Neo-Thomistic Hylomorphism Applied to Mental Causation & Neural Correlates of Consciousness

Matthew Keith Owen

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Department of Philosophy
College of Arts & Law
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Abstract

The aim of this work is to defend substance dualism by defeating two of its paramount potential defeaters. I will argue that a substance dualist position, neo-Thomistic hylomorphism, provides a solution to the causal pairing problem and a good explanation of neural correlates of consciousness. After an introductory first chapter, I'll explicate dualism's dominant potential defeaters in the next three chapters. Chapter 2 will clarify what neural correlates of consciousness are and the objection to dualism based on neural correlates. The following two chapters will distinguish and elucidate dualism's principal problem regarding mental causation, which I'll argue is the causal pairing problem. The fifth chapter will introduce and explain neo-Thomistic hylomorphism. Chapter 6 will apply neo-Thomistic hylomorphism to the causal pairing problem, providing a solution that appeals to a fundamental tenet of neo-Thomistic hylomorphism. In Chapter 7 I'll apply the view and an Aristotelian powers ontology to construct a model of neural correlates of consciousness that's intended to explain such correlations. The final chapter will offer a conclusion and briefly discuss relevant future research.

To my grandparents,
Keith Wallace and Sarah Kathryn Owen

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During the fall of 2016 I had the privilege of being a participant at the University of Oxford's *Neo-Aristotelian approaches to the metaphysics of the mind* summer school & conference, directed by Anna Marmodoro. The congenial environment provided an excellent opportunity to deepen my understanding of Aristotelian metaphysics. During this conference I first began thinking significantly about how an Aristotelian powers ontology can be applied to an account of neural correlates of consciousness.

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The president of the Davenant Institute, Brad Littlejohn invited me to present on neuroscience and the human mind, which gave me the opportunity to present content

from Chapter 2 and Chapter 7. And some content from Chapter 2 was published fall 2017 at the American Philosophical Association's blog. I appreciate the helpful comments on that piece.

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Introduction

The aim of this work is to defend dualism. I intend to defuse two paramount objections threatening to defeat dualism. The causal pairing problem allegedly undermines the possibility of mental causation for nonphysical minds. And neural correlates of consciousness allegedly provide strong evidence for physicalism and the negation of dualism. I will argue that one substance dualist position, neo-Thomistic hylomorphism, can solve the causal pairing problem and provide a good explanation of neural correlates of consciousness.

The next three chapters will clarify and explicate dualism's potential defeaters. Chapter 2 will discuss neural correlates of consciousness (for brevity NCC), what they entail, and how they purportedly undermine dualism. Chapters 3 and 4 will distinguish and clarify dualism's chief problem regarding mental causation, which I'll argue is the causal pairing problem. Neo-Thomistic hylomorphism is presented in Chapter 5 and subsequently applied to dualism's defeaters in the following two chapters. In Chapter 6, I propose a hylomorphic solution to the causal pairing problem. In Chapter 7, I construct my hylomorphic model of NCC intended to explain the correlations between neural processes and consciousness. By the end, I hope to have shown that neo-Thomistic hylomorphism can solve the causal pairing problem and explain NCC, and thus overcome the two paramount objections to substance dualism.

Dualism is unpopular; substance dualism is even less popular. So naturally one might ask why I would defend such an antiquated view as a contemporary philosopher of mind. The fundamental reason pertains to my curiosity and interest. I'm very interested in the topic I've chosen to research, and it turns out that I'm not alone. As I'll point out in the following section, in the last half century dualism has gone from being nearly blacklisted in contemporary philosophy of mind to seriously reconsidered. Surprisingly, dualism is being dusted off and reevaluated as "the waning of materialism" becomes more evident, to borrow of phrase from a volume published by Oxford University Press in 2010.

But such reconsiderations will be short lived and dualism's rejection will be renewed, if dualism's paramount problems are not dealt with. In section 1.2 of this introduction, I'll discuss these problems. In section 1.3, I'll elaborate on the aim of this work and provide a brief overview of the forthcoming chapters. Section 1.4 will address my starting presuppositions.

1.1 Recent History

Throughout the previous century dualism's demise seemed imminent. During the 1970s Daniel Dennett (1978, p. 252) assessed the field of philosophy of mind and his evaluation of dualism is unflattering, to put it mildly:

> Since it is widely granted these days that dualism is not a serious view to contend with, but rather a cliff over which to push one's opponents, a capsule 'refutation' of dualism, to alert if not convince the uninitiated, is perhaps in order.

Dennett's (1978, p. 252) one paragraph refutation claims the dualist has two bad options. She can accept an epiphenomenalism that claims there are causally impotent non-

physical mental states resulting from brain events or a Cartesian interactionist dualism. Either way, Dennett (1978, p. 252) concludes, dualism comes with an "exorbitant price."

Two decades after Dennett's assessment, John Haldane (1998) published 'A Return to Form in the Philosophy of Mind.' In this article, written just before the turn of the century, Haldane (1998, p. 257) highlighted an ironic shift in the field: "dualism has to be contended with." The two decades between the two assessments, Dennett's and Haldane's respectively, included the rising realization that consciousness is quite recalcitrant. Reducing consciousness to physics was made difficult by qualia and multiple realizability.

Qualia are the subjective experiences of what it's like to be in a particular conscious state. For example there's a difference between consciously tasting chocolate versus consciously feeling a bee sting. This is a difference of qualia. Multiple realizability is the idea that conscious states like tasting chocolate can be realized by different physical states (cf. Bickle, 2016). Accordingly, two subjects with different types of physical bodies could have the same conscious state. Both qualia and multiple realizability will be discussed in Chapter 2 section 2.4.2.

To be sure, the recalcitrance of consciousness has not led to a resurgence of dualism, but rather a reconsideration.[1] It was true at the end of the previous century and has been true during the beginning of this century that "mainstream orthodoxy consists of various versions of materialism" (Searle, 1992, p. xiii). Nevertheless a change in the tide, a reconsideration of dualism, is evidenced by a brief overview of the publication record. The decades following Dennett's decisive declaration saw a variety of substantial

[1] Timothy O'Conner and David Robb (2003, p. 5) speak more optimistically: "…dualism in recent years has even enjoyed something of a renaissance."

publications questioning physicalism and supporting nonphysicalist and dualist views. In this section I'll highlight some noteworthy works from 1980 to the present.[1]

In the early eighties, the Gifford lectures given by the well-known neuroscientist, Nobel laureate, and dualist, John Eccles were published under the title *The Human Psyche*. In that volume Eccles (1980) argued against materialism and for a dualist-interactionist position. A couple years later, Howard Robinson (1982) published *Matter and Sense: A Critique of Contemporary Materialism* with Cambridge University Press (hereafter CUP). The same year Frank Jackson (1982, p. 130) presented his well-known Knowledge Argument against physicalism using his infamous thought experiment involving a hypothetical neuroscientist named 'Mary' (see also Jackson, 1986).

In the mid-eighties, Oxford University Press (hereafter OUP) published *The Evolution of the Soul*, in which Richard Swinburne (1986) argues for substance dualism. Two years later W.D. Hart (1988) argued for substance dualism in *The Engines of the Soul* published by CUP. Hart was well aware that he was swimming against the current of mainstream materialism. "But orthodoxy needs devil's advocates," he wrote, "they have a serious part in the play of ideas even if committed heterodoxy invites excommunication" (1988, p. x). Before the decade closed the University of Virginia Press published *The Case for Dualism* (Smythies and Beloff, 1989).

The nineties also saw substantive publications that questioned physicalism as well as publications that favored dualism. The year of 1991 witnessed several publications. That year, OUP published David Hodgson's (1991) *The Mind Matters: Consciousness and Choice in a Quantum World*, which challenged a reductive physicalist mechanistic

[1] For a helpful list of sources pertaining to dualism, see Brandon Rickabaugh's (2016) unpublished bibliography.

view of the mind. Roderick Chisholm published 'On the Simplicity of the Soul' in *Philosophical Perspectives*. Chisholm (1991, p. 167) argued that the nature of human persons is completely unlike that of compound physical things. And Routledge published John Foster's (1991) *The Immaterial Self: A defense of the Cartesian dualist conception of the mind*.

Two years after the prolific year of 1991, a volume edited by Howard Robinson (1993) entitled *Objections to Physicalism* was published by OUP. And evidently Hart wasn't excommunicated for defending his unorthodox dualist position in the eighties. In the mid-nineties he wrote a section on dualism for *A Companion to Philosophy of Mind* published by Blackwell. Also in the mid-nineties, CUP published E.J. Lowe's (1996) *Subjects of Experience*, in which Lowe defends substance dualism. And OUP published David Chalmers's (1996) influential work *The Conscious Mind*, which argues for property dualism. Just before the turn of the millennium William Hasker (1999) advocated for emergent substance dualism in *The Emergent Self*, published by Cornell University Press.

The new millennium brought new works challenging physicalism as well as new works supporting dualism. In 2001, CUP published *Physicalism and Its Discontents*. In 2005, David Oderberg published 'Hylemorphic Dualism'[1] in *Personal Identity*, a volume published by CUP and edited by Ellen Frankel Paul, et al. *The Waning of Materialism*, edited by Robert Koons and George Bealer was published by OUP in 2010. This volume includes intriguing chapters authored by top-tier philosophers, such as Laurence

[1] Oderberg spells 'hylomorphism' according another common spelling, 'hylemorphism.'

BonJour's 'Against Materialism' and E.J. Lowe's 'Substance Dualism: A Non-Cartesian Approach.'

In 2011, Continuum published *The Soul Hypothesis*. The University of Notre Dame Press published *After Physicalism* in 2012. From 2012 to 2013, an interdisciplinary research project generously funded by the Templeton Foundation entitled 'Neuroscience & the Soul' investigated whether the soul exists and what neuroscience has to say about it (see Crisp et al., 2016). Around the same time, two works in favor of dualism arrived on the scene. Richard Fumerton's (2013) *Knowledge, Thought, and the Case for Dualism* appeared in the Cambridge Studies in Philosophy series and Richard Swinburne's (2013) *Mind, Brain, & Free Will* was published by OUP. One year later a volume edited by Andrea Lavazza and Howard Robinson, *Contemporary Dualism: A Defense* was added to the Routledge Studies in Contemporary Philosophy series. In 2015 another interesting study funded by the Templeton Foundation began at Cambridge University. Led by Tim Crane, *The New Directions in the Study of the Mind* investigated non-physicalist views of the mind. And in 2017, *The Blackwell Companion to Substance Dualism* made its début.

Dualism is far from prominent and physicalism is still philosophical orthodoxy. Yet it's apparent that dualism is being reconsidered. And this reconsideration has led to the development (or re-development) of considerable arguments for dualism. Nevertheless dualism's defeaters must be dealt with if dualism is to be seriously considered as anything more than an interesting route to a dead end.

1.2 Dualism's Defeaters

The third chapter of Jaegwon Kim's *Physicalism, Or Something Near Enough* is entitled 'The Rejection of Immaterial Minds: A Causal Argument.' Kim's (2005, p. 70) opening words allude to dualism's reconsideration:

> The deep difficulties that beset contemporary nonreductive physicalism might prompt some of us to explore nonphysicalist alternatives; in fact, the nonreductivist's predicament seems to have injected new vigor into the dualist projects of philosophers with antecedent antiphysicalist sympathies.

In the first two chapters of the book Kim focused on problems physicalists face regarding mental causation. According to Kim (2005, p. 70), the "upshot" is that physicalists have two options: epiphenomenalism or reductionism. "With good reason," Kim continues, "most philosophers have found neither choice palatable."

Given two unpalatable options, the worry is that substance dualism will be considered an alternative (Kim, 2005, p. 71). But dualism is a dead end that won't help and will actually make things worse when it comes to mental causation, Kim argues (2005, p. 71). So as the title of the chapter suggests, we should reject substance dualism. His argument for rejecting substance dualism rests on mental causation. In the rest of the chapter, Kim (2005, pp. 71, 73-74, 92) tries to defeat dualism by developing a famous objection Princess Elisabeth of Bohemia raised against René Descartes's interactionist dualism. The result is the causal pairing problem for substance dualism.

I'll explicate the causal pairing problem at length in Chapter 4. Suffice it to say that the basic idea is that a nonphysical mind and a physical body are of such different natures that it's impossible for them to be causally paired as cause and effect. The consequence of the causal pairing problem is that mental causation is impossible for the

nonphysical (or immaterial) minds of substance dualism. If that's true, dualism should indeed be rejected.

If the causal pairing problem is irremediable, it could itself undermine dualism. But it is not dualism's only prominent potential defeater. A second considerable objection appeals to neuroscience. Hedda Hassel Mørch (2017) sums up a common conception: "Modern science has given us good reason to believe that our consciousness is rooted in the physics and chemistry of the brain, as opposed to anything immaterial or transcendental." This claim is so widely believed today that it can be (and often is) made without citing any of the evidence that allegedly supports it. Nevertheless it's neural correlates of consciousness that allegedly provide powerful evidence that consciousness is rooted in brain processes and that some version of physicalism is true (see e.g. Murphy, 1998, p. 13). If neuroscience proves physicalism then it disproves dualism, which then becomes an "antiscientific" position in contradistinction to the "scientific" physicalist alternatives (cf. Searle, 1992, pp. 3-4).

Thus despite dualism's reconsideration in recent times, it faces two potential defeaters that threaten to undermine its viability. The causal pairing problem threatens to make mental causation impossible for the immaterial minds of substance dualism. And neural correlates of consciousness allegedly show that the mind is not immaterial but rather something physical. If either defeater succeeds, dualism disintegrates. Thus the success of either defeater would stifle the recent reconsiderations of dualism and warrant its rejection. Indeed this seems to be Kim's (2005, pp. 70-71) intention with the causal pairing problem. But if these defeaters can be defeated, they provide no such warrant for dualism's demise.

1.3 Defeating Dualism's Defeaters

My aim is to defeat substance dualism's potential defeaters. I intend to show that there's a version of substance dualism, which I call *neo-Thomistic hylomorphism*, that provides a solution to the causal pairing problem and a good explanation of neural correlates of consciousness. The next three chapters will focus on explicating dualism's potential defeaters. The subsequent three chapters will explain neo-Thomistic hylomorphism and how it can solve the pairing problem and account for neural correlates of consciousness.

Chapter 2 will focus on neural correlates of consciousness, explaining what they are, how we identify them, what they entail, and the argument against dualism based on such correlations. The conclusion of this chapter is that neural correlates don't entail any particular view of the mind and the argument against dualism based on these correlations has considerable weaknesses. And thus it's unclear how neural correlates undermine dualism.

Chapters 3 and 4 will clarify dualism's paramount problem regarding mental causation. However, there are various problems pertaining to mental causation and not all of them are serious problems for dualism (cf. Kim, 2001b, pp. 271-272). Therefore these chapters will clarify what problem is dualism's paramount problem regarding mental causation and give a detailed explication of it. Chapter 3, entitled 'Mental Causation and Two *Other* Problems,' will distinguish two problems that do not provide strong threats to dualism, at least relative to the causal pairing problem. A problem Donald Davidson raises regarding a lack of psychophysical laws and the causal exclusion problem will be clarified and discussed in that chapter. The aim is to distinguish these problems from dualism's chief problem regarding mental causation – the causal pairing problem – and

justify setting them aside to focus on the pairing problem. Chapter 4 will explain the causal pairing problem.

In Chapter 5, I'll introduce neo-Thomistic hylomorphism. My intention in this chapter is to present and describe a view in the philosophy of mind and human ontology that is informed by Saint Thomas Aquinas. However, my focus will not be exegetical or historical. I will not focus on interpretive debates about what exactly Aquinas thought. I call my view a "*neo*-Thomistic" view because it's informed by Aquinas's thought, but I make no claim that it is exactly what Aquinas thought. I am interested in whether this view can defeat substance dualism's defeaters. I think it can, and that's what I intend to demonstrate.

Since I'll be defending dualism, and specifically substance dualism, let's clarify what I mean by 'substance dualism.' Timothy O'Conner and David Robb (2003, p. 4) distinguish substance dualism from property dualism as follows. According to property dualism, there are nonphysical mental properties even if the mind itself is a physical substance. According to substance dualism, the mind is a nonphysical substance. Property dualists say there are nonphysical mental properties. Substance dualists go further and say such mental properties are the properties of a nonphysical mental substance (see Robinson, 2016, section 2.3). What I mean by 'substance dualism' is the idea that human persons have or are a nonphysical mental substance.

Admittedly, different metaphysical commitments entail different definitions of a substance. I'll discuss what a substance is according to Aristotelian-Thomistic metaphysics at the beginning of Chapter 5 before presenting neo-Thomistic hylomorphism. For now, let me simply say that a substance is a unified entity that can

persist through time and change. So what I mean more precisely by 'substance dualism' is broadly the view that human persons have or are a unified nonphysical mental entity that can persist through time and change.

In contemporary philosophy, the term 'mind' usually refers to a mental substance, whether that substance is physical or nonphysical. Thus physicalists will speak of a physical mental substance that they call the 'mind.' Similarly substance dualists often speak of a nonphysical mental substance that they call an 'immaterial mind' or 'nonphysical mind,' following the terminology of modern philosophy. I will often do the same. However substance dualists also sometimes refer to the nonphysical mental substance using the term 'soul,' following pre-modern terminology. And I will often use this terminology as well, and especially when describing Aquinas's thoughts or the neo-Thomistic view I'm advocating.

It's worth explicitly mentioning that, contrary to what's often thought, not all substance dualist think a human person consist of two substances. There are substance dualists that claim the mind (or soul) is a nonphysical substance *and* the body is a physical *substance*. But there are also substance dualists that merely say that the mind is a substance without saying that the body is itself a substance. For example, a crude caricature of substance dualism presents the picture of a ghost, who we can call Casper, in a machine that Casper inhabits and somehow moves around. Suppose someone held this Casper dualist view but her metaphysical view of substances only allowed her to say Casper is a substance, but not the machine body. She would still be a substance dualist because substance dualism is not about counting two complete substances. Rather substance dualism is *dualist* in the sense that it claims there are nonphysical mental

properties and it's *substance* dualist in the sense that it says there's a nonphysical substance that bears nonphysical mental properties.

Interestingly, just as there are property dualists that claim the mind is a physical substance that bears nonphysical properties, there are substance dualist that claim the mind is a nonphysical substance that has physical properties. In his chapter on dualism in *The Oxford Handbook of Philosophy of Mind*, E.J. Lowe describes his dualist view, non-Cartesian substance dualism. This view allows for the nonphysical mind to have physical properties in virtue of having a body with physical properties (Lowe, 2009, p. 68). As will become apparent in Chapter 5, the neo-Thomistic hylomorphic view I propose also permits the claim that the nonphysical soul has physical properties of the body.

After explicating neo-Thomistic hylomorphism in Chapter 5, I will apply the view to dualism's paramount problems in Chapters 6 and 7. The sixth chapter will apply the view to the causal pairing problem. In that chapter I'll provide a solution to the causal pairing problem that capitalizes on the fundamental tenet of neo-Thomistic hylomorphism. The seventh chapter will introduce an Aristotelian powers ontology and apply it to the proposed hylomorphic view in order to give an account of neural correlates of consciousness (i.e. NCC). The aim of the seventh chapter is to construct a neo-Thomistic hylomorphic model of neural correlates, in order to provide a good explanation of NCC from a dualist view.

Chapter 8 will provide a very brief conclusion and highlight relevant forthcoming research. For clarification, this volume will *not* provide sufficient justification for substance dualism broadly, nor neo-Thomistic hylomorphism specifically. My goal is not to argue for dualism. My goal is more modestly to defend dualism against what I think

are its strongest objections. In other words, I aim to defeat dualism's paramount potential defeaters. I hope to show that dualism's difficulties are not insurmountable and that it's a position worth keeping on the table for substantive consideration.

1.4 Presuppositions

As just clarified, my focus is not to argue for dualism in the sense of giving positive arguments for its truth. It's also not my present intention to argue against physicalism, per se. I will argue against physicalist commitments in order to defend dualism and defeat its defeaters. But my aim in this work is not to provide a conclusive refutation of materialism or physicalism.

