Crane (2013) reconstruct them from Kim's work (2005), these two principles are the following:

Denial of Overdetermination: The effects of mental causes are not overdetermined by mental causes.

The Exclusion Principle: If an effect is not overdetermined, then it cannot have more than one sufficient cause.

The notion of overdetermination will play an important role in the argument. What is overdetermination? In a genuine case of overdetermination, there are more than one causes of an effect each of which would be sufficient to cause that effect in the absence of the other(s). The most hackneyed example in the literature is a case in which a person is killed by two bullets shot by two different assassins. The bullets hit the person at the same time. More importantly, if any of the bullets hit the person in the absence of the other bullet, the person would have still died. In other examples, two children, Billy and Suzy, shatter a window by throwing rocks at it, or a sleeping person's alarm clock starts sounding just at the same time when a jackhammer starts working outside her window. The common features of these paradigm examples of genuine overdetermination can be summarized as (i) having two distinct sufficient causes (ii) which start to operate at the same time.

The other addition, the exclusion principle, seems to state something tautological. Indeed, Kim (2005, p. 51) regards it to be close to an analytic truth which do not say much. After all, if we define a case in which there are two or more successful causes acting simultaneously as overdetermination, then when a case is not a genuine case of overdetermination, there cannot be more than one sufficient cause. This principle seems to say something like this: a case of causation is either a genuine case of overdetermination, in which case it has two or more sufficient causes, or not a genuine case of overdetermination, in which case it cannot have more than one sufficient cause. If physical effects are not overdetermined by mental causes as the first additional principle states, then this principle will exclude any proposed cause of physical effects on the basis of the claim that all physical effects have sufficient physical causes.

One thing to be pointed about the exclusion principle is that there are two different conceptions of it: explanatory exclusion and causal exclusion. As Árnadóttir and Crane (2013) rightly observe, Kim presents the principle as the explanatory exclusion principle in his earlier presentation of the argument (Kim, 1989, p. 79) whereas he switches to an exclusion principle in terms of causation in his later presentation of the argument (Kim, 2005, p. 42). Árnadóttir and Crane (2013) regard this move as a necessary and right one because that a single physical fact having two simultaneous and sufficient explanations does not seem relevant to whether it is overdetermined or not (Burge, 1993). A physical event can have two distinct explanations without it being overdetermined.

With the addition of these principles, Kim attempts to resolve the supposed tension among the initial three principles by turning the problem into an argument against one of them, that is non-reductivism:

1. There are physical effects which have mental causes

2. For any physical effect there are sufficient physical causes.

3. The effects of mental causes are not overdetermined by mental causes.

4. If an effect is not overdetermined, then it cannot have more than one sufficient cause.

Therefore,

Identity of Causes: mental causes which have physical effects should be identical to some physical causes (*contra* non-reductivism principle).

In the following chapter, I will evaluate this argument and show that it suffers from a problem. This evaluation will lead us to how the notion of grounding can help better understand mental causation.

The mental exclusion argument: Why it is not successful

In the beginning of the previous chapter, we have seen that it seems difficult to hold on to mental-efficacy together with non-reductivism and the principle of causal closure of the physical. One way to resolve this tension is to deny one of these seemingly inconsistent principles. Kim's mental exclusion argument takes this route and denies that mental causes are distinct from physical causes. However, this is not the only way to resolve the tension. One can argue that these three principles are compatible with each other, hence there is no need to deny any of them. Such solution attempts are named as *compatibilist* solutions of the problem of mental causation (Bennett, 2008).

In this chapter, I will present an evaluation of Kim's exclusion argument against nonreductivism, on the basis of compatibilist accounts proposed by Karen Bennett (2003, 2008) and Árnadóttir & Crane (2013). This evaluation will be based on a difference between *horizontal* (i.e., diachronic) determination relations like causation and *vertical* (i.e., synchronic) determination relations like constitution, realization, grounding, etc. The role vertical determination relations play in this analysis of the exclusion argument against non-reductive physicalism will lead us to grounding physicalism.

According to compatibilism about mental causation, there is no tension between nonreductivism, mental-physical efficacy and the physical causal closure. Then, the problem in Kim's exclusion argument must be in the additional premises. I will evaluate them one by one.

Denial of overdetermination

This premise states that the effects of mental causes are not overdetermined by mental causes. As we have seen, paradigm cases of overdetermination include two *distinct* sufficient causes acting at the same time. Each of those causes would still cause the same effect even *in the absence of the other*. Compatibilists accept that mental causes do not overdetermine their physical effects in the way the causes in paradigm cases do. So, they accept this premise.

Nonetheless, there is a further point about this premise which will be relevant for the evaluation of the argument. Simply stating that they are distinct does not encapsulate all of the common features in paradigm cases of overdetermination. As Árnadóttir & Crane (2013) rightly points out, those causes are not only distinct from each other but also independent from each

other. Each of the bullets hitting the person in the example is sufficient to kill that person *independently* of the other bullet. The extents of notions of distinctness and independency do not necessarily overlap. There can be distinct things which are not independent from each other. In fact, for two things to be dependent on one another, they need to be distinct from each other.

According to the target of the exclusion argument, namely non-reductive physicalism, mental causes are distinct from physical causes but they are not independent from them. It is a non-reductive account thanks to the fact that it accepts that mental causes are distinct from physical causes. But, it is a physicalist account thanks to the fact that it asserts a metaphysical dependence relation between the mental and the physical. One way to capture this dependence relation between the mental and the physical is through realization. It can be claimed that a mental cause is realized by a physical cause where realization is understood as a synchronic metaphysical relationship requiring the instantiation of the realized entity whence, and thanks to that the realizing entity is instantiated.