With that said, I should acknowledge that I find the recent reconsiderations of dualism warranted because I think there are substantive objections to physicalism (see e.g. Owen, 2015). Furthermore, some arguments for dualism broadly and substance dualism more specifically strike me as persuasive and sufficient to justify dualism. For example, I find persuasive Dean Zimmerman's (2011) vagueness argument from property dualism to substance dualism based on the subject that is the bearer of experiences. I also think William Hasker's (2010) argument from the unity of consciousness justifies substance dualism.[1] E.J. Lowes (2001) argument from the simplicity of the self also seems forceful to me. And Richard Swinburne's (1986) case in *The Evolution of the Soul*, especially the evidence from personal identity, is powerful in my opinion. I also think there are good arguments for substance dualism based on freewill and human knowledge

[1] However, I don't think the unity of consciousness supports Hasker's version of emergent substance dualism as well as it supports other versions of substance dualism.

(cf. Swinburne, 2013). In short, I think there are good reasons to think physicalism is false and dualism, even substance dualism, is true.

Therefore, I approach the subject of dualism's potential defeaters with different starting presuppositions than many of my physicalist colleagues. After all, it's not uncommon for contemporary philosophers to assume that dualism is simply not worth serious consideration. I am assuming just the opposite—dualism is worth considering because there are good reasons to think it's true. However, I also think there are considerable objections to substance dualism that must be dealt with. In the next three chapters I'll clarify and explicate what I think are the two most forceful objections to substance dualism. In the following three chapters, I'll try to show that neo-Thomistic hylomorphism can overcome these objections.

2

Neural Correlates of Consciousness

The nonphysical mind of substance dualism is commonly considered a relic of our pre-neuroscientific past. Neuroscience, many would say, has nullified dualism. According to philosopher Nancy Murphy (1998, p. 13), neuroscience provides "dramatic evidence for physicalism." In *The Astonishing Hypothesis: The Scientific Search for the Soul*, molecular biologist and neuroscientist Francis Crick (1995, p. 3) proposes that human persons are "…in fact no more than the behavior of a vast assembly of nerve cells and their associated molecules."[1] Even theologian Michael Horton (2011, p. 376) informs the faithful in *The Christian Faith: A Systematic Theology for Pilgrims on the Way* that neuroscience has firmly established "the mind is matter (i.e. the brain)."[2]

Granted, not everyone shares such sentiments. There are numerous dissenters. Nonetheless, most would still agree with a concession found in the *Stanford Encyclopedia of Philosophy*: "the 'neuroscientific milieu' of the past four decades has made it harder for philosophers to adopt dualism" (Bickle et al., 2010). True as that may be, we must ask: What is the evidence modern neuroscience provides against dualism?

[1] Cf. Mitchell Glickstein (2014, p. 1).

[2] Horton seems to be disavowing dualism and advocating materialism. The previous line says: "Philosophical defenses of materialism seem increasingly substantiated by science" (2011, p. 376). Following that line, he says neuroscience has proven the mind is matter. However, on the next page he advocates what he calls "dichotomy," according to which the soul is distinct from the body and persists after bodily death (2011, p. 377). This seems very dualistic. Moreover, on the same page he has a footnote where he commends John W. Cooper's (1989) position, which Cooper calls "dualistic holism" (see Chapter Ten, section IV). And elsewhere Cooper (2009, p. 46) commends "Thomist dualism."

Surely it's not merely the fact that acts of the mind such as thought are associated with the brain. For this is hardly new information provided by modern neuroscience. The Greek physician Hippocrates (460-375 B.C.E.) knew this much (see 1886, p. 344), as did medieval philosopher and theologian, Thomas Aquinas (see ST 1a 78.4c). So what original evidence has modern neuroscience provided that disproves dualism?

The foremost answer is: Neural correlates of consciousness (for brevity NCC). Accurate or not, the most common example of an NCC is C-fiber activation in one's brain that takes place when they're in a mental state of pain.[1] So when I'm in a conscious state of pain there's a corresponding neural state in my brain, i.e. C-fiber activation. So the C-fiber activation is the neural correlate of the conscious state of pain, according to this example.

On the basis of such correlations, it's argued that physicalism is true and thus dualism is false. This chapter is devoted to explicating and analyzing this line of reasoning. In the first section, I'll clarify what NCC are. Then the methods used to identify NCC will be introduced in the following section, where I'll briefly summarize some example studies. The third section will focus on what NCC imply. The fourth explicates and critically analyzes the argument against dualism based on NCC and the principle of simplicity.

In short, this chapter will clarify the objection to dualism that's based on NCC, and highlight its shortcomings in order to cast considerable doubt on its sufficiency to undermine dualism. In Chapter 7, I will then argue that neo-Thomistic hylomorphism is

[1] C-fiber activation correlated with pain is the standard example in the philosophical literature; therefore I'll often use this example. However, most neuroscientists "would *not* consider these a true content-specific NCC…The pain-NCC is higher-order somato-sensory cortex…" (Koch, 2017).

not only consistent with NCC but also provides a good explanation of NCC. It should be noted that throughout this entire work I won't concern myself with the question of whether there are NCC (cf. Noë and Thompson, 2004). I assume there are. My concern is what they imply, or what best explains them.

2.1 What is an NCC?

Simply put, a neural correlate of consciousness is a neural state or process that's correlated with consciousness. The idea is that when a subject is in a particular conscious state there's a corresponding state of their brain that's correlated with their conscious state. That's a basic description of an NCC.

However, in his influential work 'What Is a Neural Correlate of Consciousness?' David Chalmers (2000) points out that there are various conceptions of neural correlates within the NCC literature. Thus he tries to offer conceptual clarity by giving a theoretically neutral, reasonable definition that reflects common usage (2000, pp. 31, 38). As a starting point, Chalmers (2000, p. 17-18) presents and considers a definition of an NCC derived from the conference program of the Association for the Scientific Study of Consciousness.

> A neural system N is an NCC if the state of N correlates directly with states of consciousness.

Chalmers (2000, p. 18) then asks two clarifying questions: "First, what are the relevant 'states of consciousness'? Second, what does it mean for a neural state to 'correlate directly' with states of consciousness?"

Regarding the first question, Chalmers (2000, pp. 18-23) surveys several classes of phenomenal consciousness sometimes considered in the NCC literature. The first class

is being conscious. A relevant NCC would be a neural state that correlates with a subject being conscious versus not being conscious. The second is a background state of consciousness – such as being awake, asleep, under hypnosis, in a state of flow, or the like. A corresponding neural correlate would be a neural state that directly correlates with one being under hypnosis.

The third class Chalmers covers is contents of consciousness (2000, p. 19). Suppose that after a day of teaching I come home from campus with roses. My wife will delightfully rush over and smell them. When she does, her experience of the smell of the roses is a specific content of her consciousness. A neural state that correlates with that particular experience of the smell of the roses would be a relevant NCC. Contents of consciousness are more fine-grained than the previous classes. The final class Chalmers considers is arbitrary phenomenal properties (2000, p. 22). Specific states of any of the above classes can be members of this class, which might be useful if one tries to give a general definition of an NCC.

When it comes to the second question, the complexity is even more apparent. The original question is: "What does it mean for a neural state to 'correlate directly' with states of consciousness?" Yet this question prompts Chalmers (2000, p. 24-28) to ask two more fundamental questions. First, must the neural state be necessary, sufficient, or necessary and sufficient for the conscious state it's correlated with? Second, must the correlation hold across all cases or only across specific types of cases (i.e. cases with ordinary brain function in an ordinary environment, cases with a normal brain but unusual inputs, cases with varying stimulation, or cases with abnormal brain function due to lesions)?

Adequately answering the above questions is beyond the scope of this section. And my aim is not to formulate an original definition of an NCC. My ultimate aim is to show that a substance dualist position, neo-Thomistic hylomorphism, provides a good account of NCC. Such an account will be most effective if it assumes a reasonable definition that accords with general usage and is theoretically neutral. Since Chalmers's (2000, pp. 31, 38) definition is intended to meet such objectives, I'll adopt his definition.

> An NCC is a minimal neural system N such that there is a mapping from states of N to states of consciousness, where a given state of N is sufficient, under conditions C, for the corresponding state of consciousness.[1]

While this definition is more precise, there are several parts that need explaining. First, the phrase '*minimal* neural system' needs clarification. Here Chalmers (2000, p. 24) is trying to avoid irrelevant neural processes being included (cf. Koch et al., 2016, p. 308). To clarify this point, let's consider a 'minimal engine system' that's a correlate of a car starting. The car starts when the ignition switch turns. So the turning of the ignition switch is a correlate of the car starting. However, there are other conditions true of the car when it starts. The gas tank will contain gas. The fuel line will be clear. The spark plugs will be clean. The crankshaft will be in place. The list goes on and on. Yet, if I were to explain to a new driver which of the above is a relevant correlate pertaining to their car starting, I need not explain the entire system of a properly functioning car engine. I only need to tell the new driver about the 'minimal engine system' that's a correlate of the car starting – i.e. when the ignition switch turns, the car starts.

[1] Leading NCC researcher Christof Koch (2016, p. 307) gives a similar definition: "The NCC are defined as the minimum neuronal mechanisms jointly sufficient for any one specific conscious percept."

Likewise, when it comes to an NCC we're not concerned with everything taking place in the entire nervous system, or even the brain in particular, when one is in a particular conscious state. Rather, we're concerned with the minimal neural state(s) or process(s) that correspond to that conscious state. To refer again to the common example regarding the mental state of pain and C-fiber activation, suppose my dog Anselm accidently bites my hand while playing. Is every firing synapse between the bite on my hand and my brain a neural correlate of my pain state? No, rather the neural correlate is the minimal neural system that, under certain conditions, is sufficient for me to feel the corresponding state of pain. According to our example, that would be the corresponding C-fiber activation, which is the minimal neural system since there's no more fundamental system that suffices for the corresponding state of pain (cf. Chalmers, 2000, p. 25). This is just one hypothetical example. Each minimal neural system will vary depending on the conscious state it correlates with.

The second part of Chalmers's definition that needs explanation is the qualifier 'under conditions C'. To return to our car analogy, while the ignition switch turning is the correlate of the car starting, there are further conditions true of the engine when the car starts. As mentioned above, the gas tank will have gas, the fuel line will be clear, the spark plugs clean, and so on. Such are conditions of a normally functioning car engine. And according to Chalmers (2000, p. 31), the conditions typically relevant to NCC include normal brain functioning that permits some atypical inputs and brain stimulation but not changes to brain structure (e.g. lesions).[1]

[1] Chalmers (2000, p. 32) points out that lesion studies are often used to make inferences about NCC, but he thinks such methodology is flawed. According to Chalmers, "the identity of an NCC is arguably always relative to specific brain architecture and normal

Lastly, let's clarify the phrase 'there is a mapping from states of N to states of consciousness.' First of all, this is not meant to suggest that there's only an NCC if we've already identified it and mapped it. Rather, there's a mapping from the neural state N^1 to the conscious state C^1 if the former corresponds with the latter so that the correspondence could be mapped if identified. Secondly, the idea of mapping between corresponding neural states and conscious states pertains to subjects across a species, not just an individual subject. However, this mapping across a species is not necessarily a correspondence of identical neural states in every subject in a particular conscious state. The search for NCC is a search for biological regularities, and not necessary identical correspondence relations. Biological regularities of all kinds permit variations.

For elucidation, let's return to the familiar example of C-fibers and pain. Regarding the human species, there's a mapping from C-fiber activation to the conscious state of pain if it's true that when humans experience pain their conscious experience corresponds with C-fiber activation in their central nervous system. This doesn't, however, rule out variation. After all, pain can be one aspect of someone's overall conscious experience that includes additional mental states, which might result in neuronal variations. For example, some endurance athletes mentally train themselves to have an unusually high tolerance for pain through self-talk that affects their overall conscious experience when they're in pain. Thus while their experience of pain will be

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brain functioning, and correlation across abnormal cases should not generally be expected." What was an NCC can cease to be such when a lesion alters brain structure, thus warranting caution when making inferences from lesion studies. Fully aware of the case (and need) for caution, Koch pointed out to me on October 16, 2017 that lesion studies can nevertheless provide important information when it comes to identifying NCC especially when such information is coupled with findings from artificial stimulation studies in a healthy brain that corroborate lesion studies (see e.g. Koch et al., 2016, p. 308).

similar to the experiences of other subjects in pain, there will be some mental variation that could result in variation with respect to the neural processes.

Such variation is also relevant to a methodological challenge regarding controlled experiments. That is, it is very difficult if not impossible to produce identical overall conscious experiences in subjects being tested. If a neuroscientist showed me an image of red roses I could report to her my conscious perception of the image, just as my wife could if shown the same image. Yet, my overall conscious experience will likely vary from hers even though we both consciously perceive the same image. After all, I don't care much for red roses whereas she absolutely loves red roses and gets very excited about them. And even if the neuroscientist could get us to have the exact same overall conscious experience, our brains are not exactly similar. In fact, no two individuals have brains that are exactly alike, not even identical twins, or even clones. In light of such variations, we should not expect the search for NCC to reveal correlations that are exactly the same across a species, but rather similar correlations reflecting biological regularities that permit variation.[1]

In sum, according to Chalmers's definition, an NCC is a minimal neural system that's sufficient under certain conditions for the corresponding state of consciousness, such that this correspondence can be mapped. Before concluding this section, it's worth noting that Chalmers's definition can be modified to apply specifically to specific types

[1] I'm indebted to Koch for this point and the foregoing sub points elucidating the overall idea. In our conversation on September 11, 2017 he pointed out the variations pertaining to NCC due to variations of overall conscious experience and differences in individual brains. Koch is the President and Chief Scientific Officer at the Allen Institute for Brain Science that's endeavored to map the human brain and mouse brain, which involves cloned mice (see brain-map.org).

of phenomenal consciousness. For example, Chalmers (2000, p. 31) gives a modified definition particularly relevant to contents of consciousness.

> An NCC (for content) is a minimal neural representational system N such that representation of a content in N is sufficient, under conditions C, for representation of that content in consciousness.

While this modified definition applies to contents of consciousness, similar modifications could be made so that the definition applies specifically to other types of phenomenal consciousness. At times, such modifications might even be necessary.

Now that we're equipped with a definition of neural correlates of consciousness, let's consider how we identify NCC. The next section introduces standard methodology used to identify neural correlates of consciousness.

2.2 Identifying NCC

The aim of this section is to introduce methods used to identify neural correlates of consciousness. In meeting this objective I'll refer to several example studies. The first study took place in the nineteenth century and provided a theoretical basis for techniques vital to the contemporary search for NCC. The second study, published in the year two thousand, pertains to neural correlates of binocular rivalry. It gives us an example of standard contemporary methodology used to identify NCC, which explicitly relies on subjective reports from study participants. The third study also pertains to neural correlates of binocular rivalry, but it implements the recently developed 'no-report paradigm.' This paradigm includes trials of the study with explicit reports from participants, as well as trials without explicit reports where physiological measures (e.g. pupil dilation) are used to infer what participants perceive (Koch et al., 2016, p. 308).

Fundamental to identifying neural correlates of consciousness is finding neural activity that consistently corresponds with certain conscious states. Imaging brain activity is central to this endeavor. Over a century ago Italian physiologist, Angelo Mosso (1846-1910), laid the conceptual basis for brain imaging techniques vital to the contemporary search for NCC (see Sandrone et al., 2014). A chief challenge to studying the brain is that it's enclosed in a hard protective casing – i.e. the skull. Mosso worked with a patient named Bertone who suffered extensive damage to the top of his skull, consequently much of it was missing. Where Bertone's skull was missing, Mosso placed a cap made out of a rubber-like substance, *gutta percha* (Glickstein, 2014, p. 343). This flexible cap made it possible to record brain pulsations of blood pressure correlated with mental activity such as emotional arousal and doing arithmetic (Glickstein, 2014, p. 343).

Mosso's study confirmed a straightforward hypothesis. That is, if the brain works harder there will be increased blood flow to the brain, so if the brain works harder when the mind works harder, there will be increased blood flow to the brain when the mind works harder. Put differently, (a) increased mental activity means (b) increased brain activity, which means (c) increased blood flow in the brain. So (a) increased mental activity correlates with (c) increased blood flow in the brain. Mosso confirmed this by measuring the increased blood flow in Bertone's brain that took place when Bertone's mental activity increased.

However, the method Mosso used to measure pulsations in Bertone's brain had a limitation. It was effective only if the patient had an abnormal skull breach (Sandrone et al., 2014, p. 622). Mosso's ingenious 'human circulation balance' was invented to overcome this limitation (Sandrone et al., 2014, p. 622). Mosso had his patients lay on a

table that was essentially a balance intended to measure pulsations of blood flow that would tip the balance. Whether or not Mosso's human circulation balance was reliable, his work laid the conceptual foundation for noninvasive functional brain imaging techniques (Sandrone et al., 2014, p. 621-622). Noninvasive functional brain imaging is done while the brain is active and without being invasive to the brain by penetrating it in any significant way. Such brain imaging is vital to the search for NCC. Since it allows us to see brain activity that corresponds with a conscious subject's mental activity.

Needless to say, noninvasive functional brain imaging technology has advanced significantly since Mosso's day. In the 1920s a German psychiatrist, Hans Berger, discovered it's possible to record electrical activity in the brain from the human scalp (Glickstein, 2014, p. 338). This type of recording is called an electroencephalogram (EEG) (Glickstein, 2014, p. 338). Positron emission tomography (PET) and functional magnetic resonance imaging (fMRI) have also since developed. A PET scan can reveal blood flow, glucose metabolism, oxygen metabolism, or concentrations of dopamine transporter indicative of brain activity (Johnson and Becker, 1999). An fMRI reveals increased brain activity by revealing increased blood flow. The blood carries oxygen on molecules of hemoglobin containing iron that changes the thermodynamic and magnetic properties of the brain area, which is detected by magnetic resonance imaging (see Bulte, 2011, 4:15-5:00).

Such technology is invaluable in the contemporary search for NCC, principally instigated in the late twentieth century by Francis Crick and Christof Koch (1990). To elucidate contemporary methodology, let's consider a conventional study done by Alex Polonsky and company (2000) to identify neural correlates of perception during binocular

rivalry. In Polonsky's study fMRI was used to measure fluctuations of cortical activity correlated with alternating perceptions during binocular rivalry (2000, p. 1153). Binocular rivalry is a controllable perceptual illusion that takes place when both eyes are presented with different stimuli and the brain only allows one to be perceived (Mormann and Koch, 2007).

While two different rival stimuli were presented to each eye of study participants, the researchers measured fMRI signals in the early visual cortex (2000, p. 1153). One stimulus was a higher contrast green grating image. The other was a lower contrast red grating image. The subjects would report which stimulus they perceived by pressing one button when they perceived the green image and another button when they perceived the red image (2000, p. 1154). There was also a third button the subjects were instructed to push when their perception of either the higher or lower contrasts were less than seventy-five percent homogeneous at particular times (2000, p. 1154). The researchers found that the fMRI signal in the primary visual cortex (V1) correlated with the perceptions the subjects reported. "V1 activity tended to increase when subjects reported seeing the higher contrast green grating, and the activity tended to decrease when they reported seeing the lower-contrast red grating" (2000, p. 1155).

To clarify the degree of these activity fluctuations in the fMRI signal, they did a separate series of fMRI scans to measure V1 activity as the stimuli physically alternated (2000, p. 1155). Basically, they compared V1 activity during binocular rivalry to V1 activity during stimulus alternation. Confirming earlier accounts (see Heeger et al., 2000), it was found that neuronal activity in V1 followed the alternations of the stimuli (2000, p. 1155). And they found that the fluctuations of V1 activity during binocular

rivalry were forty-five to eighty-three percent as large as fluctuations in V1 activity induced during the stimulus alternations (2000, p. 1155). Furthermore, V1 activity fluctuations were about equal to those in visual areas nearby, that is: V2, V3, V4v and V3a (2000, p. 1155).

Polonsky and company (2000, p. 1157) concluded that their findings suggest neuronal activity critical for binocular rivalry is expressed as early as the primary visual cortex, V1, in the case of human vision. As they (2000, p. 1153) acknowledge, this runs contrary to the view that such neural activity occurs predominantly in later visual areas, which prior studies indicated (cf. Leopold and Logothetis, 1996; Logothetis and Schall, 1989; Sheinberg and Logothetis, 1997). Simply put, their methodology consisted of controlling the stimuli presented to each eye of the subjects to induce binocular rivalry and imaging V1 neuronal activity using fMRI as the subjects reported their perceptions.

Such methodology critically depends upon the subjects' awareness of their perceptions, because the subjects report what they perceive to the researchers. The researchers then infer that the mental perception being reported correlates with the neural activity at that time, which is identified via brain imaging. This reliance on subjective reports is worrisome because researchers might confuse neural correlates of the subject's mental state during the report for neural correlates of the mental state being reported.[1] In other words, when a subject (*PERCEIVES*) perceives a green grating image without considering the fact that she perceives the image she is in a different mental state than when she (*REFLECTS*) perceives the image *and* considers her perception of it. In the former case she simply has a first order awareness of what's perceived (i.e. the green

[1] I'm grateful to Koch for clarifying the motivation of the no-report paradigm during our conversation at the Allen Institute, March 15, 2017.

image). In the latter case she has a second order awareness of her first order awareness, so her mental state includes perceiving the green image and being aware of the fact that she perceives the green image.

Given that, a worry arises. That is, when the subject reports their first order awareness then they are in a different mental state that includes the second order awareness. And consequently the identified neural "correlate" may actually be correlated with the mental state that includes the second order awareness (i.e. *REFLECT*) when it's thought to be correlated with the first order mental state of simply perceiving the green image (i.e. *PERCEIVES*).

This worry motivates what's called the 'no-report paradigm' (cf. Tsuchiya et al., 2015). This methodological paradigm includes study trials with explicit reports from participants, as well as trials without explicit reports where physiological measures are used to infer what participants perceive (Koch et al., 2016, p. 308). In 2014, Stefan Frässle and a team of researchers did a study on binocular rivalry with a pioneering application of a no-report paradigm (see Koch et al., 2016, p. 318, note 36). Again the subjects were presented with different stimuli to induce binocular rivalry. Their no-report paradigm used the ocular motor reflex, optokinetic nystagmus, along with pupil size as "objective measures" of which stimulus was dominant (Frässle et al., 2014, p. 1739). These reflex measures together with fMRI purportedly allowed them to assess the NCC of binocular rivalry without active reports from the subjects (Frässle et al., 2014, p. 1738). Frässle and company compared these measures to trials with active reports from the subjects, which allowed them to test the "applicability" of the objective measures (Frässle et al., 2014, p. 1743). When all was said and done, they concluded that active

report and possibly introspection were partly responsible for neuronal activation patterns that are typically observed (Frässle et al., 2014, p. 1743-1745).

The no-reports paradigm is an innovative approach. Yet its accuracy depends on the reliability of the alleged objective measures, which may be difficult to establish. In any event, this concludes our brief overview of the methodology used to identify NCC. As an introduction to this methodology we've briefly considered three example studies intended to identify NCC. Given the discovery of neural correlates of consciousness, it's fitting to ask what they imply.

2.3 Implications of NCC

While the evidence for neural correlates of consciousness may be clear, it's not obvious what such correlations entail regarding the nature of the mind. At this point a common fallacy – *post hoc, ergo propter hoc* – is tempting to commit. This fallacy is committed when one infers that ϕ caused φ simply because ϕ is correlated with φ. If one inferred that Barack Obama winning the democratic nomination in 2008 caused the stock market crash of 2008 simply because there's a correlation between the two events, they would commit this fallacy. Correlation doesn't entail causation. One needs further rationale to infer that a correlation is best explained by (or suggests) a causal relation.

Likewise, a correlation by itself doesn't entail dependency, identity, or that one correlate is reducible to the other. Given that ϕ is correlated with φ, we need more information to justifiably conclude that ϕ depends on φ, is identical to φ, or is reducible to φ. Suppose that all around the world whenever any philosopher heard a knock on their door they found a packaged philosophy book on their doorstep. On the basis of this correlation alone we couldn't justifiably infer that the packaged books caused the knocks,

lest we commit the fallacy mentioned above. But likewise, we couldn't infer that the door knocks depend on the philosophy books. Nor could we infer that the knocks are identical to the books or in some way reducible to them. Further information would be required to justifiably make such inferences.

In some cases where we've identified an NCC we might have additional data that justifies further inferences. For example, suppose that whenever Fern was in a mental state of remembering her childhood in Kansas, a particular part of her brain lit up. And suppose further that the same area lights up in Kathryn's brain whenever she remembers her childhood in Washington State. Moreover, presume the data related to Fern and Kathryn confirms numerous studies with many human subjects. Given this, we could know that Fern and Kathryn's mental states of remembering their childhood correlate with neural activity in a particular part of the human brain.

From this correlation alone we couldn't infer that Fern and Kathryn's mental state caused the neural activity, depended on it, was identical to it, or reducible to it. However, suppose that Fern and Kathryn lost the part of their brain with the neural correlates and directly after this they could never again remember their childhoods. Given this, the data set would then include more than just the correlations. With this additional data it would be justifiable to conclude that their mental state of remembering their childhood was not only correlated with the neural activity, but also depended on it.

If a physicalist assumed physics is fundamental before mapping the correlation between Fern and Kathryn's mental activity and the corresponding neural activity, she would likely conclude the correlation implies that the mental activity depends on the neural activity before gaining the additional data. And she would be justified in doing so

to the degree that her assumption was well justified. But she would not be arriving at this conclusion merely on the basis of the correlation. Rather she would be justifiably arriving at the conclusion on the basis of the correlation *coupled with her preexperimental assumption*. Similarly, a dualist could justifiably conclude that Fern and Kathryn's immaterial minds stood in some type of causal relation with the neural correlates, if she justifiably assumed that their mental states are not reducible to physical states. However the dualist, like the physicalist, would be arriving at her conclusion on the basis of the NCC and her preexperimental assumption.

Pessimists might roll their eyes at this point and remind us that everyone has pre-experimental assumptions. That's true. Nevertheless, that doesn't mean we can't learn anything from NCC. It does mean, however, that it's important to analyze our pre-experimental assumptions and to be aware of the justificatory role they play. And according to Chalmers (1998, p. 227), "once we recognize the central role of preexperimental assumptions in the search for the NCC, we realize that there are limitations on just what we can expect this search to tell us." Given this, it's fitting that Thomas Metzinger (2000, p. 4) writes in his influential volume *Neural Correlates of Consciousness*:

> However, mapping does not mean reduction. Correlation does not mean explanation. Once strict, fine-grained correlations between brain states and conscious states have been established, a number of theoretical options are still open. Additional constraints therefore will eventually be needed. Important questions are What is the true nature of these psychophysical correlations? Are we justified in interpreting them as causal relations? What additional constraints would have to be introduced in order to speak of law-like correlations…? Is a fully reductive account, or even an eliminativist strategy, possible?

Though Metzinger is no dualist (cf. Metzinger, 2003), he goes on to acknowledge:

> Assume that we find a strict and systematic correlation between a certain brain property or type of neural event N and the subjectively experienced phenomenal property of "sogginess" S. This is entirely compatible with Cartesian dualism: The underlying relation could indeed be a causal one, namely causal interaction between events in two ontologically distinct domains.

In short, correlations don't entail causation, dependency, identity, or reducibility. Therefore further philosophical argumentation beyond the empirical data of NCC is required to arrive at a justified conclusion about the nature of the mind.

2.4 Against Dualism

So far I've argued that NCC don't entail a particular view of consciousness. As Jakob Hohwy (2007, p. 461) puts it: "…the notion of 'correlation' doesn't by itself commit one to any particular metaphysical view about the relation between (neural) matter and consciousness." Given this, a philosophical argument is needed to show that NCC suggest dualism is false.

In *Sensations and Brain Process*, J.J.C Smart (1959) aims to provide such an argument against dualism. Smart's influential argument is based on the principle of simplicity, also known as Occam's razor. Simplicity says that when there are multiple theories that sufficiently explain a data set the theory that includes the least unnecessary entities is preferable.[1] Simplicity is one theoretical virtue that helps us discern which theory amongst competing theories provides the best explanation.

In this section I'll present Smart's simplicity argument and then give a twofold critical analysis. After presenting the simplicity argument I'll critique Smart's conclusion by summarizing problems that have convinced many philosophers that it's false. Then I'll

[1] Koch (2006, p. 11) sums it up well: "…this principle states that of equally good explanations for a phenomenon, the best one is the simplest explanation that accounts for all the facts."

highlight a handful of weaknesses regarding the argument itself. My focus will be Smart's simplicity argument, but it should be noted that he isn't the only materialist who argues on the basis of simplicity. More recent contributions in this area have come from Christopher Hill (1991) as well as Ned Block and Robert Stalnaker (1999).[1] However, it's important to note that Hill's (1991, Ch. 2) simplicity argument against dualism markedly differs from Smart's (1959) argument, and I find it best to focus on Smart's rather Hill's for two reasons.

One, Smart is widely influential. Two, Hill's argument and conclusion are much weaker, in my opinion. According to Hill (1991, pp. 28-29), there are three different ways the simplicity argument can be formulated according to different ways of understanding simplicity. Hill (1991, pp. 29-39) argues that two of the formulations fail. He then presents his own formulation, which relies on simplicity for aesthetic appeal rather than epistemic justification (1991, pp. 39-40). Hill (1991, p. 40) concludes:

> It seems, then, that my claim for the simplicity argument must be modest. I must not maintain that it can be used to establish that type materialism is probable, nor that it can be used to convert all rational beings to type materialism. Rather, I can claim only that the argument makes a case that will be found persuasive by people whose aesthetic intuitions cause them to attach importance to ontological simplicity. It is, of course, my hope that the reader will find on reflection that he or she belongs to this group.

Hill's argument and conclusion seem too modest to seriously threaten dualism. Unlike Hill, Smart argues on the grounds of simplicity that it's indeed probable that

[1] Block and Stalnaker (see 1999, pp. 23-25) make an important point regarding explanatory expectations the advocate of the identity theory might appeal to in response to various articulations of the third objection Smart (1959, p. 148, footnote 11) considered and described as "the one which I am least confident of having satisfactorily met." See section 2.4.2 below.

materialism is true and dualism is false. If his argument is cogent, the implications for dualism are clearly consequential. Henceforth I'll focus on Smart's simplicity argument.

2.4.1 Simplicity Argument

On the basis of simplicity Smart (1959) argues for the thesis that sensations are identical to neural processes. Due to advances in brain imaging technology, the amount of NCC data has grown significantly since Smart published *Sensations and Brain Processes* in 1959. Yet his argument and conclusion presuppose that neural processes are correlated with sensations.

Smart concludes that mental sensations are nothing more than their neural correlates, i.e. neural processes in the brain. So pain, for example, is allegedly C-fiber activation according to an 'is' of identity (see 1959, p. 145). The mental state of pain is nothing over and above the neural process of C-fiber activation. "They" are identical and thus have all and only the same properties.[1] This thesis is referred to as Smart's brain process theory or Smart's identity theory. Specifically, it's a type identity theory since it says sensation types (e.g. pain or tasting chocolate) are identical to types of neural processes. By contrast a token identity theory says particular instances of a sensation (e.g. the pain I now feel after stubbing my toe) are identical to particular neural processes (cf. Smart, 2007).

Smart (1959, p. 142) acknowledges that consciousness appears irreducible. But "for various reasons," writes Smart (1959, p. 142), "I just cannot believe that this can be so." For one, it seems to him (1959, p. 142) "frankly unbelievable" that everything could

[1] However that's not to say, according to Smart, that 'pain' means the same as 'C-fiber activation' (see 1959, pp. 144-145). Accordingly, one can't infer that pain is identical to C-fiber activation from the meaning of terms; it's allegedly empirically discovered.

be explicable in terms of physics and biology *except* for dualism's irreducible conscious states. Smart refers to such states as "nomological danglers" because they don't fit in a completely physical world. To make matters worse, these danglers need laws linking them to the brain processes they're correlated with (Smart, 1959, pp. 143, 156).

So dualism allegedly includes these copious irreducible conscious states – i.e. nomological danglers – and the laws "whereby the 'nomological danglers' dangle" (1959, p. 156). The alternative is the identity theory, which doesn't include such odd ontological baggage. According to the identity theory there are only brain processes that turn out to be sensations upon empirical investigation. Thus the identity theory is simpler and therefore enjoys the theoretical virtue of simplicity. In other words, simplicity favors the identity theory over dualism. So the identity theory is the best explanation of NCC data. We might formally reconstruct the argument like so.

(SIMPLICITY)	All else being equal, the simplest explanation of a data set is the best explanation.
(NCC-DATA)	Neuroscience has discovered NCC.
(ID-SIMPLER)	Relative to dualism, the identity theory is the simplest explanation of (NCC-DATA).
∴ (ID-BEST EX)	Relative to dualism, the identity theory is the best explanation of (NCC-DATA).

The first premise (SIMPLICITY) is assumed by almost everyone. The second premise (NCC-DATA) is a perfectly safe assumption (see section 2.2). The fact that there are NCC is the data to be explained. The third premise (ID-SIMPLER) is a key step in arriving at the conclusion. Dualism supposedly includes nonphysical mental states (i.e. "nomological danglers") and the relevant laws relating them to neural events, whereas the

identity theory doesn't.[1] So the identity theory is a simpler theory than dualism, says the simplicity argument's proponent. Hence the conclusion (ID-BEST EX) that the identity theory is the best explanation of NCC data, and therefore it's probably true.

Now that the simplicity argument has been explicated, we can analyze its merit. The following subsection will focus on the conclusion—i.e. Smart's identity theory—and provide reasons to think it's false. After discussing the viability of the simplicity argument's conclusion, I'll critically analyze the argument for that conclusion.

2.4.2 The Identity Theory's Viability

The simplicity of the identity theory is an attractive virtue. However, in his critical analysis of Smart's argument from simplicity Jaegwon Kim (2011, p. 102) points out that what one person finds to be a simple explanation might seem like an inadequate, truncated explanation to someone else. In some cases simplicity can be seen as "poverty," to echo Koch (2012, p. 152), who has recently argued that physicalism in general is "too impoverished" to explain the origin of consciousness. Critiques of physicalism generally or the identity theory specifically pertaining to explanatory inadequacy are not uncommon, and I will raise similar issues in the next section (cf. Nagel, 2012, pp. 39-40).

However, given the truth of the identity claim central to the identity theory, expecting certain explanations may be unwarranted. After all, the truth of the identity

[1] Another interpretation of Smart says irreducible conscious states are "danglers" since they're epiphenomenal (cf. Feigl, 1967; Polgar, 2011; Smart, 2007). This makes Smart's argument hinge on the idea that irreducible mental states are necessarily epiphenomenal. Many dualists disagree, so Smart would need to show that such states are necessarily epiphenomenal. Some think causal closure entails such. In Chapter 3, I address closure. Jaegwon Kim (2011, Ch. 4) has argued that because nonphysical mental states would be epiphenomenal we should reduce them to neural correlates. Kim relies on the causal pairing problem to support the premise that nonphysical states would be epiphenomenal (see 2011, p. 113, endnote 15). I present the pairing problem in Chapter 4 and respond to it in Chapter 6.

theory would limit the need for some explanations. Consider the following analogy offered by Ned Block and Robert Stalnaker (1999, p. 24):

> Suppose one group of historians of the distant future studies Mark Twain and another studies Samuel Clemens. They happen to sit at the same table at a meeting of the American Historical Association. A briefcase falls open, a list of the events in the life of Mark Twain tumbles out and is picked up by a student of the life of Samuel Clemens. "My Lord," he says, "the events in the life of Mark Twain are exactly the same as the events in the life of Samuel Clemens. What could explain this amazing coincidence?" The answer, someone observes, is that Mark Twain = Samuel Clemens. Note that it makes sense to ask for an explanation of the correlation between the two sets of events. But it does not make the same kind of sense to ask for an explanation of the identity. Identities don't have explanations…The role of identities is to disallow some questions and allow others.

The reasoning here is sensible and it's clear how it analogously applies to NCC. The events in the history of conscious state *C* are exactly the same as those of neural state *N*, therefore *C* = *N*; and this identity relation eliminates the need for certain explanations.

The identity relation itself does not need an explanation and it eliminates the need to answer questions like 'how can *C* fit into a world full of physical things like *N*' and 'how did *C* emerge from *N*.' After all, assuming that the Evening Star is identical to the Morning Star, it makes no sense to ask: 'how did the Evening Star emerge from the Morning Star?' Given an identity relation, the question is nonsensical, and therefore needs no answer. Given the identity relation central to the identity theory, its advocate can make the same point. And when allegations are made that the identity theory is explanatorily inadequate because it fails to explain something like the emergence of consciousness, the identity theorist can claim such an explanation is unnecessary given the identity relation central to the identity theory. However, the strength of such a claim hinges on the truth of the identity theory.

The aim of this section is to question the truth of the identity claim foundational to the identity theory and to highlight reasons to think it's false. While the reasons I'll provide are not incontestable, they are merely intended to provide warrant for thinking its probable that the identity theory is false and its worthwhile to look for alternatives. The reasons I offer come in the form of apparent differences between consciousness and its neural correlates. Consciousness appears to be different from its neural correlates in several respects. If it's probable that any one of these apparent differences is an actual difference, then there is reason to think consciousness is not identical to NCC and therefore Smart's identity theory is false. And the falsity of the theory would render its simplicity moot. Even if it cannot be shown that the apparent differences are indeed true differences, they nevertheless call into question the identity relation the identity theory claims obtains.

I'll focus here on apparent differences between consciousness and neural correlates related to well-known and widely discussed issues in contemporary philosophy of mind: multiple realizability, the knowledge argument, epistemic access, and the possibility of zombies. These topics merit a book length treatment. But since a significant amount of attention has been given to them elsewhere and they are not the focus of this work, I will only be highlighting key points and their present applicability.[1]

It is important to emphasize that my target in this section is *not* the explanatory adequacy of the identity theory *per se*. The same points I rely on can be used to argue for the explanatory inadequacy of the identity theory. This section, however, focuses on the

[1] For further sources pertaining to issues discussed in summary fashion here, see Chalmers (1996), Jackson (1982; 1986), Kripke (1981), Block and Stalnaker (1999), Robinson (2012), and Swinburne (2013).

truth of the identity claim central to the identity theory. I'll use the same points someone else might use to argue that the theory is explanatorily inadequate. But I am arguing specifically that there are reasons to think the theory is false. Granted, if (A) the theory is false, then (B) it's explanatorily inadequate, as well. Nevertheless, my focus in this section is on giving reasons specifically in support of (A).

According to Leibnitz's law of the indiscernibility of identicals, if *R* is identical to *S* then everything true of *R* is true of *S* and what is not true of *R* is not true of *S* (cf. Beebee et al., 2011pp. 114-115). The foregoing discussion assumes this law and addresses apparent differences between consciousness and neural correlates, providing reasons to doubt the truth of the alleged identity relation central to the identity theory.

Multiple Realizability

More than any other difficulty the identity theory faces, multiple realizability can be accredited with bringing about its "unexpectedly early decline," according to Kim (2011, p. 122). The problem of multiple realizability, famously raised by Hilary Putnam (1967), consists of the idea that it's possible for mental kinds to be realized by multiple physical kinds (cf. Bickle, 2016). This possibility doesn't seem permitted by Smart's type identity theory.[1]

According to his identity theory, a conscious state is its neural correlate. If this were true the conscious state could not exist without its neural correlate, which suggests that beings without the neural correlate could not have the conscious state. But it seems that beings with different neurobiology than that of humans, could have some of the same conscious states with different neural correlates. The common examples often include the

[1] Multiple realizability raises a problem for Smart's type identity theory, but not token identity theories.

idea that pain is correlated with C-fiber activation, and point out that its possible for there to be animals without C-fibers capable of experiencing pain. In addition, it's often thought that there could be aliens without C-fibers capable of experiencing pain. Neither such animal nor alien pain would be possible, if pain is identical to C-fiber activation.

Multiple realizability is relevant to the contemporary neuroscientific study of NCC in two ways that provide some support to the idea that multiple realizability is possible. The full NCC of consciousness (i.e. the neural correlate of being conscious as opposed to NCC of specific conscious states) is not yet identified. Yet, the Integrated Information Theory of consciousness (for brevity IIT) is arguably the leading theory pertaining to the full NCC (see Tononi et al., 2016).[1] On IIT multiple realizability is possible (cf. Fallon; Tononi and Koch, 2015). Hence it's not surprising that a leading proponent of IIT, Christof Koch (2012, p. 152), accepts a form of property dualism.