The proper understanding of this vertical dependence relation will be an important topic later. But, at this point, we need to see that this dependence relation is the reason why mental causes do not overdetermine their physical effects in the way the causes in the paradigm cases do (Árnadóttir & Crane, 2013, p. 254). In the paradigm cases, each cause can be instantiated without instantiating the other one. On the contrary, once one accepts non-reductivism, the mental cause of a physical effect cannot be instantiated without instantiating the physical cause upon which the mental cause depends. So, these two causes are not sufficient in the absence of the other. So, mental causation is not on a par with paradigm cases of overdetermination in this respect.

To reflect this point, Bennet (2003) proposes a test of overdetermination. This test is composed of two counterfactuals about mental causation. Supposing that m and p are two causes of an effect e, the two counterfactuals are the following:

"(O1) if *m* had happened without *p*, *e* would still have happened ($m \& \neg p$) $\Box \rightarrow e$, and

(O2) if *p* had happened without *m*, *e* would still have happened ($p \& \neg m$) $\Box \rightarrow p$." (Bennett, 2003, p. 480)

According to the test, in order for the causes m and p to overdetermine the effect e, both of these counterfactuals need to be non-vacuously true.

It is important to see that this test is only a way of reflecting the idea that the dependency relation between the mental and the physical is the reason why mental causes do not overdetermine their physical effects in the way causes in paradigm examples of overdetermination do. The test does not require a significant metaphysical commitment. Bennett (2008, p. 288) makes this clear by highlighting two caveats to the test. Firstly, this test commits one to a weaker requirement than the paradigm examples of overdetermination do. These counterfactuals are necessary but not sufficient for causation. Secondly, though counterfactuals are employed in it, this test does not require one to commit to a specific account of metaphysics of causation like counterfactual analysis of causation. As opposed to this, Árnadóttir and Crane (2013, p. 253) take Bennett's method to be committed to a somewhat controversial thesis in metaphysics, i.e., causation as counterfactual dependence. However, this test is just a reflection of an ordinary reasoning regarding causation and overdetermination, one which Árnadóttir and Crane (2013) seem to be committed to.

When applied to the paradigm cases of overdetermination, both of these counterfactuals will turn out to be true regardless of whether the evaluation is done from a dualist or a physicalist perspective. For, in paradigm cases, both of the causes are sufficient to cause the effect *in the absence of the other*. However, when applied to the mental causation case, the metaphysics to which one is committed matters.

The mental and the physical do not depend on each other according to every account. For instance, recall that mind and body are two distinct substances for a Cartesian dualist. Then, there is no reason within a dualist account to deny that both a mental cause m and a physical cause p can cause an effect e in the absence of the other. Therefore, both conditionals can be true for a dualist. Moreover, because of the dualistic idea that neither of the causes m and p necessitates the other, these truths are not vacuous (Bennett, 2003, p. 279). Therefore, a case of mental causation passes the overdetermination test when it is evaluated from a dualist perspective. This would be an easy target for a mental exclusion argument, which would render the mental to be epiphenomenal, depending on whether or not the dualist accepts the completeness of physics.

For a physicalist to maintain that mental causes do not overdetermine their effects in the way causes in paradigm cases of overdetermination do, she needs to claim that at least one of O1 and O2 is either vacuous or false. An analysis of O2 gives us this result. For O2 to be true, the physical cause p needs to sufficiently cause the effect e in the absence of the mental cause m.

Bennett (2008, pp. 289–291) employs an evaluation of the notion of sufficient causation at this point. If one takes the notion of sufficiency in causation to be a global notion as in the case of global supervenience, then the physical cause p would necessitate the existence of the relevant mental cause m. For instance, in the case of a person's pain (i.e., the mental cause) and

the neurological state on which it supervenes (i.e., the physical cause) causing the person moving her arm, a non-reductive physicalist, who accepts global supervenience, would think that given the same physical facts, it is not possible to not have that pain. This would render O2 vacuous, since counterfactuals with impossible antecedents are vacuous.

On the other hand, if one accepts a local understanding of causal sufficiency, which excludes background conditions and focuses on the local physical cause instead, O2 will be simply false. For, without relevant background conditions, that physical state *p* would not cause the effect *e*. For example, in the absence of a functioning complete nervous system, firing c fibers does not necessarily cause the movement of some relevant body part. Therefore, a local conception of causal sufficiency would render O2 false.

Taken together, from a physicalist perspective, O2 would be either false or vacuous, in which case, from the perspective of a physicalist, mental causation does not satisfy the requirement for being a genuine case of overdetermination. This line of thinking, therefore, confirms Kim's denial of mental overdetermination. However, this analysis is not in favor of Kim's exclusion argument. Eventually, it will give us not only a way of rejecting the other additional premise he employs but also a way to claim that the alleged tension among the three initial principles can be resolved by a non-reductive physicalist analysis of them, on the basis of the metaphysical dependence relation between the mental and the physical.

The exclusion principle

Now that we have confirmed the premise denying that mental causes genuinely overdetermine their physical effects, the only way to argue against the exclusion argument is through denying the exclusion principle which states that if an effect is not overdetermined, then

it cannot have more than one sufficient cause. In this part, I will employ Árnadóttir and Crane's analysis of the exclusion principle (2013) to argue that the metaphysical dependence relation between the mental and the physical renders this principle baseless.

Kim (2005, p. 51) takes this principle to be something like an analytic truth. At first glance, this might seem reasonable. That a physical effect has either one cause or more than one causes seems to be an analytic truth. As it stands, this proposition seems to be about whether there are distinct causes or not. If this was all of the story, then the exclusion principle could have been confirmed easily.