Secondly, multiple realizability is relevant to neuroplasticity. In the last two decades, there has been much research interests in neuroplasticity, which is the nervous system's capacity "to respond to intrinsic or extrinsic stimuli by reorganizing its structure, function and connections" (Cramer et al., 2011, p. 1592). In 'What is a neural correlate of consciousness,' Chalmers (2000, p. 24) ruled out the idea of an NCC being necessary and sufficient on the grounds that such a condition would be too strong. "It might turn out," Chalmers reasoned, "that there is more than one neural correlate of a given conscious state." It now appears that there is some empirical support suggesting that after traumatic injury resulting in the loss of NCC, consciousness can come to be

[1] IIT claims the physical substrate of consciousness is an integrated structure in the central nervous system that exhibits maximal intrinsic cause-effect power (Tononi et al., 2016, p. 450). See also Chapter 7 section 7.5.2.

correlated with different neural mechanism than before (Jensen and Overgaard, 2011; Mogensen, 2011; Munoz-Cespedes et al., 2005; Overgaard and Mogensen, 2011). If such alterations do to take place, this suggests that multiple realization is not just a possibility but an actual occurrence in (some) brains affected by traumatic injury. Yet, the idea that this is even a possibility worth investigating suggests something important for our purposes. That is, an apparent difference between consciousness and corresponding neural correlates; namely, the former are multiply realizable.

Knowledge of Qualia

In his article 'Epiphenomenal Qualia,' Frank Jackson (1982, p. 130) provides an infamous thought experiment pertaining to qualia – i.e. felt experiences of what-it's-like to be in a conscious state. The experience of tasting Swiss chocolate feels different than the experience of tasting dirt. The difference is a difference of qualia. What-it's-like to taste Swiss chocolate is different than what-it's-like to taste dirt. Here I will offer a modified version of Jackson's thought experiment that also pertains to direct access to one's conscious states.[1]

Imagine a neuroscientist, Mary, whose parents want her to become the star of a famous thought experiment. From birth they have her wear black and white goggles, which she never takes off. As a result, she has never seen the color red. One day Mary gets a large grant to study all the neurobiological, neurophysiological, neurochemical information and every other type of physical information pertaining to the nervous system that corresponds to seeing red. If her study is successful, she will learn all the physical information there is about the NCC of seeing red.

[1] For notable replies to the line of reasoning presented here, see Churchland (1985), Tye (1986), and Loar (1990).

Since the grant is very lucrative, Mary decides to hire the band members of *Red Hot Chili Peppers* to be subjects in her study. Mary studies all that takes place in the brains of the band members as they view visual images that include the color red, which Mary presents them with. However, Mary cannot see the color in the images herself since she always keeps her goggles on (to stay true to her parents' dream). In the end, Mary's study is a major success and she learns all the physical information about the neural correlates of the conscious state of seeing red. However, she doesn't share any of this information with the band. For she knows the drummer is upset with the lead singer, and is therefore leaving the band to pursue a career in neuroscience. She doesn't want him to publish the information from the study before her, so she keeps it to herself.

However, despite her knowledge of all the physical information about the NCC of seeing red, it seems the band members would have knowledge Mary would lack. They would know what-it's-like to see red, whereas Mary wouldn't because she has never seen red due to her black and white goggles. Despite her knowledge of all the physical information about the NCC of seeing red, it's reasonable to think Mary wouldn't know what-it's-like to see red. Yet, the band would know what-it's-like to see red, even though they don't know the physical information about the NCC. This suggests two differences.

One, the physical information describes the neural correlates but not the correlated qualia. Two, qualia can be directly known by the subject without knowledge of the physical information describing the neural correlates, which cannot be known in the same way (see Swinburne, 2013, Ch. 3). It is due to these differences that neuroscientists rely on reports from subjects when identifying NCC (even on the so-called "no-report" paradigm in order to have trials to compare and to identify the physiological indicators,

see section 2.2), and why IIT can reasonably be based on starting axioms conscious beings directly know about the nature of their consciousness (see Tononi et al., 2016).

Zombie Nervous Systems

The possibility of zombies can also make one worry about the identity theory.[1] David Chalmers (1996, p. 94) describes a zombie as something physically the same as a conscious being such as himself, but with no conscious experience. If the identity theory is true, zombies aren't possible. Given the identity theory, conscious states are identical to their neural correlates; therefore neural correlates could not possibly exist without their corresponding conscious states. So if zombies are possible, that would imply the identity theory is false. Many philosophers think zombies are possible, and many do not. Yet to call into question the identity claim central to the identity theory, we only need the possibility of an unconscious nervous system, not a complete, embodied, behaving zombie.

Thus brain organoids, popularly known as 'mini-brains' provide an interesting conversation piece to the debate. In 2011, at the Institute of Molecular Biotechnology in Vienna a postdoctoral researcher, Madeline Lancaster, inadvertently brought about the production of a brain organoid from human embryonic stem cells (Willyard, 2015, p. 520). The brain organoids neuroscientists are now capable of growing consists of several million neurons. In April 2018, *Nature* published an article on the ethics of experimenting with brain organoids. The team of authors, lead by Nita A. Farahany (2018, p. 430), offer the following description of brain organoids:

[1] For worries about zombies, such as whether they're conceivable and what that would entail, see Dennett (1995), Marcus (2004), and Bailey (2009).

> Brain organoids can be produced much as other 3D multicellular structures resembling eye, gut, liver, kidney and other human tissues have been built. By adding appropriate signaling factors, aggregates of pluripotent stem cells (which have the ability to develop into any cell type) can differentiate and self-organize into structures that resemble certain regions of the human brain.

These so-called "mini-brains" resemble human brains in noteworthy ways regarding their constitution, neural activity, and structure. Thus they prompt a key question with serious ethical implications: *Are they conscious?* The question is natural to ask because it seems possible that despite them being composed of human brain tissue, and having similar structural features, and neural activity, it's possible they are not conscious. To use Chalmers's terminology, it's possible they are "zombie" mini-brains.

Granted, brain organoids are much, much smaller and far less developed than actual brains in full-grown individuals. But we can imagine that in the not so distant future scientist could be capable of growing a full human nervous system that they can take parts from to replace damaged neural tissue in a human patient. And even when we "life-size" these brain organoids it would seem that the same question would still make sense: *Are they conscious?* This question is far from trivial, in light of the ethical risks on one side and the potential medical benefits on the other side. For if we say they must be conscious, that answer would result in ethical limitations on experimentation and medical usage. But if they are non-conscious "zombie" nervous systems, more would seem to be permissible.

The identity theory appears to rule out the possibility that such nervous systems with the same neural function could be non-conscious "zombie" nervous systems. But it seems possible that they could be. This suggests it's possible for the neural correlates of conscious states to exist without the corresponding conscious states. But the

corresponding conscious states could not possibly exist without the corresponding conscious states. This appears to be another difference between neural correlates and corresponding conscious states.

To recap, in this section I've discussed apparent differences between consciousness and neural correlates that suggests conscious states are not identical to NCC, and vice versa.[1] Given that consciousness is not identical to its neural correlates, the identity claim central to the identity theory is not true, and therefore the identity theory is false, which makes its simplicity moot. The foregoing discussion has briefly summarized issues that provide reason to think the identity claim central to the identity theory is false. Next I'll analyze the argument for the identity theory.

2.4.3 Simplicity Argument Analysis

Having discussed reasons to think the identity theory is false, which at least provide motivation for considering alternative views, I will now critique Smart's simplicity argument for the identity theory. In this section a critical analysis of the simplicity argument will be given, but two points of clarification are in order. For one, the principle of simplicity and the simplicity argument are not the same thing. The argument utilizes (or is based on) the principle. The principle of simplicity is merely a premise in the simplicity argument; hence it's not the argument. Moreover, successful and unsuccessful arguments can have one or more true premises.

This brings me to the second point: The epistemic principle of simplicity is indispensable. Not only is it theoretically well justified, its track record demonstrates it's pragmatically helpful. In this section objections to the simplicity argument will be given,

[1] See Hacker (2007, p. 252) for a concise list that includes other apparent differences and related issues.

but these objections are not aimed at the principle of simplicity. The argument can fail to be cogent, even though one of its premises – the principle of simplicity – is true and indispensable.

As for my critical analysis of the argument, I'll highlight three concerns. First I'll discuss the fact there are additional theoretical virtues to consider. My second concern pertains to the scope of data being explained. Lastly I'll discuss the simplicity argument's misrepresentation of dualism.

Theoretical Virtues

One weakness of the simplicity argument is that it rests upon one, and only one, theoretical virtue. Simplicity is significant, but it's not the only theoretical virtue. To use Mario Bunge's (1961, p. 120) terminology from *The Weight of Simplicity in the Construction and Assaying of Scientific Theories*, simplicity "competes" with additional "desiderata." There are additional theoretical virtues to consider, such as explanatory power, explanatory scope, fertility, accuracy, internal coherence and consistency with widely accepted theories and background knowledge.[1]

If the identity theory is the simplest theory, that's a significant point in its favor. However, by itself simplicity is not conclusive. If simplicity itself were conclusive, then we should go with a view like solipsism and conclude that there's just one mind that exists that's imagining NCC data along with everything else. It's hard to think of a simpler theory. But given that there's more to consider than simplicity, we need not commit ourselves to solipsism simply because it's simple. Likewise, simplicity itself is not enough to establish that dualism is false and the identity theory is true.

[1] While most of these theoretical virtues are commonplace, fertility is less known. If a theory leads to further research opportunities, it has the theoretical virtue of fertility.

Unless, of course, all else is equal and the identity theory is on par with (or better than) dualism on every other score. If that's the case, then simplicity can act as an epistemic "tiebreaker" tipping the balance in favor of the simplest view. In other words, the simplicity argument requires another premise affirming the condition mentioned in premise one, which reads: *All else being equal*, the simplest explanation of a data set is the best explanation. Thus the needed premise is: (EQUAL) All else is equal, or in favor of the identity theory. So we can give a second, more accurate, formal reconstruction.

(SIMPLICITY)	All else being equal, the simplest explanation of a data set is the best explanation.
(EQUAL)	All else is equal, or in favor of the identity theory.
(NCC-DATA)	Neuroscience has discovered NCC.
(ID-SIMPLER)	Relative to dualism, the identity theory is the simplest explanation of (NCC-DATA).
∴ (ID-BEST-EX)	The identity theory is the best explanation of (NCC-DATA).

While a justifiable appeal to simplicity requires (EQUAL), some might think it needs no defense and that it's quite safe to assume. However, (EQUAL) is not obviously true, but questionable given the apparent differences between consciousness and neural correlates discussed above, which dualist views are often consistent with. And as discussed in Chapter 1, I think there are good arguments offered by leading philosophers for dualism. Granted, dualism has its problems; hence my aim in this work to show that one dualist view is capable of overcoming dualism's most significant problems. My point, however, is merely that (EQUAL) is questionable. It's also where much of the debate actually lies. And those inclined to either dualism or physicalism will often

consider this premise in the light of differing metaphysical presuppositions that influence the apparent plausibility of (EQUAL).[1]

Data Scope

Another limitation of the simplicity argument is that it appeals to a quite narrow scope of data. The simplicity argument accounts only for the *existence* of NCC. It does not reference any data about the *nature* of NCC. As leading NCC researcher, Koch (2016) pointed out to me in an email:

> Note that the NCC themselves are neutral from the point of view of physicalism/materialism or one of the various shades of dualism. Under any reading, consciousness will have physical correlates. The question is what are those correlates, where are they and what can and will they tell us about how consciousness is generated in the first place. They also don't speak to whether or not consciousness can be analyzed using reductionism or other mereological assumptions.

The data revealing that there are NCC is well established and will become more so as the contemporary search for neural correlates continues (cf. Shulman, 2013). This is interesting data, but the fact that NCC exist doesn't tell us much about their nature. And as Koch points out, the real question is: What are the correlates, i.e. what's their nature? The answer to that question will tell us much more than the fact that the correlates exist.

If an argument appeals to empirical data, you want the scope of the data to be to be as wide as possible. The simplicity argument makes such an appeal. A key premise is:

(NCC-DATA) Neuroscience has discovered NCC.

The problem is that this premise says nothing about the nature of NCC. Thus another weakness of the simplicity argument is that it doesn't appeal to any empirical data beyond the existence of NCC that tells us about the nature of such correlates. And the

[1] Cf. Tahko (2012, pp. 40-41).

nature, rather than the existence, of NCC are more likely to provide information that has implications for the nature of the mental. In other words, the simplicity argument appeals to an empirical data set that has a narrow and limited scope.

Physicalists are naturally inclined to think a wider data scope that includes the nature of NCC will just further support physicalism anyway. After all, they think their view accurately describes reality as it pertains to the mind and a wider data scope will only tell us more about reality in that area. But for the exact same reason, nonphysicalists might reasonably expect a wider data scope to confirm their view.[1] Again one's presuppositions can play a role. Here they influence expectations of what a wider data set will support. In any event, it's to the simplicity argument's detriment that it appeals to such a narrow scope of neuroscience data.

In addition to the simplicity argument appealing merely to the existence of NCC, there's another weakness. The simplicity argument only addresses neuroscientific data. Yet, we have more data about ourselves than neuroscientific data. We have what Roderick Chisholm (1976, pp. 16-18) called "philosophical data." Such data includes our capacity to reason, to think about things, to make choices, our persistence through time and bodily changes, our moral awareness, and so on (cf. Chisholm, 1976). If a theory provides the simplest explanation of the fact that there are NCC, that's a point in its favor. However, that doesn't say much about how well it can account for philosophical data about human persons.

[1] It has been argued that the nature of certain neural correlates relevant to cases of neuroplasticity imply irreducible conscious states (see Owen, 2016; Schwartz, 1999a; b; Schwartz and Begley, 2002).

In sum, a considerable weakness of the simplicity argument is that it appeals to a narrow scope of data. It only appeals to neuroscientific data about NCC when there's also philosophical data about human persons, and the neuroscientific data it appeals to is limited to the existence of NCC and says nothing about their nature. To conclude that dualism is false and the identity theory is true based on such a narrow data set seems hasty, even if the identity theory is simpler.

Dualism Misrepresented

The version of dualism targeted by the proponent of the simplicity argument is often a minimal version of dualism, simply the idea that mental states are irreducible and nonphysical. And in light of NCC it's thought that laws relating irreducible nonphysical mental states to neural events must be postulated. This sort of dualism seems to be the target of Smart's (1959, pp. 142-143) presentation and Christopher Hill's (1991, p. 20) presentation of the simplicity argument. It's easy to understand the motivation for targeting a minimal version of dualism. The idea is that if you can undermine the minimal tenet(s) common to all versions of dualism, then you undermine all versions of dualism.

However, there are several problems with this approach. First, the minimal version of a position is not always the most defensible version. Sometimes a more robust version of a position is more defensible precisely because it's more complex, or more nuanced, or has more resources available to deal with problems and provide explanations. Secondly, the minimal version of dualism that's the target of the simplicity argument misrepresents basic elements of the version of dualism I'll defend in later chapters. On the view I'll put forth, there aren't countless individual isolated mental states that together compose the mind. Rather there's one simple substance that engages in certain

mental activity. Given this, I think it's simpler than the typical minimal depiction of dualism.

Thirdly, proponents of the simplicity argument seem to think that dualism is a neuroscience theory meant to account for neuroscientific data. But most dualist philosophers are not dualists because they think dualism is the best theory for explaining NCC or any other neuroscientific data (cf. Moreland, 2011a, p. 33). Typically, the rationale for dualism is strictly or principally philosophical and not empirical. For example, the nonphysical mind of substance dualism is thought to be what grounds human essence (cf. Oderberg, 2005), personal identity (cf. Lowe, 2001), subjective experience (cf. Zimmerman, 2011), agency (cf. Plantinga, 2012), cognition (cf. Fumerton, 2013), moral awareness (cf. Swinburne, 1986), and/or the ethical value of a human person (cf. Moreland and Rae, 2000).

Since the nonphysical mind of substance dualism is not presented as a neuroscientific theory by dualists or argued for as if it were, it shouldn't be evaluated principally on how good of a neuroscientific theory it is. With that said, however, in chapter seven I'll try to show how neo-Thomistic hylomorphism can account for NCC. Yet my aim will be to defeat a potential defeater of dualism, not to give a positive case *per se* for dualism.

2.5 Conclusion

The claim that neuroscience nullifies dualism is often thought to be supported by the discovery of NCC. Yet as we've seen, such correlations don't entail any particular view of the mind. Moving from the fact of NCC to the conclusion that physicalism is true and dualism is false isn't an empirical step. Rather it requires philosophical argumentation,

which the simplicity argument aims to provide. However, there are reasons to think the conclusion of the simplicity argument – the type identity theory – is false. Furthermore, the argument for the conclusion has considerable weaknesses. Thus contrary to popular opinion, it's not clear how NCC invalidate dualism. Moreover, I'll argue in chapter seven that my neo-Thomistic hylomorphic position, which is a version of dualism, provides a good explanation of NCC.

However, there's a different issue threatening dualism's viability – i.e. mental causation. In fact, it's this issue that's cited by Koch (2012, p. 151) when he aims to falsify substance dualism in *Consciousness: Confessions of a Romantic Reductionist*:

> Two recent defenders of dualism, the philosopher Karl Popper and the neurophysiologist and Nobel laureate John Eccles, made an appearance in chapter 7. Let me repeat a point I made there when discussing their views on Libertarian free will. The dualism they advocate, in which the mind forces the brain to do its bidding, is unsatisfactory for the reason that the 25-year-old Princess Elisabeth of Bohemia had already pointed out to Descartes three centuries earlier – by what means does the immaterial soul direct the physical brain to accomplish its aim?

The problem regarding mental causation that Koch refers to has been developed by Jaegwon Kim (2005). Kim (2005, p. 74) alleges that the argumentation of Descartes's earlier critics, including Princess Elisabeth, falls short even though it's on the right track. So he developed the point made by Princess Elisabeth into what's known as the causal pairing problem. This problem is dualism's most daunting difficulty regarding mental causation.

Therefore, addressing the causal pairing problem is one of my primary aims in this work. However, there are two other problems regarding mental causation that do not threaten dualism like the causal pairing problem does. Thus before addressing the causal pairing problem, I'll clarify and discuss these two *other* problems in the next chapter.

3

Mental Causation & Two *Other* Problems

It's the bell lap of a one-mile footrace. Four hundred meters to go and Sir Roger Bannister's legs become heavy; lactic acid begins to be released in his blood stream as his muscles begin to lack oxygen. His body's physiology screams at him to slow his pace. Yet his mental desire to cross the finish line in less than four minutes causes the opposite effect: his stride only quickening. That's mental causation. Another example would be a father's intention to express love to his child being causally relevant to his arms opening wide. Mental causation in terms of top-down, mental to bodily causation, is the focus of most contemporary discussions about mental causation. The same will be true of this work. Nevertheless it's worth noting that there is bottom-up causation as well where mental events are caused by bodily events. For example, a pin pricking one's skin causes an experience of pain.

Mental causation, it seems, is a prerequisite for essential human capacities like rationality and agency. Nevertheless, accounting for mental causation is difficult for any view of the mind. And the various problems are not merely puzzling; they're consequential. Jerry Fodor (1989, p. 156) offers sobering words: "if it isn't literally true that my wanting is causally responsible for my reaching, and my itching is causally responsible for my scratching, and my believing is causally responsible for saying…if none of that is literally true, then practically everything I believe about anything is false

and it's the end of the world." Given the consequential entailments, if mental causation is incoherent on a particular view, that view ought to be rejected.

Many charge substance dualism with such incoherence. The "causal problem" is thought to demonstrate it. But what is the Causal Problem against dualism? The fact that's often overlooked is that there are multiple problems pertaining to mental causation. Different problems arise given different assumptions. As Jaegwon Kim (2000, p. 29) pointed out in his Townsend Lectures at the University of California, Berkeley:

> Philosophical problems do not arise in a vacuum. Typically they emerge when we come to see a conflict among the assumptions and presumptions that we explicitly or tacitly accept, or commitments that command our presumptive respect.

These words are now found in, "The Many Problems of Mental Causation;" a chapter summarizing various causal problems entailed by assorted doctrines. Different problems regarding mental causation arise from different tenets endorsed by different views. As we will see the causal exclusion problem arises due to what's called the 'causal closure principle.' And as will also become clear, the causal pairing problem arises for Cartesian dualism since it denies causal closure and posits causal interaction between a nonphysical mind and a physical body.

While there are multiple problems regarding mental causation, the aim of this dissertation is not to deal with every one of them. Rather, I will ultimately focus on one of them. My aim is to address substance dualism's chief problem regarding mental causation. That is, it seems to me, the causal pairing problem. It's the pairing problem that charges substance dualism with incoherence vis-à-vis mental causation. The purpose of this chapter is to clarify two *other* problems of interest to contemporary philosophers of mind in order to ultimately set them aside in order to prevent confusion. The goal is to

parse out other problems that I subsequently won't be addressing to make matters more clear when I do address exclusively the causal pairing problem.

However, avoiding real issues is not the goal. Thus justification will be given for why the causal exclusion problem and the problem of a lack of psychophysical laws are being set aside while the pairing problem will be focused on. In section 4.1, the problem of a lack of psychophysical laws will be explained and my rationale for setting it aside will be given. In section 4.2, the causal exclusion problem will be presented and I will give considerable space to warranting the substance dualist's denial of the causal closure principle. My rationale will be aimed at questioning the physicalist's justification for thinking closure is demonstrably true, yet it will also include reasons to think the principle is simply false. A denial of causal closure, if warranted, circumvents any threat the exclusion problem poses for substance dualism. It's my desire that by the end of this chapter two things are clear: one, the causal pairing problem is the problem my thesis pertains to hence ensuing chapters will focus on it, and two, my subsequent focus particularly on the pairing problem is not without warrant. With that said, let us consider the first of these *other* two problems.

3.1 Lack of Psychophysical Laws

The problem of the lack of psychophysical laws is connected to Donald Davidson's view of the mental, which is known as *anomalous monism*. In this section, I will analyze this view and the problem it prompts. To start with, anomalous monism and the way in which it leads to the problem of a lack of psychophysical laws will be presented. Then the set of assumptions that entail the problem will be specified. Lastly, rationale will be given for subsequently setting this problem aside.

On Davidson's view mental events are events describable in mental terms and physical events are events describable in physical terms (see Davidson, 2001, p. 215; cf. Glüer, 2011, p. 250). According to his anomalous monism, mental event types are distinct from physical event types and there are strict causal laws pertaining to physical types, but no such laws regarding mental types (see Glüer, 2011, p. 252). Hence Davidson thought that every token mental event that causes a particular physical event is identical to a token physical event (Glüer, 2011, p. 250). Yet mental types, according to Davidson, are irreducible to physical types. So Emma's mental intention that causes her left arm to rise is identical to some instance of a physical event. However, the type of mental event, which Emma's intention is an instance of, is irreducible to any physical type. In other words, the mental type 'intention to raise left arm' is not reducible to a specific physical type, such as 'brain fiber-ϕ firing.'

Why adopt anomalous monism? At the heart of Davidson's rationale is the idea that there are "strict laws" governing physical causation, which make causation possible between physical events, but there are no such laws governing mental to physical causation (Glüer, 2011, pp. 248-256). That is, there are no psychophysical laws; i.e. laws that govern causation between mental events and physical events. This is problematic given two assumptions: *a.* the causal framework of event causation, and *b.* the nomological requirement. Those who hold to event causation "see causation as a relation among events" (Plantinga, 1984, p. 267). Causation, on this framework, is an external relation requiring distinct events as relata that stand in relation to one another. The nomological assumption says: whenever one event causes another event the causal

relationship is derived merely from noncausal features of the situation and pertinent covering laws (John Foster, 1991, p. 163). Given these assumptions, every case of causation has distinct events governed by a covering law(s).

Now we can understand the motivation for anomalous monism. Since there are no psychophysical laws there cannot be causation between nonphysical mental events and physical events. Thus whenever a mental event causes a physical event, that mental event must be a physical event. Otherwise it couldn't cause the physical event. Reducing the specific mental event to a physical event allegedly allows one to explain why the mental event caused the physical event. Yet the idea is that mental types are still distinct from physical types. Supposedly, this view allows one to have mental causation without a full-blown reduction of the mental to the physical.

Given the above assumptions, and Davidson's belief that there can be no psychophysical laws, we can see why he adopted anomalous monism. But why did he think there can't be psychophysical laws? Before we answer this question, let's be clear about what Davidson considers a "strict law" to be. According to Davidson (2001, p. 215) laws are linguistic. Strict laws, it's thought, are true statements that are universally applicable without qualification (Glüer, 2011, p. 252). Such laws allow us to explain why events take place. Given the law of gravity, for example, we can say why the coin fell to the floor when Jon released it. Whenever anyone releases a coin, while on earth, the coin will fall toward the ground. The thought is that physical laws apply universally without exception. So we can explain physical events by appeal to such laws.

Not so for mental events (Davidson, 2001b, p. 216). Davidson (2001b, p. 216) thought mental concepts are "irreducibly causal" and thus cannot be specified in a way

that universally applies (Glüer, 2011, p. 254). This flows out of Davidson's position known as the 'holism of the mental.' According to which, what leads someone to act in a specific way has to do with their whole psychology at that time, not particular mental events. So psychological causes of actions are not specific mental states or specific reasons. Yet Davidson also thought psychological explanations, which are needed for "strict laws," are aimed at specifying the specific reasons that cause someone to act.

Therefore, a problem arises: the specific reasons that cause one to perform a given action need to be specified for there to be strict laws, but such cannot be universally specified (Davidson, 2001b, p. 216; Glüer, 2011, p. 255). For one, we can never identify particular reasons that cause one to act because it is one's entire psychology at a time that causes their action, not specific mental states. In addition, the same reasons will not always cause the same result. Basically, strict laws depend on psychological explanations that require the identification of specific reasons that universally cause specific actions, but such identification is not possible given the holism of the mental.

To make matters more clear, let's consider an example. On April 19th 1861, one week after Confederate forces fired at Fort Sumter in Charleston Harbor, Abraham Lincoln ordered a blockade of southern seaports.[1] In essence, Lincoln's order began the United States Civil War. What reasons spinning around in Lincoln's mind caused his act? Consider these hypothetical reasons: *a.* the blockade will severally damage the economy of the rebelling states; *b*. the blockade will prevent Confederate forces from securing needed military supplies; *c.* instigating war with the South will lead to freedom for southern slaves; *d.* being President during a civil war will secure my place in history; *e.*

[1] The historical details throughout this entire example were gathered from 'The Declarations of War: North and South' (2015).

not responding to the shots fired on Fort Sumter will send the message that the North is ill prepared for war.

Given the holism of the mental, it's impossible to specifying which reason (or set of reasons) caused Lincoln to act as he did. For Lincoln's action was determined by Lincoln's entire mental psychology at the time in question, not by any one particular reason or set a of reasons. Therefore, we cannot specify which reason(s) caused Lincoln to act as he did. And even if we could, there's an additional problem. The reasons that caused Lincoln's action would not cause the same effect without exception.

Suppose Lincoln's action was caused by reasons *a* and *c*. In such a case, for there to be a psychological law, we need to be able to say that *a* and *c* will always cause the same choice by someone in Lincoln's position. Yet, if Lincoln had one additional belief—for example: *f*. a blockade of southern ports will also damage the economy of potential allies—this may have altered his decision entirely. Additionally, suppose the First Lady, Mary Lincoln, was President and Abe was the first, First Gentleman. We cannot say that she would have done the same, and we especially cannot say whether reasons *a* and *c* would have caused her to do so. Psychological explanations are not like physical explanations. We cannot specify which reasons will universally, and without exception, lead to certain actions. Therefore, according to Davidson's line of reasoning, there are no strict psychological laws (Davidson, 2001b, p. 216; Glüer, 2011, p. 255-256). For such laws would require us to be able to say which reasons will cause specific actions universally without exception. We cannot do so. Thus, according Davidson's line of thought, there are no psychophysical laws that causally relate mental events to physical events.

That is the problem of a lack of psychophysical laws and the rationale for it. Given that there are no psychophysical laws, the alleged problem for dualism is that there are no laws to relate nonphysical mental causes to physical effects. And such laws are supposedly necessary for one event to cause another event. Therefore, the thought is, there can't be causation between nonphysical mental events and physical events.

To be clear, my thesis is not focused on responding to this problem. Rather this problem has been summarized and clarified for the sake of preventing confusion in later chapters. In fact, this problem—the lack of psychophysical laws—will be subsequently set aside and following chapters will not focus on it. Nevertheless, before we set the problem aside, let's consider warrant for doing so.

3.1.1 Justification For Setting This Problem Aside

I will not be focusing on the problem of a lack of psychophysical laws in the following chapters because my aim is to deal with the chief objection to substance dualism based on causal grounds. And this problem doesn't present such an objection. After all, philosophical problems arise given certain assumptions. We considered tenets Davidson held that lead him to conclude: there are no psychophysical laws. However, dualists are not necessarily committed to the same assumptions that produce the problem. Dualism doesn't commit one to the following assumptions held by Davidson:

a. Framework of event causation: causation is a relation between events.

b. Causation is an external relation between causal relata (i.e. events).

c. Causation requires strict universal laws to explain cause and effect.

d. Laws are linguistic and depend on our identification of universal regularities.

e. Reasons one has for a particular belief or action cause one's belief or action.

Minus any one of these assumptions, the problem doesn't arise. Furthermore, dualists don't need to accept any of these assumptions.

Many dualists are disinclined to accept the framework of event causation and rather endorse agent causation (see Lowe, 2013; Plantinga, 1984). On the framework of agent causation, agents have causal power and effects don't necessarily depend on previous events. And one who accepts agent causation can endorse the notion of pure powers, which don't rely on other causal powers to make them powerful (see Marmodoro, 2010). Given pure powers, one wouldn't need to think causation is necessarily an external relation between cause and effect. Consequently, the need for universal laws connecting cause and effect would be moot. Dualists are not tied down to the idea that there must be strict universal laws to account for mental causation (see John Foster, 1991). We could go on listing points of disagreement dualists have with Davidson's assumptions. But I will mention just one more: dualism doesn't say one's reasons for acting cause their action. So it wouldn't matter if there were no laws causally relating particular reasons to particular actions, because on dualism one's reasons do not cause their actions anyway. In short, Davidson's problem arises due to the assumptions he holds and very few, if any, of his assumptions are necessitated by dualism. Therefore, the problem of a lack of psychophysical laws doesn't necessarily arise for the dualist.

However, even if dualism's tenets did give rise to the problem, it's not clear how it would threaten dualism. According to Davidson's line of thought, strict laws are essentially statements with universal applicability. Thus laws depend on our ability to ascertain why, how, and when certain events cause other events. And laws are basically our linguistic statements that fittingly apply. If that's what laws are, the lack of them is

inconsequential. It could be that whatever makes possible causation between a mental state and a bodily state is unascertainable. Yet, nothing follows that compromises mental causation on dualism. We may never know why, or how, pin pricks cause pain events. Likewise, we may never know why, or how, my intention to raise my arm results in my arm raising. Nevertheless, not knowing the answers to the "why question" or the "how question" wouldn't threaten the fact that there seems to be something that makes possible the consistency of pin pricks causing pain events, and intentions causing bodily movements. Facts about the world can be entirely unknown to us or inexpressible for us. Our inability to specify why, how, or when certain mental states will lead to physical states doesn't do anything to undermine the fact that they do. Thus a lack of psychophysical laws, in Davidson's sense of 'law,' seems harmless to dualism.

To summarize, in this section we have laid out the problem of a lack of psychophysical laws and the rationale behind it. Furthermore, two important points have been made in an effort to warrant setting this problem aside. The first point is: the problem of a lack of psychophysical laws rests on a number of assumptions dualists are disinclined to accept. Admittedly, for the one who finds Davidson's assumptions compelling, giving up any of them will entail a cost. And surely some will be more costly to give up than others. Nevertheless, the multiple ways of avoiding the problem merely require a denial of one of the assumptions that the problem depends on. And substance dualists can deny any of Davidson's assumptions and be perfectly consistent with dualism. The second point is: the problem of a lack of psychophysical laws, in Davidson's sense of 'law,' doesn't seem to offer a consequential threat to dualism. In

light of these points, I will set this problem aside in an effort to move on and deal with dualism's chief causal problem—the causal pairing problem.

However, before doing so there is another problem to be clarified, and yes, subsequently set aside. Yet the justification for doing so will demand more extensive considerations. Let's now turn our attention to one of the most notorious problems threatening mental causation.

3.2 Causal Exclusion Problem

The causal exclusion problem boils down to the mental being excluded from playing a genuine causal role. Given that every physical event has a sufficient physical cause, mental causes are excluded from causing physical events. Loosely speaking: all causal jobs are filled by physical causes, so mental causes are out of work. Technically speaking: if physical event *p* is sufficiently caused by mental event *M*, the causal closure of the physical domain will be violated; yet if *p* has a sufficient physical cause, say *P**, then *P** would preempt *M* as the cause of *p*. In effect, *P** excludes *M* as the cause of *p*.[1] In this section, the causal exclusion problem and what gives rise to it will be explicated. Additionally, I'll consider two routes that can be taken to avoid the problem, one of which I'll endorse. The endorsed route hinges on a controversial denial of what's known as the *causal closure principle*. Hence considerable space will be devoted to rationale for such a denial.

Consider an example. Timothy's mother is teaching him to give charitably. Before church, where they're invited to give charitably, Timothy's mother hooks him up to an electrical system that shocks him. The electrical shock causes his hand to open and

[1] My summary is informed by Jaegwon Kim (2000, p. 37).

release money held in it. When the offering plate passes by Timothy, his mother hits a button that sends electrical currents through his body causing his hand to open, and out falls the money into the plate. Given the way things are set up, the money falls into the plate due entirely to the physical causes.

Timothy's mother needs parenting classes. But she may also benefit from a critical thinking class. After all, she is trying to teach young Timothy to be charitable. Yet the causal system she set up leaves no room for genuine charity to play a causal role. The physical causes—the electrical current and the automatic neural and muscular reactions—sufficiently explain why the money falls into the offering plate. There's no room for a charitable attitude, desire, or intention of Timothy's to play a meaningful causal role in bringing about the effect of the money falling into the plate. For even if Timothy desires to give to the church that feeds the poor, his desire isn't necessary to cause his hand to open and drop the money into the plate. The money will fall into the plate wholly apart from Timothy's charitable desire. Whether his desire is present or not, the physical causes bring about the effect. Here's the problem: Timothy's mental states are excluded from having a causal impact.

Given four principles, the same problem arises for mental causation in general. Scott Sturgeon (1998, pp. 413-414) defines these principles as follows.

(COP) *Completeness-of-Physics*: Every physical effect has a fully revealing, purely physical history.

(IMP) *Impact-of-the-mental*: Mental events have physical effects.

(NOD) *No-Overdetermination*: The physical effects of mental events are not generally overdetermined.

(DUAL) *Dualism*: Mental events are not physical events.

(COP) is also known as the causal closure of the physical domain. According to it, every physical effect has a sufficient physical cause. It's often thought that this principle is supported by the physical sciences. (IMP) essentially says the mental aspect of human persons cause physical effects. It's commonsensical that my mental belief 'a rock is about to fall on me' plays a causal role in bringing about physical effects such as my legs moving in a walking (or running) motion, and my body changing spatial locations. According to (NOD), physical effects that are mentally caused are not caused by more than one sufficient cause. In most cases, one sufficient cause does the job. (DUAL) is the idea that mental events are not identical to physical events. This principle is consistent with nonreductive physicalism that says the mental can't be reduced to the physical, property dualism that says mental properties are sui generis properties, and substance dualism which claims human persons have or are nonphysical minds.

Any set of three of these principles is consistent. Yet the set of four is inconsistent (see Sturgeon, 1998, p. 414). Here's why. If it were true that every physical effect had a fully revealing purely physical causal history, then no mental cause could play a causal role in bringing about any physical effect as long as mental events are distinct from physical events. One might think physical events could just have multiple sufficient causes. Like a ship that sinks due to multiple holes that could sink the ship on their own. But if this were so, there would be overdetermination, and (NOD) would be false. It seems the set of all four principles is simply inconsistent.

Yet there are four simple ways to avoid this inconsistency. Since any set of three of the principles is consistent, a denial of any one of the four allows one to dodge the incoherence. The epiphenomenalist is content with the idea that the mental is causally

inefficacious. Thus she denies (IMP). The physicalist has no qualms with a purely physical world with merely physical people. So she denies (DUAL). Dualists may have options. It seems at first glance, they can avoid the inconsistency by choosing one of two routes.

> *Route OD*: posit that physical effects are often overdetermined by sufficient mental causes and sufficient physical causes; thus denying (NOD).
>
> *Route CO*: admit causal openness between the mental and the physical that allows nonphysical causes to have physical effects; thus denying (COP).

There are different motivations for taking either route. Let's consider each route in turn.

Route OD: Positing Overdetermination

Route OD seems to be preferable for nonreductive physicalists who think the mental can't be reduced to the physical, and thus endorse (DUAL). For the alternative route, *Route CO*, explicitly requires a denial of causal closure, which many physicalists believe is essential to a physicalist worldview (see Kim, 1993, pp. 209-210). So *Route OD* is attractive to physicalists in so far as it doesn't ask one to deny anything essential to orthodox physicalism. However, whether or not positing overdetermination, and thus taking *Route OD*, is an available option for the nonreductive physicalist will depend on how she views the closure principle. According to Jaegwon Kim (2000, p. 40), "One way of stating the principle of physical causal closure is this: If you pick any physical event and trace out it's causal ancestry or posterity, that will never take you outside the physical domain. That is, no causal chain will ever cross the boundary between the physical and the nonphysical." This articulation of closure precludes overdetermination. For if no causal chain ever crosses the boundary between the two domains, then physical effects simply could not have nonphysical causes that overdetermine them.

Consequently, if the nonreductive physicalist views closure as Kim does, she seems to be in a bind. Neither *Route CO* nor *Route OD* can be taken without sacrificing closure, and so she seems stuck with denying either (DUAL) or (IMP). Given this, Kim (2000, p. 30) appropriately acknowledges the weight of this problem for physicalists.

> This, I claim, is our principal problem of mental causation. In referring to this as "our" problem of mental causation, what I mean to suggest is that it is a problem that arises for anyone with the kind of broadly physicalist outlook that many philosophers, including myself, find compelling or, at least, plausible and attractive…the exclusion problem is distinctive in that it strikes at the very heart of physicalism…

Kim thinks physicalists can take one of two ways out: reductionism or epiphenomenalism (see 2005, pp. 70-71). Other physicalists disagree with Kim and believe that there are versions of causal closure that are consistent with overdetermination.

Since my aim is not to defend any broadly physicalist view, but rather substance dualism, I will leave that debate for physicalist to hash out. Regarding substance dualism, I'm inclined to think that overdetermination will lead to problems when it comes to certain types of actions performed by agents where mental causes are inherently necessary causes, not just overdetermining sufficient causes. Therefore, it seems to me, *Route CO* is worth serious consideration.

Route CO: Denying Causal Closure

Route CO requires a denial of causal closure. That is, a denial of a tenet that's in no way entailed by substance dualism. It's worth noting that the causal pairing problem (which will be presented in Chapter 5) would never arise for dualists if they didn't deny causal closure. In other words, if dualists did not mix "physical and nonphysical events in a single causal chain" (Kim, 2000, p. 37) there would be no need to pair nonphysical causes with physical effects; yet this need provides the basis for the pairing problem.

Given that causal closure is in no way essential to substance dualism, it's no surprise that most dualists explicitly, or tacitly, deny the principle. Examples include Richard Swinburne (2013), Alvin Plantinga (2008), Robert Garcia (2014), Alexander Pruss (2013b), Stewart Goetz (2011), Karl Popper and John Eccles (1983), George F.R. Ellis (2012, p. 6), Wilder Penfield (1975, pp. 75-76), and John Foster (1991). E.J. Lowe has presented a dualist account of mental causation that is allegedly consistent with causal closure (see, 2006, p. 18); nevertheless, even he believed the principle is false (see 2003, p. 145). And after arguing that it is false, Lowe (2013, p. 169) pointed out that it need not concern him that his dualistic account of human agency is inconsistent with it. After all, closure is not necessitated by dualism.

Since the substance dualist can deny the causal closure of the physical domain without giving up anything essential to her view, *Route CO* is appealing. Yet we must consider whether or not dualists have sufficient warrant for denying closure. In the following section, we'll consider the dualist's rationale for denying the causal closure principle.

3.2.1 Rationally Denying Closure

Before moving forward let's take stock of where we are. So far, we've considered the alleged problem of a lack of psychophysical laws. For a couple of reasons we set it aside. We then moved on and presented the causal exclusion problem. Two routes that one could take in order to avoid the problem while maintaining that mental events are not physical events presented themselves. *Route OD* requires positing overdetermination. *Route CO* requires a denial of the causal closure of the physical domain. While this principle may be essential to physicalism, it's no part of substance dualism. So dualist

can take *Route CO* without sacrificing anything essential to their view. Now we'll turn to consider whether or not the dualist can rationally deny closure. I will argue that the dualist is warranted in denying the causal closure principle.