However, we have seen that overdetermination is not only about having two distinct causes. Besides distinctness, there is the issue of dependency between the causes. Recall that the analysis above showed that mental causes do not overdetermine their physical effects although mental causes are distinct from their physical bases. Hence, we already know that distinctness is not the only matter about overdetermination. If two distinct causes are related to each other with a certain metaphysical dependency relation, them being distinct from each other does not entail overdetermination. Therefore, it is certainly not an analytic truth that if an effect is not overdetermined, then it cannot have more than one sufficient cause. On the contrary, in the case of mental causation, the above analysis renders this principle false. There are cases of causation involving two distinct causes but which are still not overdetermination.

But there is more to be said on this topic. Kim is not unaware of the notion of dependent causes. In fact, he takes this very notion to be the problem:

"It is important to see that the problem we face arises because the two putative causes are not independent events. The difficulty is exactly that the causal status of the dependent event is threatened by the event on which it depends" (Kim, 1998, p. 53)

This line of thinking seems to be based the idea that for a dependent fact to be causally efficacious, it needs to add something additional. It needs to add a causal power "in excess of" the causal powers given by the fact on which it depends (Kim, 1998, pp. 54–55). Árnadóttir and Crane (2013) call this idea *the motivating principle* since Kim motivates his case for the exclusion argument by using this. However, as they rightly point out, this principle opens up a new discussion about the topic. Where does that requirement of additional powers come from? There seems to be no plausible argument for this. Non-reductive physicalists can successfully deny the exclusion principle on the basis of the idea that the mental is nothing over and above the physical although they are distinct from each other. Yet, Kim denies this by using the additional causal powers requirement without making a case for this requirement. Therefore, Árnadóttir and Crane (2013) regard this to be question begging.

Until this point, we have seen that the notion of metaphysical dependence renders the exclusion argument unsound by making the exclusion principle false. The compatibilist conceptions of mental causation evaluated here take the crucial aspect of the to be the tight relation between the mental and the physical. But, neither Árnadóttir and Crane (2013) nor Bennett (2003; 2008) provides a detailed account of that tight relation. In the following part, I will introduce such an account into the debate which takes that relation between the mental and the physical to be grounding. This account will show us why a tight vertical dependence relation renders the initial triad compatible with each other. Furthermore, I will argue that grounding is

the most suitable metaphysical dependence relation for this task on the basis of that it is "the tightest" dependence relation (Fine, 2001, p. 15).

III. Grounding Physicalism

The mental and the physical can be distinct from each other without being independent from each other. Formulating this notion of dependency is probably the most important part of non-reductive physicalists' task. Furthermore, as we have seen above, the tight relation between the mental and the physical is the crucial point of the compatibilist reply to the mental exclusion argument. The question, then, is how to formulate this tight relationship between the two.

When Donald Davidson (1970) argued for the idea that physicalists are not obliged to accept the reduction of the mental to the physical, he described the relationship between the two in terms of supervenience. According to his definition, this meant that there could be no difference in terms of mental events without a difference in terms of physical events [reference + revision]. From that point on, the notion of supervenience has been taken to be the primary candidate for non-reductive physicalist task.

However, that was not the first usage of the term 'supervenience' in analytic philosophy. The first usage of the term in an analytic context was in metaethics by Hare (1952, pp 80-81). There, the term was used to refer to a relationship between normative notions and descriptive notions. G. E. Moore (1922, p. 261) employed a similar notion, albeit without using the word 'supervenience', in order to describe the relation between the intrinsic value of something and its non-normative features. In the context of philosophy of mind, the notion was first used by some British emergentists. Emergentists, like non-reductivists do now, addressed the question of describing the relationship between the mental and the physical. This was a delicate task for them because they accepted the existence of brute non-physical facts although they weren't substance dualists. Morgan (1923, pp 15-16), for instance, employed the term to describe the dependency relation between concurrent events at different levels, i.e., life-related events and physical events.

In all these usages of the notion, the basic idea was similar to what Davidson had in mind, cited above. The notion of supervenience has since been used in the context of philosophy of mind with this basic meaning. This meaning is captured well in David Lewis' (1986) definition of the notion: "Supervenience means that there could be no difference of one sort without difference of the other sort" (p. 15).

There are some further considerations about supervenience which need to be mentioned before evaluating whether supervenience is the right kind of notion to formulate the relation between the mental and the physical. One such consideration is about the possible worlds talk. If it is taken as referring to entities in the same possible world, supervenience is regarded to be *weak* (Kim, 1984). The definition of weak supervenience says that if *A* sort of entities are supervenient on *B* sort, then two things which are in the same possible world and which are indiscernible from each other with respect to *B* sort, should be indiscernible with respect to *A* sort as well.

On the other hand, the notion of *strong* supervenience talks about entities in different possible worlds. Let's say that there are two entities each of which is in a distinct possible world. If *A* sort of entities are supervenient on *B* sort, then given these two entities are indiscernible with respect to *B* sort, they are indiscernible with respect to *A* sort as well. Equipped with this distinction, Horgan (1993) thinks that the definitions of supervenience used in philosophy of mind should be understood in terms of strong supervenience, because the meaning of the modal notion expressed by concepts in those supervenience definitions can be captured by employing a *between*-possible-worlds analysis, not a *within*-a-possible-world analysis.

Another consideration about supervenience is about the fact that the supervenience notions we have reviewed mostly talk about properties instantiated by the same individual entity. But this can pose a problem for the application of the notion to some philosophical debates. For instance, it can be said that in order to account completely for the mental properties of an individual, a theory needs to cite not only the physical properties of that individual but also many relevant features of the context in which that individual is embedded. If this is true, the theory needs to take a holistic attitude instead of an individualistic one. To account for this, *global* supervenience is offered (Kim, 1984). According to global supervenience notion, if A sort of entities are supervenient on B sort, then two possible worlds which are indiscernible with respect to A sort as well.