Consider the following words of physicalist Jaegwon Kim (2003, p. 65): "We commonly think we, as persons, have both a mental and a bodily dimension—or, if you prefer, mental aspects and material aspects. Something like this dualism of personhood, I believe, is common lore shared across most cultures and religious traditions…" Kim goes on to argue that this common dualistic conception of ourselves is false. Nevertheless, his claim that a dualistic conception of human ontology is commonly held seems correct (cf. Moreland, 2011b). Since such is necessary for the possibility of disembodied existence after the death of our bodies or reincarnation. If we are identical with our bodies, both are obviously impossible. Yet, countless people hold such beliefs. So it's fitting that countless people believe we have a nonphysical mental aspect, i.e. a soul. Moreover, it seems to us that the nonphysical mental aspect brings about physical bodily effects. This is why epiphenomenalism "strikes most of us as obviously wrong, if not incoherent; the idea that our thoughts, wants, and intentions might lack causal efficacy of any kind is deeply troubling, going against everything we believe about ourselves as agents and cognizers" (Kim, 2005, p. 70). In short, it seems to most people that they have a nonphysical mental aspect and that the mental has causal power.

As Roderick Chisholm (1976, p. 16) once pointed out: that which we're justified in assuming when not philosophizing, we're also justified in assuming when doing philosophy. Of course, such assumptions are not infallible. They can be proven false. The

commonly held dualistic conception of human persons is a fair place to start, but it can be falsified by sound argumentation. The causal exclusion argument allegedly does just that.

At this point, for the sake of clarity, let's formalize the causal exclusion argument against (DUAL) and for reductive physicalism in the following way.[1]

(IMP) Mental events have physical effects.

(NOD) Physical effects of mental events are not generally overdetermined.

(COP) Every physical effect has a fully revealing, purely physical history.

∴ ¬(DUAL) Mental events must be identical to physical events.

The physicalist relies on (COP) to secure the conclusion that (DUAL) is false and reductive physicalism is true.

Clearly, if physicalism is true, (COP) makes sense. Thus the argument is forceful for those who accept a physicalist view. But according to the commonly held substance dualist view, (COP) seems false. For it seems that our nonphysical mental aspect causes physical effects all the time. The rock climber's trust that her rope will hold her and her intention to rappel down the cliff causes her grip of the ledge to release. The expectation that a specific person far away will receive a signal from their phone when a particular number is dialed leads to one's fingers pushing specific buttons. The skydiver's desire for a thrill and confidence that her parachute will open causes her to physically jump out of a plane. The judge believes the terrorist bomber consciously intended to cause an explosion in order to kill innocent citizens, so he sentences the terrorist to life in prison while totally ignoring the flames causal role in igniting the dynamite. As if a mental intention was needed to cause a specific physical effect.

[1] This formalization was guided by Robert Garcia's (2014, p. 97) presentation of the argument. David Papineau (2013) has articulated the argument in a very similar way.

In short, it prima facie seems plausible that we have a nonphysical mind that often causes physical effects. Thus causal closure seems false. Moreover, most philosophers that hold to substance dualism think there are further reasons that suggest we have a nonphysical mental aspect with causal power to produce bodily effects (see Plantinga, 1984; 2012; Swinburne, 2013). Rationale for this view would serve as justification for the falsity of the closure principle. What's important to note is that the substance dualist comes to the exclusion problem with a very different outlook than the physicalist. Given the physicalist's worldview, closure may seem obviously true. But given the substance dualist's worldview, which is not without warrant (see Chapter 1), closure seems obviously false. For on dualism, the world is chalk full of nonphysical minds that bring about physical effects all the time.

We must ask: what obliges the substance dualist to accept causal closure? The dualist is obliged to accept it if, and only if, the physicalist can *demonstrate* that closure is *true*. To do so, the physicalist must give compelling reasons that don't presuppose physicalism. Let's consider how the physicalist might show that the causal closure principle is demonstrably true.

3.2.2 Analyzing the Justification For Closure

In this section we will critically analyze justification physicalist commonly give for the causal closure principle. Throughout this section, I aim to give four primary points of rebuttal to the physicalist's rationale for closure. The first point will be that it's not easy to say what the principle actually claims, and therefore, it's difficult to say whether or not it's justified by support offered in its favor. The second point is that empirical observation falls short of demonstrating that closure is true. The third point is that the

success of science doesn't necessitate the truth of the causal closure principle. The fourth and final point will be that there are positive reasons to think closure is false. Each point will be considered in turn.

Ambiguity of the Causal Closure Principle

A prerequisite for justifying a claim is specifying the claim to be justified. If you don't know what the claim is then you can't know whether rationale given for it actually supports it or not. Thus, the first step in justifying the causal closure principle is clarifying what exactly it says. That is no easy task. As we shall see, various formulations of the principle and the variety of ways a key term in the principle can be understood make satisfying this prerequisite quite difficult.

After surveying five different versions of the principle, E.J. Lowe (2000, p. 574) aptly remarked: "One might have hoped for more exactitude and agreement amongst physicalists when it comes to the formulation of a principle so central to their position." Unfortunately, there isn't one clear principle everyone has in mind in the conversation about causal closure. We have already noticed above that Sturgeon's definition of closure differs from Kim's, and that the former is consistent with overdetermination whereas the latter isn't. Here's a small sampling of further versions of the principle.

> *Every physical effect has a sufficient physical cause*. Papineau (1998, p. 375) has presented this version. In contrast to Kim's articulation above (see p. 6), this version is compatible with overdetermination (Garcia, 2014, p. 99).
>
> *The chances of physical effects are always fixed by sufficient physical causes*. In an endnote following the above version, Papineau (1998, p. 386) assumes his reader asks about quantum indeterminacy and he indicates that closure can be put this way. More so than the above version, this version suggests determinism.
>
> *At every time at which a physical event has a cause it has a sufficient physical cause*. S.C. Gibb (2013, p. 2) has put closure in these terms. This version also permits overdetermination.

Every physical effect has its chance fully determined by physical events alone. Martin Noordhof (1999, p. 367) prefers this version, which doesn't permit overdetermination and suggests determinism.

The various versions of the principle confuse matters. Yet perhaps we could just pick one version that's agreed on by most physicalist in order to satisfy the prerequisite of specifying the principle to be justified. Kim (2009, p. 38) thinks most ontological physicalist will accept the following.

(COP*) If a physical event has a cause at *t*, it has a sufficient physical cause at *t*.

This principle seems simple and straightforward enough. Until we ask: what is meant by 'physical'?[1] The answer is anything but straightforward. For consider the following puzzle.

Suppose that at a particular time $t_{0,}$ you have two physical items. The first is a log with a circumference of one meter and height of one meter. The second is a flat square board with a length of one meter and a width of one meter. While it's clear that you have two physical objects at t_0, suppose that at a later time t_1 you place the log under the center of the board. So at t_1 the board rests on the log and forms a table (T). Do you now have three physical items—the log, the board, and a table? Or do you just have one physical item, the table? Or do you still just have the two original physical items, the log and the board? Various philosophers, even various physicalists, will give various answers. The same would be true if our example pertained to fundamental physical particles, rather than a log and a board. Such puzzles may seem irrelevant, yet there are genuine implications for the causal closure principle.

[1] Here, and throughout the next several pages, I am indebted to the work of Scott Sturgeon (1998).

Scott Sturgeon (1998) has pointed out that the term 'physical' in the causal closure principle can mean *microphysical* or *macrophysical*. If microphysical is meant, then the claim is that every microphysical event has a sufficient microphysical cause. And what would count as 'physical' would be fundamental physical particles (whatever they happen to be). If macrophysical is meant, the claim is that macrophysical events have sufficient macrophysical causes. And entities composed out of more basic fundamental physical particles could be concrete particulars that could causally produce effects. Simply put, if 'physical' means microphysical then our table (T) from our above puzzle doesn't count as a physical entity that exists, but if 'physical' means macrophysical then it does.

Thus if what counts as physical, according to (COP*), is microphysical fundamental physical particles, this appears to be inconsistent with the existence of macrophysical things such as planets, jet airplanes, animal bodies, biological organs, plants, automobiles, tornadoes, weather patterns, and so forth. These seem to be physical things, although they are not microphysical things. Thus if the only things that count as physical entities are microphysical entities, according to the principle, then the principle seems to be at odds with the apparent existence of non-microphysical, macrophysical entities.

Furthermore, it is not just that macrophysical things seem to exist, but they also seem to causally produce physical effects that the principle doesn't address, if 'physical' only means microphysical. Consider automobiles that collide into one another causing shattered glass and dented doors, jet engines that propel an airplane from one location to the next, a hearts that pumps blood, a river that causes erosion, the movement of a

runner's legs propelling her forward, and the like. It seems that these are physical entities, but not microphysical entities, which cause physical effects in the world. Thus if 'physical' in (COP*) only means microphysical, then the principle doesn't appear to address macrophysical causes of physical effects, which appear to exist. Moreover, it's also reasonable to think there are macrophysical causes of microphysical effects, which would be inconsistent with (COP*) if 'physical' means microphysical. While there are many examples one might give, I'll give just two brief examples here of apparent macrophysical causes of microphysical effects that present prima facie difficulties.

First, consider a fundamental physical particle, *P*, which is sitting on the surface of my floor (let's call its location L^1) at time t_1. Suppose that I move a vacuum cleaner hose over L^1 and the vacuum inside the hose lifts *P* upward into the hose causing it to change locations to L^2 inside the hose, where it is located at time t_2. It seems that the cause of *P* moving from L^1 to L^2 is the vacuum inside the vacuum hose. And it is difficult to reduce a vacuum to a fundamental physical entity because a vacuum requires a whole system of physical parts to be co-operative. The vacuum might be reducible to a structured collection of fundamental physical entities functioning in tandem. But such a collection does not seem to be a fundamental microphysical entity, and therefore if it is the cause of *P* moving from L^1 to L^2 it seems to provide a counterexample to (COP*) if 'physical' means microphysical.

Second, the natural function of a human brain requires countless individual oxygen molecules consisting of two oxygen atoms (i.e. O^2). For simplicity's sake, let's assume an atom is a fundamental physical entity, and thus microphysical. Through a physiological process – the repetition of systolic contractions – a human heart pumps

blood that carries erythrocytes including hemoglobin with oxygen molecules consisting of oxygen atoms (see Martini et al., 2006, p. 68). We can imagine an individual oxygen atom, which is a constituent of an oxygen molecule, that is in a heart chamber at one time and then subsequently moves to the brain because the heart pumps the blood carrying the oxygen molecule including the individual atom to the brain. And without the heart (or an artificial heart) pumping the blood, the movement of such atoms to the brain would cease and the natural function of the brain would cease. The causal explanation of the movement of the individual oxygen atom seems to include a macrophysical cause – the heart's contractions. Thus it appears to be an example of a macrophysical cause of a microphysical effect, which (COP*) understood in terms of 'microphysical' wouldn't permit.

One might respond and say that the heart pumping blood is nothing more than the combination of more fundamental physical things such as heart chambers, composed of heart tissue, composed of cells, and so on down to the most fundamental physical particles that are structured in a particular way. This is a reasonable response, but even if this is true it is still the structured combination of these things that performs the physiological process that causes blood to be pumped and the oxygen atom considered to be transported. And such a structured combination is not clearly a microphysical entity.

To recap, if 'physical' means microphysical then (COP*) has several prima facie difficulties. In addition to microphysical entities, our world appears to include macrophysical entities, and there appear to be macrophysical causes of macrophysical effects as well as macrophysical causes of microphysical effects. Collectively, these issues suggest that it may not be wise to articulate (COP*) in terms of microphysical.

Therefore, the physicalist may want to define 'physical' in terms of macrophysical. Then (COP*) would say all macrophysical events have sufficient macrophysical causes. However, as Sturgeon (1998, p. 416) points out, if 'physical' means macrophysical then the closure principle isn't supported by commonsense nor any scientific theory. Rather, "everyday experience indicates that mental events have macrophysical effects. So does macro science" (1998, p. 416). Regarding the first point, that experience suggests the mental produces physical effects, we must remember two things. One, (DUAL) is plausible at the outset. In Sturgeon's (1998, p. 214) words: "Mental and physical events are distinct. This is how reality strikes us pre-theoretically." The exclusion argument aims to prove (DUAL) is false nevertheless. Yet at the outset, we can't just presuppose (DUAL) is false, and given (IMP) the impact of the mental on the physical, it seems plausible that irreducible mental events cause physical events. In other words, from everyday experience it seems plausible that closure is false. Moreover, as Sturgeon (1998, p. 416) points out: "No working scientific theory says broadly physical [i.e. macrophysical] effects have fully revealing broadly physical histories." In other words, science doesn't say macrophysical events like handshakes have merely physical causes. So if 'physical' means macrophysical, closure isn't supported by everyday experience nor is it scientifically supported.

At the end of the day, justification that the causal closure principle is demonstrably true requires clarity regarding what the principle actually claims. Such clarity is not only lacking, it's also difficult to secure. For one, there are various versions of the principle with different entailments. Perhaps more importantly, however, the clarity of the principle depends on the clarity of the meaning of 'physical.' This term is

absolutely critical to the principle. Yet it's not easy for physicalists to clarify what they mean by 'physical.' And roadblocks crop up whether they mean *microphysical* or *macrophysical* by the term 'physical.' We have only considered challenges regarding 'physical.' However, another key term—cause—would no less require clarity and would potentially present no fewer difficulties. The physicalist owes us at least a basic clarification of what is meant by the key terms in the principle. For without such clarity, the physicalist could equivocate on the meaning of terms unknowingly. If the exclusion argument is to be logically valid, it can't equivocate on the meaning of 'physical' from one premise to another.[1] In sum, to show that the causal closure principle is demonstrably true physicalists must clarify what the principle claims, and that's a very tall order.

Inadequacy of Empirical Investigation

Clarifying the meaning of the causal closure principle is difficult to do. Nevertheless, let's assume for the sake of argument that such a prerequisite can be met. We shall now consider the merit of justifying causal closure on the basis of empirical investigation, which is a common way physicalists try to warrant the principle. In this subsection I argue that such justification fails to demonstrate that the causal closure principle is true.

Let's consider the physicalist's line of argument that I have in mind. Kim (2011, p. 214) provides us with a place to start:

> Pick any physical event—say, the decay of a uranium atom or the collision of two stars in distant space—and trace its causal ancestry or posterity as far as you would like; the principle of physical causal closure says that this will never take you outside the physical domain. Thus, no causal chain involving a physical event

[1] Indeed, Sturgeon (1998, p. 415) has shown that the "the plausibility of (COP) and (IMP) trade on distinct readings of 'physical.'"

> ever crosses the boundary of the physical into the nonphysical: If *x* is a physical event and *y* is a cause or effect of *x*, then *y* too must be a physical event.

Kim is not here arguing for the principle. Nevertheless his words echo common argumentation for closure, which can be put as follows.

1. If causal closure is true, empirical investigation will lead us only to physical causes of physical effects.

2. Our empirical investigations lead us only to physical causes of physical effects.

3. Therefore, causal closure is true.

Let's call this the Empirical Investigation Argument for closure, or the *E.I. Argument* for short. Initially, we might think it's an argument in the form of modus ponens, which says:

A→B
A
∴ B

However, it's actually in the following form.

A→B
B
∴ A

Notice (A) does not logically follow from (A→B) and (B). However, that's not problematic. In this case, it just means that the argument is not meant to be deductive.

It's either an inductive or abductive argument, which is what we would expect given that it's based on empirical observation. The conclusion of a good inductive argument is probable if the premises are true. The conclusion of a good abductive argument is a hypothesis that provides the best explanation of true premises.[1] Given that

[1] My articulation of inductive and abductive arguments is informed by Tim Pickavance's (Logic and Reasoning, p. 6) description.

the two argument types are similar and space is limited, let's simply ask: is the above a good inductive argument for closure?

It doesn't seem to be. For there are two good reasons to think the premises, if true, do not suggest that closure is probable. The first reason is that the majority of scientists consider it their job to find physical causes of physical phenomena. They try to do so via empirical observation. Most scientists do not see it as their job to identity nonphysical causes. The idea is that the job of the scientist, qua scientist, is to find physical causes of effects, thus her theories and hypothesis are to be aimed toward that end. The empirical observations of physical scientists are not aimed at identifying nonphysical causes. So it seems inconsequential if empirical investigations of scientists do not identify nonphysical causes. For they are not looking for them! Only if one presupposes physicalism and thus that the physical sciences give an exhaustive account of the world, does it make sense to conclude that there are no nonphysical causes because physical scientists haven't identified them through empirical investigation.

Even if scientists were looking for nonphysical causes there is a second reason to think the premises do not make the conclusion probable. That is: nonphysical causes, if they exist, are most likely invisible and not observable by empirical investigation. A line of reasoning mirroring E.J. Lowe's (2003) in *Physical Causal Closure and the Invisibility of Mental Causation*, applies here.

Suppose there is a physical event *E* that necessitates two co-causes that are always actualized together. Suppose further that one of the necessary co-causes is physical and observable while the other is nonphysical and invisible to empirical investigation. Let us use '*O*' to designate the observable cause and '*i*' to designate the invisible cause. To

summarize: *O* and *i* inevitably cause *E*. Thus, when you have *O* & *i*, you get *E*. Let us represent this idea as: ($O\&i \rightarrow E$).

The tricky part is that *i* will not be recognized by the empirical investigator, but *O* will be. Thus, to the observer, whenever ($O\&i \rightarrow E$) is true it will appear as though ($O \rightarrow E$) is true. Consequently, it appears that *O* is a necessary and *sufficient* cause of *E*, but in reality it is merely necessary. Moreover, the invisible cause *i* is also necessary and present, despite appearances. One might think we could deduce that a co-cause is necessary if there were some cases where the cause *O* was present along with *E*; and other cases where *O* was present and *E* was absent. Yet, since the two co-causes are always actualized together, such a scenario would never take place.

The basic worry is that if there were an invisible nonphysical co-cause of *E* that was necessary, it could not be known on the basis of empirical investigation; nor could it be known that the observable cause is not sufficient. For the observable cause would appear to be the lone sufficient cause from the vantage point of empirical investigation, whether or not it actually is. Note that even if such a scenario is not actual anywhere, but merely possible, it undermines the legitimacy of inferring that there are no nonphysical causes on the basis of such empirical investigations. Thus, such investigations cannot, in principal, prove that there are no nonphysical causes (cf. BonJour, 2010, p. 6; Lowe, 2003).

In this subsection, the merit of the *E.I. Argument* as an inductive argument for closure has been challenged. We have not challenged the truthfulness of the premises meant to support the conclusion. Rather, we have given two reasons to think the premises, if true, do not make causal closure probable. For one, the empirical

investigations of physical scientists are not aimed at identifying nonphysical causes so if they don't find such causes, that doesn't mean there are not such causes. Secondly, if there are nonphysical causes it's possible that they are invisible and unidentifiable via empirical investigation. What these points suggests is that the conclusion of the *E.I. Argument* is not supported by its premises, and thus, the argument falls short of demonstrating that closure is true. However, there is another way one might appeal science to support closure.

The Inevitable Success of Science

Causal closure proponents sometimes defend their position on the basis that "research programs in physics, and the rest of the physical sciences, presuppose something like the closure principle" (Kim, 2011, p. 215). This fact combined with the success of physical sciences is thought to support the truthfulness of causal closure. The rationale goes like so: *a*. physical scientists presuppose something akin to closure during their research; b. such research has seen success that we wouldn't expect if the presupposition were false; c. therefore it's likely true. Such rationale is persuasive. But several points collectively undermine it.

First, the presupposition is just that, a presupposition, that scientists bring to their research, not a conclusion they derive from it. The presupposition is not a scientific hypothesis that scientists are aiming to prove by their research. So it's misguided to think that the presupposition scientists make is a scientific hypothesis or theory that they've proved. That's not the case. Rather, it's an assumption they make at the outset of empirical investigation.