However, global supervenience might not be the right way of expressing the conceived relationship between the mental and the physical because the notion, as defined above, allows two possible worlds indiscernible with respect to B and A sorts to have regions within the same possible world which are indiscernible with respect to B sort but not indiscernible with respect to A sort. If the two possible worlds overlap each other with respect to both A and B sorts, the regional differences between the instantiation of A and B sorts will not prevent this case to be satisfying the conditions of global supervenience. But such cases need to be excluded if one wants to propose a dependency relation between A and B sorts.

Horgan (1982) offers a remedy for this: *regional* supervenience. Given that those entities in a region which are not dependent in a general ontological sense to entities outside that region are *intrinsic* to that region, the notion of regional supervenience states that if A sort is supervenient on B sort, there are no two regions which are indiscernible from each other with respect to B sort but not indiscernible with respect to A sort. The notion of regional

supervenience is stronger than the global one because it excludes the problematic case described above. Furthermore, the notion of regional supervenience entails the notion of global supervenience since we can take the regions mentioned in the definition to be whole possible worlds.

Given the considerations above, I take it that supervenience theorist's best formulation of the tight relation between the mental and the physical is *strong regional* supervenience. From now on, the term 'supervenience' will be used in this thesis to refer to this specific formulation unless otherwise stated.

Notice that the formulations of supervenience summarized above are compatible with many different accounts of the ontology of the physical and the mental. The fact that the notion is used both by emergentists and physicalists makes this point clearer. This is because the notion of supervenience by itself does not imply whether there are non-physical brute facts or not. Supervenience is only a modal notion stating that two sorts of entity correlate (Lewis 1986, p. 15). It is "a denial of independent variation" (Lewis 1983, p.358). As such, it does not provide us with an explanation of why those two sorts correlate. Yet, as Kim (1990) indicates, the notion is widely used as if it implies some kind of ontological priority to the physical. The discussion about non-reductive physicalism is one of those contexts where the notion of supervenience is used in place of an ontological priority relation. As Horgan pointed out in his influential paper (1993), non-reductive physicalists need a notion of ontological relation between genuine facts residing on different levels which is compatible with a physicalist ontology. Being only a correlational notion, supervenience alone is not enough for this task.

Besides not being the right kind of notion, supervenience is also not strong enough to capture the modal aspects of the ontological relation needed by non-reductive physicalism

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(Steinberg, p. 26-31). Supervenience does not say more than that two sorts covary. However, a theory which treats facts on every level to have equal statuses can be, at best, an emergentist theory. For a theory to be counted as a physicalist one it must cite physical facts as the ones which determine facts on other levels. Therefore, the relation between facts on different levels must be an asymmetrical one. Such a relation will indicate that if *A* and *B* have that relation to each other, not only *A* and *B* will be co-instantiated but also the reason why one of them is instantiated will be the other one and not vice versa.

Furthermore, the scope of physicalism as a general ontological theory includes more than physical and mental facts. Biological, chemical, and perhaps social phenomena call for explanations within a physicalist worldview as well. If a non-reductive physicalist wants to account for all these, a multilayered ontology is needed. Moreover, the facts on different levels must be determined by the facts on the physical level. Thus, the ontological relation between facts on different levels must be a transitive one, so that the dependence relation comes, directly or indirectly, from the level of physics. Lastly, the relation must be an irreflexive one because the facts on higher levels are not determined by themselves although it is trivially true that each fact (co)varies with itself.

So, the ontological relation needed by non-reductive physicalists must be a transitive, asymmetric, and irreflexive one. Supervenience is neither asymmetric nor irreflexive. But what if we make the required adjustments so that supervenience can capture the modal aspect of the ontological relation between the physical base and the other levels? It is true that such an adjustment would be a step towards capturing the modal aspect but this modal appropriation itself calls for an explanation so that it is not ad hoc. There must be an ontological relation which

is the reason why that adjustment is required. In other words, some ontological notion must explain the constraint on the general supervenience relation.

To sum up these considerations, non-reductive physicalist can reply the mental exclusion argument by taking a compatibilist position. The key aspect of a compatibilist solution is the idea that the mental and the physical are tightly related to each other. This tight relation has been mostly formulated in terms of supervenience. However, as we have seen, supervenience is not the right relation for this task. Non-reductive physicalist needs a relation (i) which will have structural features like asymmetry, irreflexivity, and transitivity so that the conceived relation between the mental and the physical can be captured, and (ii) which will be an ontological dependence relation and not merely a correlational one so that it satisfies the requirements of a physicalist worldview.

Grounding physicalism, the idea that all facts are grounded in physical facts, is a perfect candidate for this task. Grounding is a relation in the world which has all the structural features described above. By taking the physical to be the fundamental, it satisfies the physicalist ontological requirements. Yet, grounding physicalism is still a non-reductive theory now that it works with an Aristotelian, i.e., permissive perspective. It admits the existence of facts which are not reducible to physical facts. Furthermore, by taking non-physical facts to be ontologically dependent on the physical, it means that the compatibilist solution to the mental exclusion problem is not ad hoc.

What is the grounding compatibilist solution, then? Suppose that we have a physical effect e, its mental cause m, and e's physical cause p. Both m and p are the causes of e but this is not a case of overdetermination in the sense that the paradigm cases of overdetermination are because m is grounded in p. As we have seen above, the causes in the paradigm cases of

overdetermination like two snipers killing the same person at the same time are not only distinct but also independent from each other. The two facts being related to each other via grounding means that although m and p are distinct facts they are not independent from each other. The mental fact m is instantiated in virtue of the instantiation of the physical fact p. Therefore, it is not possible for m to cause e in the absence of p. Recall Bennett's test for genuine overdetermination. For a case of causation to be genuine overdetermination, it must be possible for both causes to cause the effect in the absence of the other cause. The mental fact m cannot cause e in the absence of the physical cause p because m cannot be instantiated in the absence of p. The case does not pass the test for genuine overdetermination. Therefore, mental-causal efficacy, the causal closure of physics, and non-reductivism regarding the mental and the physical are compatible with each other.

As Kroedel & Schulz (2016) points out, this type of solution renders physical causation a more fundamental phenomenon than mental causation. However, this is not denial of mental causation. Grounding physicalism works through a permissive ontology where the basic question is about whether an entity is fundamental or derivative rather than whether it exists or not.

IV. A Similar Discussion in another Context: Downward Causation in Philosophy of Science

The discussion about mental causation has come a long way in the context of philosophy of mind but there is another context in which a similar discussion has been significant. Philosophers of science have dealt with the problem of inter-level causation for a while. Just like the discussion about mental causation in philosophy of mind, this latter discussion begins with an alleged incompatibility between inter-level causation and the principle of causal closure of the physical. In this chapter, I will briefly present the problem and some of the influential solution attempts to it. Then, with the help of the debate in the context of Philosophy of Mind, I will suggest that Grounding Physicalism provides a good solution in this context, too.

The problem of inter-level causation

Physics has been taken to be the paradigm science; and, to state the obvious, it deals with facts on the physical level. But, there are other sciences (i.e., specific sciences) which seemingly deal with facts on more than one levels. Psychology and geology are two examples. Psychology seems to bridge facts on the psychological (the cognitive or the mental if you like) level with those on the neurological level. Geology seems to bridge big-scale geological facts with ordinary-level physical facts. Thus, some of the explanations given in the context of these specific sciences mention inter-level determination relations, usually in guise of inter-level causation.

In some inter-level causal explanations, higher-level facts are cited as causes of effects on the lower-level. Call this kind of explanation and causation *downwards explanation* and *downwards causation*. Now, it is possible to revoke here an adjusted version of the compatibility

upon which Kim's mental exclusion argument is based. According to this adjusted version, the following principles are incompatible with each other:

Downward Efficacy: There are lower-level effects which have higher-level causes.

Physical Causal Closure: For any physical effect there are sufficient physical causes.

Non-Reductivism: There are some genuine metaphysical levels of reality such that facts on higher levels are distinct from facts on lower levels.

It seems that once we accept that every physical effect has sufficient physical causes, it is difficult to open a place for downward causation unless we accept that the higher-level causes are identical to certain lower-level causes. So, if type identity materialism is not accepted, either the principle of causal closure of the physical or downward causation needs to be abandoned. Yet, the former is important for physics while the latter seems to be crucial for the ontological status of the explanations given in specific sciences. Should we prefer one over the other?

How to account for downward causation

Some philosophers think that we need to deny the principle of causal closure of the physical vis-à-vis this tension (Kistler, 2009; Santos, 2015). However, there is another way of solving this problem. Craver and Bechtel (2007) propose an account according to which it is possible to reconcile the principles above, albeit by modifying some of them a bit. These authors are famous for using a mechanistical understanding of scientific explanations. From this perspective, levels of reality correspond to the parts and the wholes of mechanisms. For instance, a cell as a whole is on a higher level while its parts like nucleic acids are on a lower level. In this

environment as the cause of the fact that the rate at which nucleic acids in the cell are produced decreased, will be a multi-level causal explanation.

Craver and Bechtel (2007) account for such cases without abandoning the idea that there is a complete causal explanation at the molecular level for the change in the production rate of the nucleic acids within a cell. To this end, they employ a notion of mediation between the facts on different levels. This mediation is succeeded by a synchronic metaphysical relation between different levels — i.e., *constitution*. The entities on the higher level are constituted by entities on



Figure 1: A mechanistic analysis of downward causation in which a higher-level cause C causes a lower-level effect e through a lower-level cause c which (partially) constitutes C.

Figure 2: A mechanistic analysis of downward causation in which a higher-level cause C causes a lower-level effect e through a lower-level cause c which (partially) constitutes C.

the lower level. Each case of multi-level causal explanation, whether it is downwards or upwards, is understood as a mechanistically mediated explanation where two different determination relations work together. One of these is a synchronic non-causal relation while the other is a diachronic causal one. Figure 1 and Figure 2 exemplify two possible ways of understanding downward causation from a mechanistical perspective.

The critical aspect of this analysis is that the horizontal component of the hybrid explanation is

restrictively intra-level— i.e., its relata are always on the same level. Given that the horizontal component is causation and its level is that of physics, there will always be a sufficient physical cause for a physical effect. This is why there is no need to deny the principle of causal closure of the physical according to this account. Nonetheless, it is still possible to make sense of

downward causation because there are entities on different levels which are related to each other through a non-causal relation.



Figure 3: A mechanistic analysis of downward causation in which a higher-level cause C causes a lower-level effect e through a higher-level effect E which is (partially) constituted by e.

Notice that the arrows indicating the constitution relation between entities at different levels go both ways. This is surprising as Kistler (2009) rightly observes because the notion of constitution, on the face of it, seems to be an asymmetrical relation: the parts of an entity constitute the whole of it but the whole of an entity does not

constitute its parts. At this point, there is a vagueness in Craver and Bechtel's account (2007). It seems that they are using two different notions. Although the mechanistic mediation between entities at different levels is understood through constitution, they apparently define another notion which is symmetrical, without giving it a name:

"The [inter-level] relation is symmetrical precisely because the mechanism as a whole is fully constituted by the organized activities of its parts: a change in the parts is manifest as a change in the mechanism as a whole, and a change in the mechanism is also a change in at least some of its component parts." (Craver & Bechtel, 2007, p. 554)

As it is seen, although constitution is asymmetrical the authors define a general notion of inter-level relations which is symmetrical. This relation being symmetrical is presented as the way to account for not only upward inter-level causation but also downward inter-level causation. But should we stick to a notion of symmetrical relation to account for downward causation? The reply to this question will enlighten the critical similarity between the discussion

about downward causation in the context of philosophy of science and the discussion about mental causation in the context of philosophy of mind.