Second, the presupposition of scientists is methodological naturalism, not ontological naturalism. Furthermore, methodological naturalism doesn't entail ontological naturalism. Assuming that the physical sciences are aimed at the discovery of physical causes of physical effects, scientific methodology is guided by the presupposition that there are physical causes responsible for physical effects. Given this presupposition scientists focus their empirical investigations on discovering physical causes, and only physical causes. Thus it's thought that they should construct and test theories that appeal only to physical causes. The basic idea is that science investigates physical causes not nonphysical causes, thus the methodology of scientists should be focused on the discovery of only physical causes and assume the possibility of such discovery. But this doesn't necessarily rule out the existence of nonphysical causes. It's just that scientific methodology is not aimed at discovering such causes. So what follows, at most, from the fact that many scientists presuppose methodological naturalism is that nonphysical causes will not be discovered by scientific investigation. Yet there could still be such causes, which brings us to our next point.

Third, methodological naturalism is entirely consistent with there being nonphysical entities that have causal power to produce physical effects. Since methodological naturalism is not a presupposition about the nature of reality, but rather about the nature of scientific methodology, it doesn't rule out an ontology that includes nonphysical causes. Moreover, success due to the presupposition of methodological naturalism would at best indicate that most effects studied by physical scientists have physical causes. That doesn't rule out the existence of nonphysical causes. One can

endorse methodological naturalism and consistently be a dualist that believes mental causes can produce physical effects.

Stewart Goetz (2011) gives a prime example: the well known Wilder Penfield. Penfield assumed during his experiments regarding neural impulses that brain regions of patients he studied were closed to nonphysical causes, yet as Goetz (2011) notes, Penfield was a dualist (see Penfield, 1975, pp. 79-82). Thus the former chair of Yale's philosophy department, Charles Hendel, fittingly comments on an early manuscript of Penfield's *The Mystery of the Mind*. In the preface, Penfield (1975, p. xii) relays Hendel's comments.

> As I read it again and again, your story is one of your starting with the physical hypothesis (accepted by all scientists as a belief in order to gain knowledge): that the physical attributes of man and energy alone are what they can deal with. You start here and cannot do otherwise, and ought not to do so. But there are discoveries made which made you wonder about something that does not fit into the scientific picture, and you wonder again and again. It is the testimony of living, conscious patients. This is an objective item in your scientific evidence. How can it be fitted into the assumed hypothesis of an entirely physical nature of man?

Penfield practiced methodological naturalism. Yet that didn't stop him from concluding there is a nonphysical mind that acts, or in other words, makes decisions put into effect through brain mechanisms (see 1975, pp. 75-76). "It does this," according to Penfield, "by activating neurone-mechanisms" (1975, p. 76). Although Penfield presupposed methodological naturalism, no entailment of it obliged him to conclude that the physical domain is causally closed.

In sum, whether or not there are nonphysical causes of physical events, the physical sciences have been and will be successful in providing useful knowledge about reality. That's inevitable. All it requires is the prevalence of empirically detectible physical causes that produce physical effects of interest to scientists. Such causes can be

(and are) prevalent whether or not nonphysical causes exist as well. Thus the success of physical science does not require the causal closure principle. So one need not conclude that the principle is true just because physical science is successful.

This brings us to the end of our analysis of justification for closure. Throughout this section, I've argued against justification often offered for the causal closure principle. At the outset, it was emphasized that in order to justify closure physicalists must meet the prerequisite of clarifying the closure principle; so we can know whether or not the justification offered actually supports the principle. We've seen that meeting this prerequisite is no easy task. Never mind the various versions of the principle, clarifying the meaning of 'physical' is hard enough to do in a way that doesn't cast doubt on the principle's veracity. Subsequently I argued against the notion that causal closure is empirically verified. Lastly, the idea that the success of physical science proves closure was challenged. At this point, I think it's quite safe to doubt the physicalist's claim that closure is demonstrably true and therefore dualist ought to accept it. After all, warrant commonly offered by physicalists for this claim seems to fall short.

3.2.3 Reasons to Think Closure is False

Up until this point, I've merely argued against justification offered for the causal closure principle. In light of our considerations thus far, it's reasonable to demur the claim that closure is justified and dualist ought to believe it. Now I will give two reasons to think closure is actually false.

Reason one: The initial singularity of spacetime suggests causal closure is false.[1] According to the standard Big Bang model spacetime began at an initial singularity. This singularity either had a cause or it didn't have a cause. If it had a cause, it's likely that cause was nonphysical (see Pruss, 2010b). For given that space and time began at the singularity it seems that before the singularity there would be nothing physical to cause the singularity. Thus, the cause would be nonphysical.

One might wish there was something physical capable of causing the singularity before spacetime began. But that would be at odds with the fact that space and time began at the singularity. For one, physical things have spatial extension. Thus a physical thing couldn't have existed before space. For another, before the singularity there was no time, and it's difficult to see how there could be a physical entity capable of causing the singularity that existed before time. To see why, consider the fact this physical entity's causation of the singularity would be either necessary or contingent. It would either cause the singularity as a necessary outworking of its own existence or the causation of the effect would be conditional. If the former is the case, the physical entity could not have *preexisted* the effect; which would be necessary for it to exist before time given that the effect is the starting point of time. The reason the physical entity could not have preexisted the effect is simply that the cause and effect would always coexist since the effect would be a necessary corollary, or outworking, of the physical entities existence.

Therefore, the causation of the singularity by this supposed preexistent physical entity would have to be contingent. But how could a physical entity that is outside time

[1] My argumentation for this first reason to think closure is false, throughout the next couple pages, is informed by William Lane Craig's work on the Kalam cosmological argument (see 1979; 2008, Ch. 3; 2003, Ch. 23). I'm indebted to him for numerous points throughout this section.

contingently cause the singularity? Since a purely physical entity wouldn't be capable of agent causation, some event would have to take place that causes the physical entity to cause the singularity. For the physical entity could not choose to cause the singularity. Thus something would have to take place that causes the physical entity to cause the universe. But it seems that couldn't happen without there being an event before the singularity, and therefore, time before the singularity. Yet that would clearly be inconsistent with the fact that time began at the singularity.

So in the final analysis it seems that if there was a cause of the singularity it was nonphysical and thus closure is false. Seeing what follows if the singularity had a cause, physicalists may prefer to say it had no cause at all. Yet if the singularity had no cause at all that would undermine the popular version of closure that says all physical events have a sufficient physical cause. For the singularity would not have a sufficient physical cause if it had no cause at all. Given this problem one might opt for a version of the principle that doesn't require there to be any cause at all, but just says that if there is a cause it must be physical. (COP*) is such a version, it permits the possibility of no cause, but rules out nonphysical causes. Thus one could hold that the universe was uncaused and that science has proved causal closure. The physicalist who adopts this position could avoid surrendering causal closure by denying that there was any cause of the universe.

However, this way of salvaging closure seems to shipwreck the legitimacy of scientific investigation. For only if physical events have causes, does it makes sense to investigate what those causes are. But if it's perfectly adequate to say physical events like the initial singularity can be uncaused, what prevents that from being a viable option regarding any physical event? One might respond: "the laws of physics." But the

response won't do because the laws of physics wouldn't place any more constraint on entities that don't exist before they pop into existence than they would on the singularity before it allegedly popped into existence. After all, before an entity exists in space and time, the laws of physics cannot affect them any more than laws of physics could have affected the singularity before it existed. The only satisfying answer, and the only answer that salvages the legitimacy of science is that it's a metaphysical principle that physical effects have causes. So this fact doesn't depend on any other physical facts. If this metaphysical principle were not legitimate then scientific investigations for causes, such as the laws of physics, would not be warranted. In the end, the route of denying that the universe had a cause undermines a metaphysical presupposition undergirding the legitimacy of science. That presupposition is: effects have sufficient causes. To deny this to preserve causal closure would be *ad hoc* and certainly more dubious than admitting nonphysical causes of physical effects (cf. Pruss, 2010b).

Someone might respond by claiming that the Copenhagen interpretation of quantum mechanics provides counterexamples of uncaused quantum events. I offer two points in reply. First, the Copenhagen interpretation of quantum mechanics is just one interpretation and there are also causal interpretations, according to which quantum events have causes. For example, a theory proposed around the same time as the Copenhagen interpretation by Louis de Broglie, in 1927, provides such an alternative interpretation (Bricmont, 2016, p. 129). After being neglected for about twenty-five years, the theory was proposed again by David Bohm (1952; 1993, p. 3). The Broglie-Bohm theory, also referred to as Bohmian mechanics, provides a causal interpretation of

quantum mechanics (Goldstein, 2017). It's not at all clear, at this point, that quantum events can be uncaused.

Second, if there are quantum events lacking a cause identifiable by physicists, or if it empirically seems that such events do not have a cause, it doesn't follow that such events have no cause at all. They could have a nonphysical cause that is unidentifiable via empirical investigation. Thus they would appear empirically to have no cause at all. Interestingly, in *Downward Causation and the Neurobiology of Free Will*, leading scientist George F.R. Ellis (2009, pp. 78, 74-76) appeals to what appears to be randomness at the quantum level to account for the fact that there are nonphysical causes of physical effects. Ellis (2012, p. 6) thinks "the mind is not a physical entity, but it certainly is causally effective…" He reasons that causal slack at the quantum level permits nonphysical causes to occur along with, and without violating, physical causation (Ellis, 2009, p. 63). On his view there are higher and lower levels of causation interacting. These levels include both physical and nonphysical causation. According to Ellis (2009, p. 78), causal interaction between the various levels is always taking place. Given such causal interaction, there may be so-called "undetermined" events at a particular level that are actually determined by causes at another level. So on Ellis's view, if I have understood him correctly, so-called "undetermined" quantum physical events may not be determined by physical causes, but rather by nonphysical causes.

In any event, the fact that some quantum events appear to have no cause from the vantage point of empirical investigation looking only for physical causes, is what we might expect if there are nonphysical invisible causes of physical effects. So the objection regarding the Copenhagen interpretation doesn't undermine my point that the singularity

must have had a nonphysical cause. In fact, given the metaphysical principle that effects have sufficient causes, and supposing that some quantum events really have no physical cause, it seems most fitting to conclude those events have a nonphysical cause. Thus given the principle that effects have sufficient causes, my point would only be confirmed by the fact that some events don't have physical causes. Some, it would seem, must have nonphysical causes. On that note, let's conclude the first reason to think closure is false and move on to a second reason.

Reason two: The causal closure principle undermines the possibility of rational belief in the causal closure principle.[1] By "rational belief," in this context, I mean belief that's arrived at via logical or mathematical inferences. Let's assume the exclusion arguments rationale: If closure is true, then mental causes of physical effects must be physical. Given this, a problem arises. That is, if all mental causes are physical, it would be impossible for ones belief to form via logical and mathematical inferences.

For the sake of giving ourselves an example to work with, let's suppose that Papineau arrived at his belief that closure is true by logically deducing it from empirical data. Let's also suppose, however, that Plantinga arrived at his belief that closure is false by logically inferring it from the fact that God exists and caused the universe. In short, they both arrived at their beliefs rationally. Assuming that closure is true and the rationale of the exclusion argument, it seems that neither scenario would be possible. For given such, all mental events are physical events. And thus, mental events themselves must be caused by prior physical events. But if that's the case, Papineau's belief that closure is

[1] The argumentation here presented is not original. The list of philosophers who have argued along the same lines includes: Richard Swinburne (2012), C.S. Lewis (1947), and R. Scott Smith (2012).

true and Plantinga's belief that closure is false must have been caused purely by physical events. This undermines the possibility that they arrived at their beliefs rationally. To do so they would've had to depend on inferences that are justified by laws of logic. But laws of logic are nonphysical, for they can exist in nonphysical worlds and physical entities can't. As a result, laws of logic would be excluded from playing any causal role in the production of either person's belief on the same grounds that mental causes would be excluded if they were nonphysical. So the process by which they arrive at their beliefs would not include laws of logic. Hence, neither Papineau's belief nor Plantinga's belief could be rational in the sense we stipulated above.

One might respond by claiming that the physical causal chain leading up to each person's belief would just be what a "rational process" would amount to (cf. Anscombe, 1981, pp. 224-232). Thus, as the response goes, rationality would not be excluded from the process of belief production. However, such an objection misses the point: that in such a process, whether we call it a "rational process" or not, laws of logic are excluded from playing any role in the production of the resulting belief (see Owen, 2015). If closure were true and mental events were physical events, then the existence of every physical event would be due entirely to physical causes. Consequently, the *only* roles to be played in the production of such beliefs would be *causal roles* and such roles would be filled by physical causes. Since laws of logic are not physical, they couldn't play such roles. Thus they could play no role in the production of any belief. Hence, neither Papineau's belief nor Plantinga's belief could be rational in our above sense, if closure were true. Therefore, if you have reason to belief that either Papineau or Plantinga arrived

at their belief in the sense we supposed they did, then you have reason to think closure is false.

Now we have two reasons, which don't presuppose dualism, to think closure is false. However, the dualist that already rationally believes we have a nonphysical mind has another obvious reason to think closure is false. That is: we seem to mentally cause bodily effects all the time. For instance, the dualist that's justified in believing that intentionality is *sui generis* mental has strong motivation to deny closure every time it seems to her that her intention plays a causal role in her bodily actions. Additionally, many dualists are also theists. Theism and dualism fit well together. And any dualist that rationally believes that God exists has reason to believe closure is false. Given that God would be the cause of the universe's existence. Furthermore, any theist that has sufficient warrant to believe God has performed miracles has grounds for believing closure is false. Thus, the historical evidence for the resurrection of Jesus of Nazareth could justify one's belief that closure is false (see Licona, 2010; Wright, 2003). As could the evidence for contemporary miracles (see Keener, 2011). At the end of the day, the dualist has several reasons to think closure is false, and the theist has still further reasons.

In summary, we have not only analyzed justification often given to oblige dualists to accept closure and found it wanting. We've also seen that there are reasons to think closure is false that do not depend on dualism being true. The first reason is that the initial singularity of spacetime most likely had a nonphysical cause. The second reason is that the causal closure principle undermines the possibility of rational belief in the causal closure principle itself. Therefore, it appears that dualists are fully within their intellectual rights to deny causal closure. Given that dualists can justifiably deny closure and the

principle isn't entailed by their view, dualists can rationally evade the causal exclusion problem via *Route CO* without sacrificing anything essential to dualism. Hence why I don't find the causal exclusion problem to be dualism's chief causal problem.

3.3 Conclusion

In this chapter we have considered two *other* causal problems: the problem of a lack of psychophysical laws and the exclusion problem. I refer to these problems as two "other" problems because I am hereafter setting them aside. In the following chapters that deal with dualism and mental causation, these two "other" problems will not be in view. The basic reason is that I don't think they offer very strong threats to substance dualism, and my aim is to deal with the problem that offers the greatest threat to dualism on causal grounds. We have seen that the problem of a lack of psychophysical laws arises on the basis of certain assumptions, none of which are entailed by dualism. And the causal exclusion argument crucially depends on the causal closure principle, which most dualists deny, and reasonably so. In any event, it seems to me that neither of these problems pose the greatest threat to substance dualism when it comes to mental causation. The purpose of this chapter has been to clarify and distinguish these two other problems and justifiably set them aside.

We can now move forward and focus on dualism's chief causal problem: the causal pairing problem. In light of the dualist's denial of the causal closure principle, the pairing problem arises and apart from such a denial it would never arise. The pairing problem boils down to the alleged impossibility of nonphysical causes and physical effects standing in a causal relation with one another. If legitimate, the pairing problem would certainly threaten dualism, but it would also provide the strongest *a priori*

rationale for causal closure (cf. Tiehen, forthcoming). Given that the pairing problem is the most likely candidate for a sound a priori defense of causal closure, I didn't bother considering a priori arguments for closure above. Since the following chapter will be entirely devoted to an analysis of the causal pairing problem, which is dualism's foremost causal problem.

4

The Causal Pairing Problem

In the previous chapter we saw that the causal exclusion problem arises due to the causal closure principle. Given that substance dualism in no way entails the closure principle, one way of avoiding the problem clearly presents itself to the dualist. That is: deny causal closure. Doing so costs the dualist nothing that's essential to substance dualism. And as I argued in the last chapter, dualists have warrant for such a denial. However, given such a denial another problem appears to arise. That is the causal pairing problem. This problem boils down to the alleged incoherence of a nonphysical mind being causally paired with physical effects. If dualists didn't deny causal closure by positing causal interaction between a nonphysical substance (the mind) and a physical substance (the body), the pairing problem wouldn't arise. Given a denial of closure entailed by causal interaction that "mixes physical and nonphysical events in a single causal chain," it appears that dualists face the pairing problem (Kim, 2000, p. 37). This problem, it seems to me, is substance dualism's chief problem regarding mental causation. For relative to the "other" two problems considered in Chapter 3, it depends on less assumptions that dualists are strongly inclined to demur.

In Chapter 6, I will argue that neo-Thomistic hylomorphism is a dualist position capable of solving the causal pairing problem. In that sense, I will be offering a rebuttal to the pairing problem. However, a prerequisite of any good rebuttal is an adequate hearing of the argument to be rebutted. The aim of this chapter is to meet that

prerequisite. The focus of this chapter is to give a fairly in depth presentation of the pairing problem and an analyses of its conclusion, or thesis. In section 5.1, a summary of the causal pairing problem will be given. The summary will be somewhat detailed and at the end a formulization of the argument is presented. In section 5.2, we'll analyze the thesis of the argument in an effort to be as clear as possible about what the charge against substance dualism is. Such clarity will aid my rebuttal in Chapter 6.

4.1 Summarizing The Pairing Problem

Jaegwon Kim is the clearest contemporary proponent of the causal pairing problem. Hence my summary throughout this section will focus on his work in "Mental Causation" and *Physicalism, Or Something Near Enough*.

Kim (2005, pp. 73-74) tees up his argument for the pairing problem by offering an analysis of earlier arguments given by historical critics of "Descartes interactionist dualism." According to this dualist view, an immaterial mind and material body are united because they causally interact with one another (Kim, 2005, p. 77).[1] Past critics include: Antoine Arnauld, Pierre Gassendi, and Princess Elisabeth of Bohemia (Kim, 2009, pp. 29-30). Perhaps the first presentation of the argument is found in a letter the princess wrote to Descartes (Kim, 2009, p. 31). The principle point of Descartes's objectors is easily grasped: the two substances—the immaterial mind and the physical body—are of such different categories that it seems impossible for them to causally interact (see Kenny, 1968).

[1] Kim seems to express doubt about the historical accuracy of his reading of Descartes's view on mind-body unity (see 2005, p. 77); cf. Keith Ward (2013).

According to Kim (2005, p. 74), however, the argumentation of Descartes's earlier critics "is incomplete and unsatisfying…it only expresses a vague, inchoate dissatisfaction of the sort that ought to prompt us to look for a real argument." Kim (2005, p. 74) asks: "Why is it incoherent to think that there can be causal interaction between things in 'diverse categories'? Why is it 'impossible' for things with diverse natures to enter into causal relations with one another?" By his critique of Descartes's earlier critics, Kim clearly indicates that his aim is to go further than they and to put forth a "real argument" demonstrating why mental causation is incoherent and impossible on substance dualism (cf., 2005, p. 86).

4.1.1 Prerequisite: Pairing Relation

Kim explicitly states that Descartes's interactionist dualism is the target of his causal argument for the rejection of immaterial minds (2005, p. 71). At the outset of his argument he invites his reader to "consider an example of physical causation" (2009, p. 32). A fundamental assumption that Kim and his interlocutors presuppose is that the nature of immaterial substances and physical substances are very different. Nonetheless, from the outset it is assumed by Kim that an example of physical causation is fittingly paradigmatic for all causation, even causation involving immaterial substances.

The example given involves two guns fired simultaneously. Gun A's firing causes X's death; gun B's firing causes Y's death. What explains the fact that A's firing caused X's death, not Y's; and that B's firing caused Y's death, not X's? "That cannot be an unexplainable brute fact. There must be a relation R that grounds and explains the 'cause-effect pairings'"(2009, 32). Kim quickly points out: "We are not supposing at this point that there is a single such R for all cases of physical causation, only that some relation

must ground the fact that a given cause is a cause of the particular effect that is caused by it" (2009, p. 32). It's worth noting that Kim's example demands one posit an *external* relation between cause and effect. In any case, Kim's key point is: Some pairing relation must ground the fact that a particular cause caused a particular effect (2009, p. 32).