It is obvious that Craver and Bechtel (2007) give an affirmative answer to the question above. They are not alone in doing so. To explicate the reasons why this is not a theoretical choice, I will evaluate two other accounts according to which the principle of causal closure of the physical is denied on the basis of reasons related to that affirmative answer as to symmetry question. Kistler (2009) and Santos (2015), both by building upon Craver and Bechtel's account, deny the principle of causal closure.

Kistler (2009) thinks that the principles mentioned in the beginning of this chapter are incompatible with each other. To overcome that incompatibility, he chooses another method: denying the principle of causal closure of the physical. It is interesting, and illuminating as we will see later, that although he differs from Craver and Bechtel (2007) from this respect, he builds upon their account: the synchronic relation between entities on different levels must be symmetric. Moreover, he accepts that inter-level causation should be understood as a hybrid notion and it should be analyzed in terms of a non-causal synchronic component and a causal diachronic component.

The problem in Craver and Bechtel's account, according to Kistler, is that they did not use the proper notion to capture that synchronic non-causal component which needs to be symmetric. Constitution, as we have said, is an asymmetric relation. Kistler (2009) offers *constraint*, a symmetric relation, instead of constitution. Constraint is the relation where one relatum has the ability to decrease the degrees of freedom of the properties of the other relatum. Both the parts and the whole can constrain each other's properties. The vertical component in the analysis of inter-level causation needs to be understood as a constraint in which a property

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instantiation at the level of the whole constrains certain property instantiations at the level of parts (i.e., a fact at the level of the whole decreases the number of possibilities for relevant facts at the level of parts).

Should we deny the causal closure of the physical?

Now that he has a symmetrical notion which can allegedly be used in hybrid causal explanations, Kistler returns to the incompatibility in the beginning. Contrary to Craver and Bechtel (2007), he thinks that the incompatibility can only be overcome by abandoning one of the principles. Downward causal efficacy is allegedly accounted for by hybrid analysis. So, he denies the principle of causal closure of the physical. To this end, he employs two examples from biology and quantum physics. The first one is about an inter-level determination in which a change in the cognitive status of a person causes a change in the rate of blood flow to a specific muscle group. He takes this to be an exemplary case where it is not possible to give a complete explanation of the phenomenon at hand without mentioning the higher-level fact, i.e., the change in the cognitive status of the person.

Whether one's being able to give a complete causal explanation of a phenomenon is a sufficient criterion of there being a complete causal determination of that phenomenon is a topic to be discussed, but let's leave that aside for now. The example above still lacks plausibility since it gives no reason to believe in the idea that there is no such explanation. Kistler claims that the burden of proof falls on the shoulders of one who thinks there is a complete explanation at the lower level. But this is only a practical matter. Keeping track of all the changes happening on a biological level is not possible yet for us. In fact, it may not ever be possible for us to be able to keep track of phenomena at lower-levels.

Now, when I claim that there is always a complete causal explanation of that lower-level phenomenon, I am not committed to the idea that the higher-level fact is identical or reducible to relevant lower-level entities nor to the idea that there is no downwards determination. As we have seen in the previous chapters, the principle of the causal closure of the physical, nonreductivity and the principle of mental-physical efficacy are compatible with each other. However, Kistler does not have the appropriate metaphysical toolkit (i.e., the compatibilist solution) to render those principles compatible.

Kistler's second example is from quantum physics. He states that there are some quantum mechanical systems such that certain measurements of the system at a specific time are not completely determined by previous measurements of the same system. Kistler takes this to be a scientific example which casts doubt on the principle of causal closure of the physical. However, this is simply a conceptual mistake. The notion of complete determination here is employed to indicate a distinction between probabilistic and deterministic systems. In a probabilistic system, the outcome of a causal process is not definite —i.e., given the initial status of the system, the number of possible outcomes is more than one. However, this does not necessarily cast doubt on the principle of causal closure of the physical. A system's being probabilistic is compatible with the principle because an after-the-fact evaluation of the case will still yield only physical causes. That is, a system can have all and only physical causes and at the same time be probabilistic. Like his first example, Kistler's second example does not support his case against the principle of causal closure.

The second account against the principle of the causal closure of the physical which is built upon that of Craver and Bechtel is proposed by Gil Santos (2015). He agrees with Kistler (2009), and Craver and Bechtel (2007) on that what these authors regard as inter-level causation need to be given an important place in scientific explanation. Nevertheless, he objects to the idea of a hierarchical view of reality. His main motivation against the hierarchical view comes from the idea that there are no immutable intrinsic properties of entities. The identity of an entity is constructed through their intrinsic and extrinsic relations. He takes this to be a sufficient reason to abandon the hierarchical view since he reconstructs the hierarchical view in a way that it entails the idea that wholes are entities above their parts. But his is not true, according to him. Wholes are in fact relational systems whose identity is constructed by the extrinsic and intrinsic relations of their parts, he continues, and hence, we need to give up the hierarchical view since they will not be above their parts.

The relational ontology, Santos (2015) states, preserves the sense of inter-level causation "without assuming the existence of causes that "go up" and "go down" between parts and wholes" (p. 28). The putatively upward causation happens when the direction of a case of causation is from the relata to the whole, and the putatively downward causation happens when it goes from the whole to the relata (Santos, 2015, p. 29). Nonetheless, these are not inter-level causation according to him because the whole is not above its parts. Thus, it is fair to say that Santos attempts to solve the problem about inter-level causation by collapsing levels on each other. They are all at the same level. So-called upward and downward causation are names for two different faces of the causal phenomena produced by the same intra-level processes (Santos, 2015, p. 28).

Santos' conclusion from the reasoning summarized above is that there is no domain (or level if you like) of organization which must be conceived as causally closed (Santos, 2015, p. 37). This is because every system or entity is open to changes through their external relations. According to the relational ontology, there is no immutable intrinsic properties which are

immune to changes mediated through external relations. Thus, he rejects the principle of causal closure of the physical. To use the phrase by Craver and Bechtel (2007, p. 562), he "stretches the notion of causation" to make room for causal influences coming from the whole to the parts.

There is a crucial problem about Santos' objection to the hierarchical view. It is basically a straw man argument. The hierarchical view is not obliged to a notion of absolutely immutable intrinsic properties. On the contrary, it can accommodate a relational perspective provided that that relational perspective is compatible with the idea that the mutability of properties is mediated through synchronic non-causal determination relations. Santos reconstructs the hierarchical view as it is obliged to use absolute immutability of intrinsic properties and then attempts to oppose the view on the basis of this inaccurate reconstruction. A cell can causally influence a molecule, he says (2015, p. 36), from the perspective of relational ontology. But, a cell can causally influence a molecule from the perspective of the hierarchical view as well, on condition that the supposed causation is a hybrid determination relation composed of one synchronic non-causal and one diachronic causal relation. There is no need to deny the principle of causal closure of the physical for accepting such determination relations.

To sum up this part, the conceived tension between the principle of causal closure and downward causation is the wrong starting point for both Kistler (2009) and Santos (2015). We don't need to argue against the causal closure in order to be able to make sense of downward causation. There is no need for gaps on lower level causal processes to open a place for downward causation. On the contrary, if we accept that downward causation is possible only with mediation through synchronic determination relation, a higher-level fact's being efficient on a lower-level fact will always require the existence of another lower-level fact upon which that higher-level fact depends. Therefore, causal closure of physics is not an enemy but a friend of

downward causation, unless one understands downward causation in terms of some, to use Craver and Bechtel's (2007, p. 562) term, mysterious determination relations.

Compatibilism again: Getting help from Philosophy of Mind

On the basis of the line of reasoning above, we can say that even if the synchronic determination relation is accepted to be symmetric, this is compatible with the principle of causal closure of the physical. For, the crucial point about closure was the existence of a synchronic relation but not that relation's being symmetric or asymmetric. But then, what was the problem about Craver and Bechtel's account in the beginning?

The synchronic notion they suggested was constitution and they took it to be symmetrical so that it can account for not only upward but also downward causation. Such an understanding of inter-level causes is acceptable unless one accepts one of the levels to be ontologically prior to the other, since the ontological dependence goes both ways in this understanding. This is a problem if one is a materialist, because materialism requires the level of physics to be metaphysically prior to other levels. Thus, if one is looking for a materialist understanding of downward causation, as I am doing in this thesis, Craver and Bechtel's account needs to be adjusted so that it gives priority to the physical.

This is one of the points where the debate about mental causation in the context of philosophy of mind can be a source of help for the debate in the context of philosophy of science to overcome its conceptual problems. As we have seen above, Craver and Bechtel defined the synchronic non-causal component of the hybrid explanation in terms of symmetric manifestation of change: a change at the level of the whole of a mechanism will be manifest as a change at the level of (at least some) parts of that whole and vice versa. Now, to see the similarity between the

two, let us recall the definition of supervenience: "Supervenience means that there could be no difference of one sort without difference of the other sort" (D. K. Lewis, 1986, p. 15). There will remain almost no difference between the definition of supervenience and of Craver and Bechtel's synchronic non-causal relation once we adjust the latter by changing the word 'change' which has diachronic connotations to 'difference' which is more appropriate for denoting a synchronic notion.

Why is this similarity important? Because in the previous chapter, supervenience not being the right kind of notion to represent the synchronic relation between the mental and the physical was the main motivation for switching to a version of compatibilism understood from a fundamentality perspective. Just like supervenience, Craver and Bechtel's synchronic non-causal relation does not have the required structural feature (i.e., asymmetry) to be employed in a materialist worldview. Thus, just as we have done in the context of philosophy of mind, we need to overcome this problem by switching to an asymmetric notion.

However, there was another reason for Craver and Bechtel to use a symmetrical notion instead of simply sticking to an asymmetric notion of constitution. They thought the notion should work both upwards and downwards to be able to account for both upward causation and downward causation. If we use an asymmetric notion for the sake of materialism, how will it account for downward causation? The reply to this question is the second point where we get help from the debate in the context of philosophy of mind. Once an Aristotelian ordered ontology is accepted, the levels of the hierarchy will be sorted so that one of them is the fundamental level and the others are derivative levels which depend on the fundamental. Therefore, the facts on derivative levels will be derivative facts. Similarly, downward causation will be a derivative phenomenon.

To sum, Grounding Physicalism renders the principle of causal closure of the physical, downward causation, and non-reductivity compatible with each other. From the viewpoint of Grounding Physicalism, downward causation is understood as a hybrid notion which can be analyzed into one synchronic and asymmetric non-causal component (i.e., grounding) and one diachronic causal component. According to this analysis, a higher-level fact *C* is causally efficacious on a lower-level fact *e in virtue of* a lower-level entity *c*'s (i.e., *C*'s ground) causing *e*.

Two points need to be highlighted. Firstly, as we did in the debate regarding mental causation, we need to use an asymmetric non-causal relation in this context if we want to stay within a materialist perspective. Secondly, although we use an asymmetric non-causal component, we can still account for downward causation by accepting it to be a derivative phenomenon. Both of these points are contributions to the debate about downward causation taken from the debate about mental causation in the context of philosophy of mind.

The need for asymmetry

Before concluding this chapter, let me address one last question about Craver and Bechtel's account: would it be non-problematic if they used an asymmetrical notion of noncausal component as the name constitution suggests, instead of using a symmetric notion? Namely, why a simple adjustment regarding asymmetry is not sufficient to solve the problem? If it was sufficient, we would stay within a mechanistic perspective and restrain from committing to any substantial ontological account. However, a solution which does not mention fundamentality will not be sufficient. There are three reasons for this. Firstly, an asymmetric notion of non-causal component will only account for upward causation and not for downward causation unless the fundamentality view is revoked. Secondly, without the fundamentality view,

the account is restricted to a materialist position. Thirdly, mechanistic view is not a good template for understanding levels of reality from a non-reductive perspective. The first two reasons are already explicated above. The last one requires more elaboration.

As I stated in the first chapter, there is a seeming tension between non-reductivity and simplicity. Levels of reality view has the appeal of combining these two in a way that it gives us a unified picture of various phenomena we come across. It would not be false to say that non-reductive physicalism about the mental has the same appeal. Nonetheless, in order not to multiply the entities in our domain without a reason to do so, we need to be careful about what a genuine level is. In the context of philosophy of mind, what levels are is obvious: the mental and the physical. The motivation to accept the mental as a level above the physical comes from the idea that mental facts are not reducible to physical facts. The situation is not so clear in the context of philosophy of science. Not every mechanistic level corresponds to a genuine level of reality. For, there are some mechanistic explanations in which a fact at the level of the whole is reducible to a fact at the level of parts.

How can we distinguish mechanistic levels which correspond to genuine levels of reality from those which do not? To this end, I propose a criterion on the basis of a case which was originally used as a counterexample against realism about grounding relation. Victor Tamburini (2018) came up with an ingenious exemplary case where which seemingly poses a difficulty for realism as to grounding relation because the direction of the ontological dependence between properties instantiated in the example is opposite of the direction of the ontological dependence between the entities which instantiate those properties. The entities we talk about are a wall, Bob, and a brick which partially constitutes it. The properties these two instantiate are bondi blue (i.e., a specific shade of blue) and blue, respectively. Now, because the directions of the seeming

ontological dependency relations are opposite of each other, there is no clear dependence between the statements 'Bob is bondi blue' and 'Bob's brick is blue'. Neither of the facts depends on the other. Tamburini takes to be a reason to cast doubt on realism about grounding relation.

I am going to use this example in another way. Such examples can be produced only if we work with a notion of constitution where both a whole and its parts can instantiate the same kind of properties. But if they can do so, why would we mention a fact on the level of the whole in an explanation while we can mention a fact on the level of parts corresponding to the whole? 'Bob's bricks are bondi blue' can be substituted for 'Bob is bondi blue' without a remainder. On the contrary, according to a levels of reality view understood from a non-reductive physicalist perspective, a mental fact is not reducible to a physical fact. More importantly, it is not possible to produce an example similar to the case of Bob in that context since a property instantiated at the level of the mental will not be instantiated at the level of the physical. Thus, this can serve as a criterion to distinguish genuine levels of reality from a less important notion of levels which is reductive.

As the criterion above indicates, not every constitution relation corresponds to a relation between two genuine levels. Inter-level causation is a significant phenomenon only if it happens between genuine levels. Otherwise it could have been easily reduced to an intra-level causation. Therefore, constitution is not a sufficient notion to capture the synchronic non-causal component of hybrid inter-level causation. This is why grounding physicalism, in which an ontological dependence relation between facts at different genuine levels is used, is a better option.

Conclusion

Jaegwon Kim attempted to render non-reductive physicalism about the mental as an untenable metaphysical theory via resolving an alleged tension among non-reductivity, mental efficacy, and causal closure of the physical by turning it into an exclusion argument against mental causation. In this dissertation, by summarizing compatibilist solutions of Árnadóttir & Crane (2013) and Bennett (2003, 2008), I showed that non-reductive physicalists can oppose this argument by appealing to a compatibilist resolution of the alleged tension among the principles. The key idea in compatibilism about those principles is that the mental and the physical are distinct but they are not independent from each other. Therefore, mental causes do not overdetermine their physical effects in the way that the causes in the paradigm cases of overdetermination do.

Furthermore, I argued that compatibilist solutions to the problem require an asymmetric ontological dependence relation between the mental and the physical which explains the tight relation between these two. Grounding Physicalism, offered by Kroedel & Schulz (2016) provides that explanation. Working through an ordered ontology perspective, Grounding Physicalism accounts for the needs of a non-reductive physicalist theory of the mental.

A compatibilist solution to the problem of mental causation can only be made sense of from within an ordered ontology perspective. Otherwise, there would have been no way of distinguishing compatibilism from epiphenomenalism (i.e., the view that the mental cannot cause any physical effect) because, as Bennett (2008, p. 301) admits, compatibilist accounts deny the existence of *independent* mental causes of physical effects. The only difference between epiphenomenalism and compatibilism is their attitude towards the existence of *dependent* mental

causes. Grounding Physicalism make it possible for us to accept the following two claims together: (1) the mental ontologically depends on the physical, and (2) the mental is efficacious on the physical. These two statements are compatible with each other thanks to the idea that mental causation is a derivative phenomenon.

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