4.1.2 Necessity of Spatiality

Kim's second key point is: Spatio-temporal relations pair causes with their effects (2009, p. 32). Kim considers the prospect of a causal chain fulfilling the job of linking causes with effects, but such will not suffice as an independent solution. A causal chain would only multiply relations and the fundamental question—what does the job of pairing a cause with an effect—would remain. The answer to which, Kim believes is: spatial relations. "Intuitively, space seems to have nice causal properties" (Kim, 2009, p. 32). He doesn't say whether it follows from this that only space has such properties. Nonetheless, he (2009, pp. 32-33) explicates his intuition:

> …I can state my fundamental assumption in general terms, and it is this: It is metaphysically possible for there to be two distinct physical objects, *a* and *b*, with the same intrinsic properties and hence the same causal potential or powers; further, one of these, say *a*, causes a third object, *c*, to change in a certain way but object *b* has no causal effect on *c*. Now, the fact that a, but not *b*, causes *c* to change must be grounded in some fact about *a*, *b*, and *c*. Since *a* and *b* have the same intrinsic properties, it must be their relational properties with respect to *c* that provide an explanation of their different causal roles vis-à-vis *c*. What relational properties, or relations, can do this job? The **only** plausible answer seems to be that it is the spatial relation between *a* and *c*, and that between *b* and *c*, that are responsible for the causal difference between *a* and *b* vis-à-vis *c* (*a* was in the right spatial relation to *c*; *b* was 'too far away' from c to exert any influence). At least, there is **no other possible** explanation that comes to mind.[1]

Kim appeals to spatial relations to explain causal pairing relations. One might ask what accounts for spatial relations themselves? However, a demand for an answer might miss

[1] Bold mine.

the point of Kim's task at hand. In which he has pinpointed a key prerequisite for causal relations between the purely physical entities in his examples—spatiality.

Kim (2005, p. 85) explains how spatiality accounts for pairing relations: "By locating each and every physical item—object and event—in an all-encompassing coordinate system, the framework of physical space imposes a determinate relation on every pair of items in that domain." A key principle Kim's account (2009, pp. 34-35) relies on is the 'impenetrability of matter,' which says physical objects occupying the same space-time location are one and the same object.[1] Due to this principle, specific physical objects exclude other objects from a particular spatial locale (2009, pp. 34-35). Consequently, we can say why the cue ball, rather than the eight ball, knocked the two ball into the corner pocket. The answer depends on their spatial locations.

In sum, spatiality provides a determinate coordinate system given the impenetrability of matter, and this makes it possible for individual physical causes to be paired with specific physical effects. Since this is how causation works in the examples of physical causation he has selected, Kim (2009, p. 35) deems that causation for immaterial minds must require the same essential framework and an analogous principle of the impenetrability of matter:

> This principle is what enables space to individuate material things with identical intrinsic properties. The same goes for causation in the mental domain. What is needed to solve the pairing problem for immaterial minds is a kind of mental coordinate system, a 'mental space', in which minds are each given unique 'location' at a time. Further, a principle of 'impenetrability of minds' must hold in this mental coordinate system; that is, minds that occupy the same 'location' in this space must be one and the same. I don't think we have any idea how a mental space of this kind could be constructed.

[1] One might ask: What about coincident objects like a lump of clay and a statue? Kim acknowledges the issue of coincident objects and understandably sets it aside, not to be distracted from the trajectory of his argument (see 2009, p. 34, footnote 6).

Given that a coordinate system is necessary for causation and space is necessary for such a system, an obvious problem arises for immaterial Cartesian minds, which are nonspatial.

To use an example Kim (2005, p. 76) gives, suppose there are two persons, Smith and Jones, who are psychologically synchronized. Consequently, when Smith wills to raise his hand, Jones wills to raise his hand as well. A question arises: why is Smith's willing causally paired with his hand rising, not Jones's, and vice versa? One might say their respective minds are united to their respective bodies. But according to Kim's understanding of the Cartesian's account, their minds are united to their bodies on the basis of being causally paired with their bodies. Thus, the vital problem arises: "The 'union' of a mind and a body that Descartes speaks of, therefore, presupposes mental causation" (Kim, 2005, p. 77).

Let's elaborate on this, for it's the crux of the problem. On Kim's understanding of Cartesian dualism, Smith's mind is causally paired with his hand rising because his mind is united to his body since his mind causes his body to move. In other words, according to Kim's reading of Descartes, the Cartesian explanation essentially says Smith's mind causes his body because his mind causes his body. For one, this explanation is fatally circular. For another, this explanation relies on a mind-body causal relation that's unavailable on dualism if we assume that spatiality is necessary for causality. Given that immaterial minds are nonspatial and causality requires spatiality, a causal explanation of mind-body unity is unavailable to the dualist. After all immaterial minds that are nonspatial can't stand in causal pairing relations that require spatiality. In the end, an immaterial mind cannot be united to a body via causation since causation is

impossible for such a mind. And so this causal account of mind-body unity that Kim (2005, p. 77) thinks is "the most natural option for substance dualists" is fundamentally flawed.

This problem might be avoided if Cartesian minds were spatial. Yet according to Kim (2005, p. 88-90), supposing such will only raise more problems. First off, we allegedly lack any rational motivation for locating immaterial minds in a given spatial location. Secondly, if souls are spatial, it seems to Kim that they would just be a strange kind of matter. Kim brings up several questions he thinks such a move would raise without a hope of answering. Among such puzzles, is the question: if immaterial minds were spatial, wouldn't they exclude bodies from spatial locations and thus preclude them from indwelling collocated bodies? Ultimately, Kim reasons that the Cartesian is stuck with biting the nonspatial bullet of immaterial minds. After all, on Kim's (2005, p. 88) reading of Descartes, space is the realm of matter. In the final analysis, given their nonspatiality, immaterial minds cannot stand in causal pairing relations, whether such causal relations are mental-to-physical or mental-to-mental relations (Kim, 2005, p. 87).

Hence, Kim concludes: "causal interaction between mind and matter is precluded by their diverse natures, and we have identified the essential diversity that matters, namely the spatiality of bodies and the supposed nonspatiality of minds" (2005, p. 87). According to Kim, his causal argument for the rejection of immaterial minds "shows that immaterial minds, if they existed, would be incapable of entering into any causal relations, whether with material things or with other immaterial minds" (2005, p. 3-4). In light of the alleged impossibility of mental causation on Cartesian dualism, Kim reasons that dualism generally "…is not a workable option for anyone" (2005, p. 3).

4.1.3 Formulation of Kim's Argument

Neither in *Physicalism, Or Something Near Enough*, nor in "Mental Causation," does Kim present a formal version of his argument. Yet, here is an attempt at a formal reconstruction of his argument.[1]

(1) For every case of causation there is a cause-effect pairing relation between cause and effect.

1.1 For every case that *x* caused *y*, that '*x* caused *y*' cannot be an inexplicable brute fact.

1.2 Therefore, for every case that *x* caused *y*, there must be a cause-effect pairing relation that explains why *x* caused *y* (from 1.1).

(2) All cause-effect pairing relations require spatial relations.

2.1 In clear cases of physical causation, spatial relations account for cause-effect pairing relations.

2.2 Besides spatial relations we do not know what could account for cause-effect pairing relations.

2.3 Therefore, spatial relations are necessary for all cause-effect pairing relations (from 2.1 & 2.2).

(3) An entity/event must be spatial to stand in any cause-effect pairing relation (from 2).

(4) Immaterial minds are not spatial.

(5) Immaterial minds cannot stand in any cause-effect pairing relation (from 3; 4).

(6) Therefore, mental causation is impossible for immaterial minds (from 1; 5).

Now that we have laid out Kim's causal argument demonstrating the causal pairing problem for dualism, let's analyze the argument's thesis.

[1] For another formulation of Kim's argument, and a formulation of a more modest version of the "Pairing Argument," see Andrew M. Bailey et al. (2011).

4.2 Analysis of Kim's Thesis

Andrew Bailey and company have pointed out that "Kim says that it's impossible for a soul to cause something, not just that none in fact do" (2011, p. 351). Why opt for this stronger claim? To rule dualism out, or to warrant a full sail rejection of immaterial minds, it must be shown that mental causation is impossible on dualism, not just mysterious unchartered territory. Otherwise, if there were good reasons to believe (a) humans are composed of a body and an immaterial mind, and (b) that such a mind is causally responsible for some physical states of our bodies, we could justifiably conclude (c) that there is genuine top-down mental causation, *whether or not we understand such causation*.[1] As long as such causation is possible and we have good reasons to think there is such causation, there is no warrant for the rejection of dualism on causal grounds. We would simply be faced with territory yet to be understood.

Since Kim's aim is to justify a rejection of immaterial minds, his argumentation is judicious. His thesis—mental causation is *impossible* for immaterial minds—may seem too ambitious to some, yet it's needed to warrant a rejection of dualism. Yet, we must ask: impossible, in what sense? Kim doesn't say. His reader is left to figure this out herself.

There are four relevant senses of impossibility. Something is physically impossible if the laws of physics preclude it from happening.[2] It is physically impossible for an elephant to fly like a bird. Something is logically impossible if the laws of logic preclude it from ever being so. To use a popular example, it is logically impossible for

[1] George F.R. Ellis (2009, p. 75) makes a similar point. Richard Swinburne (2013, p. 105) also makes a very similar point, if not the same point.
[2] For a brief discussion of physical necessity, the corollary of physical impossibility, see: Chisholm (1976, p. 22).

there to be a married bachelor. For given the meaning of the terms 'married' and 'bachelor,' the law of non-contradiction precludes such a possibility.

The third sense of impossibility is nomological impossibility, which is like physical impossibility since it pertains to laws. Assuming there are natural laws beyond the laws of physics, something is nomologically impossible if such laws preclude it. The fourth relevant sense of impossibility is metaphysical impossibility. Something is metaphysically impossible if it cannot be given the natures of the entities in question (cf. Moreland and Craig, 2003, p. 50). It is metaphysically impossible for two rocks to fall helplessly in love. Since it is essential to the nature of a relationship of love that the entities standing in the relation be personal (let's assume), but by nature rocks are impersonal. Thus, it is metaphysically impossible for two rocks to be in love. Let us now try to decipher what sense of 'impossibility' is meant in Kim's thesis: mental causation is impossible for immaterial minds.

4.2.1 Physically Impossible?

The claim that mental causation on dualism is physically impossible would be as interesting as a flat, straight, road in the middle of Kansas cornfields. That is, not interesting at all; nor would such be consequential. For if there were nonphysical minds that have causal power to affect nonphysical mental states and physical bodily states, we have no reason to suspect such causation would be purely physical and therefore governed only by principles governing merely physical entities. For the entities doing the causing *ex hypothesis* would not themselves be merely physical, nor would all the effects be purely physical. Apart from the assumption that physicalism is true, we couldn't justifiably expect that such causation would necessarily be purely physical or governed

merely by laws of physics. Rather, given the nonphysical nature of the cause, we could expect the causation to be supra-physical. In other words, we could reasonably expect the governing principles of such causation to go beyond the laws of physics, while not necessarily violating them. Such principles could be in concert with physical laws and yet not be identical to physical laws, nor regulated by physical laws (see Ellis, 2009).

The dualist could grant that such causation is not physically possible in the sense that laws of physics alone could govern it. Yet, she would do well to point out that the primary question is whether or not there could be a coherent framework that includes principles of causation beyond just the laws of physics that govern causation involving nonphysical entities. To answer this question by asserting that such is physically impossible is nonsensical, for the question is whether or not something beyond mere physical possibility is possible. If Kim's conclusion was that mental causation is physically impossible for immaterial minds, the primary question would remain unanswered. Consequently, sufficient warrant for the rejection of immaterial minds would be lacking.

4.2.2 Logically Impossible?

Given that a physical impossibility of mental causation on dualism would be inconsequential, one might think Kim's conclusion pertains to logical impossibility. However, if the conclusion of Kim's argument is that mental causation is logically impossible on dualism, his premises fall short of guaranteeing such a conclusion. Consider this simplified formulation of his argument:

(*P1*) Necessarily, spatiality is needed for causality.

(*P2*) Necessarily, immaterial minds are not spatial.

(*C*) Necessarily, mental causation is impossible for immaterial minds.

For the impossibility arrived at in *C* to be a logical impossibility, the necessity of *C* must be of logical necessity. Yet, if the necessity of *C* is a logical necessity and *C* is to follow from *P1* and *P2*, the necessities of both *P1* and *P2* must be logical necessities as well. And for these necessities to be logical necessities the propositions they modify must be entailed by the meaning of the relevant terms, that is 'causation' and 'immaterial minds.'

Therefore, in order for the necessity of *P1* to be one of logical necessity, it must follow logically from the meaning of 'causality' that spatiality is needed. Kim offers his reader rationale for why he thinks causation in the actual world requires spatiality. He does so through giving examples of causation in the actual world and pointing out how causation works in those cases. But showing that causation is a certain way in the actual world is not the same as showing that causation could not have been otherwise out of logical necessity. And that is what must be done in order to show that Kim's concept of causation in the actual world is one that's logically necessary in any possible world. Thus, even if Kim's depiction of causation in the actual world was perfectly accurate, it would not prove that his understanding of causation and what it requires is logically true. So if Kim's conclusion is of logical necessity, his argument is severely weakened by the fact that he only offers justification to think causation requires spatiality in the actual world. He needs to demonstrate that causality logically requires spatiality in order for his argument to be sound. At best, Kim has shown that, given the laws of physics in our world, cases of mere physical causation require spatiality.

Not only does Kim's argumentation lack rationale justifying the idea that causality logically necessitates spatiality, such an idea is doubtfully true. It seems

logically possible for there to be different laws governing causation with different prerequisites than what the laws of physics require. For if this were not so, empirical investigation would be unnecessary for discovering truths about laws of physics. After all, if such truths were logically necessary, we could arrive at such truths through a priori reasoning *alone*. Yet the discovery of physical laws often depends on empirical investigation, even if a priori reasoning is involved. So not only does Kim's argumentation lack justification for thinking *P1* is true in the sense of logical necessity, it is doubtfully true in that sense.

Yet, even if it were true that causality requires spatiality out of logical necessity, it is doubtful that such is demonstrably true. In the case that causality logically necessitated spatiality, such a truth would clearly undermine some of the most widely held views throughout human history and during contemporary times. And given that such a truth would be knowable a priori, since it would follow logically from the meaning of 'causation,' it would be dumbfounding that it escaped the notice of countless thinkers. After all, many thinkers throughout western civilization have thought it's at least logically coherent to think an immaterial nonspatial being caused the space-time realm to come into existence and to persist with consistency. And many eastern thinkers have thought that the idea of Karma being causally responsible for certain events in our world is logically coherent.

However, causality logically necessitating spatiality would not only be at odds with religious ideology. As Andrew Bailey, Joshua Rasmussen, and Luke Van Horn (2011, p. 351) have pointed out along with J.P. Moreland (2005): the idea that causality requires spatiality entails that the singularity on the standard model of the Big Bang could

not have a cause. According to the standard model of the Big Bang the entire spacetime continuum began at the singularity; so if causality necessitates spatiality then any model proposing that the Big Bang had any cause at all, such as Quentin Smith's (2002) atheistic explanation of the singularity, would be disqualified. This would be odd to say the least. The idea that there can be effects like the Big Bang that have no cause whatsoever seems far more incoherent than the idea that there can be nonspatial causes of such effects (Pruss, 2010a). After all, I think C.D. Broad doesn't merely speak for himself when he says: "…I cannot really *believe in* anything beginning to exist without being *caused* (in the old-fashioned sense of *produced* or *generated*) by something else which existed before and up to the moment when the thing in question began to exist" (1955, p. 10). In the case of the initial singularity there is much disagreement about the nature of the cause, yet it has seemed quite reasonable to many to suppose it had a cause.

In sum, Kim has not given us reasons to believe it's logically necessary that spatiality is required for causality, which is needed for his argument to be sound if *C* is of logical necessity. To boot, it's likely false that causality requires spatiality out of logical necessity. But even if such were true, it's doubtful that it is demonstrably so. Given that countless thinkers have held central beliefs that stand in opposition to such a "fact" that would be knowable a priori. Thus, I think it's safe to say with physicalist, David Papineau (2011, p. 55): "there is nothing conceptually contradictory in the idea that physical phenomena may be affected by non-physical causes, as Descartes supposed, for example." Nevertheless, there are more senses of impossibility.

4.2.3 Nomologically Impossible?

Nomological impossibility is the third sense of impossibility worth considering. Something is nomologically impossible if it cannot be due to laws of nature, whether such laws are laws of physics or another type of natural law that might even be nonphysical.

Due to biological laws (let's assume), it is possible to cut a limb from one apple tree that grows red delicious apples and graft it into another apple tree that grows granny smith apples, so the tree grows apples of both types. This is an example of a nomological possibility. Likewise, it's nomologically impossible (we can assume for the sake of the example) to graft the same apple tree limb into a pine tree so it grows both pinecones and red delicious apples.

To elucidate how nomological impossibility could apply to dualism and mental causation, let's imagine that the natural laws in our universe include psychophysical laws that govern all causation between the mental and the physical. Suppose that these laws permit physical causes of nonphysical mental effects but preclude nonphysical mental causes of physical effects. If this were the case, it would be nomologically impossible for there to be nonphysical mental causes of physical effects in the body. And there would be no laws that could causally pair mental causes with physical effects, if such laws were needed.

As one reads the earliest works related to the causal pairing problem, one might get the impression that nomological impossibility is the issue.[1] However, Kim's (2005,

[1] According to Kim (2001a, p. 35, footnote 7), his thinking on the causal pairing problem was prompted by Foster's (1968) article 'Psychophysical Causal Relations' and Kim first

Ch. 3) most developed case for the causal pairing problem discussed in this chapter doesn't appeal to laws in order to demonstrate that mental causation is impossible for nonphysical minds. Rather, he appeals to natures, which strengthens his case.

If Kim's argument hinged on an appeal to laws, there would be several ways the dualist might try to escape the conclusion. The dualist might (1) deny that such laws govern causation, (2) deny that such laws govern all causation, (3) deny the existence of the laws that preclude nonphysical minds from producing physical effects, or (4) only accept revised versions of the laws that don't preclude such mental causation (cf. John Foster, 1991, Ch. 6). However, these escape routes will not be available, if the causal pairing problem is not rooted in laws but rather in the very nature of causation, physical bodies, and nonphysical minds. Thus it's not surprising that Kim's (2005, Ch. 3) most developed presentation of the argument for the causal pairing problem doesn't appeal to laws, but rather to natures.[1] His emphasis on natures – the nature of causation that relies on spatiality, the spatial nature of physical bodies, and the nonspatial nature of nonphysical minds – strongly suggests that metaphysical impossibility is the type of impossibility Kim's conclusion pertains to (as I'll discuss in the following section).

However, those who think laws of nature are grounded in natures might object as follows. When we consider the above example regarding biological laws and grafting an apple tree limb, biological *laws* grounded in the natures of the apple tree and pine tree are what make one scenario possible and the other impossible. The nature of the apple tree entails certain laws that make it possible to graft the limb, and the nature of the pine tree

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(1973) discussed the causal pairing problem in 'Causation, Nomic Subsumption, and the Concept of Event.'

[1] Kim (2005, p. 76) seems clearly interested in closing off escape route (1) above.

entails certain laws that make it impossible to graft the limb. Thus the possibility and impossibility are determined by the laws, which are entailed by the relevant natures. And the same is true with regards to the impossibility that the causal pairing problem presents, one might argue. It's laws grounded in the natures of causation, physical bodies, and nonphysical minds that make mental causation impossible for nonphysical minds. Thus the causal pairing problem identifies a nomological impossibility based on laws, which are grounded in natures.

The idea that laws of nature are grounded in natures is reasonable. But if this is so, the laws grounded in natures are less fundamental than the natures that ground them. And if the laws responsible for the causal pairing problem are entailed by the natures in question, it seems that the root of the problem is the natures. Thus if Kim's argument shows that the very natures of causation, physical bodies, and nonphysical minds prompt the causal pairing problem, he will have identified the very root of the problem. Additionally, his argument will close off the escape routes mentioned above. In short, his argument will be stronger and the problem identified will be more threatening to dualism. Given this, I think our fourth sense of impossibility that pertains to natures – i.e. metaphysical impossibility – provides the best interpretation of Kim's argument and its conclusion.

4.2.4 Metaphysically Impossible?

To say that mental causation is metaphysically impossible for immaterial minds is to make a stronger and more substantive claim than saying such causation is physically impossible. Yet it's a more conservative claim than saying that such causation is logically impossible. As we have seen, if Kim's thesis pertains to physical impossibility it's

inconsequential, but if his thesis pertains to logical impossibility then his premises don't warrant such a conclusion. In any event, Kim need not worry about such charges. For it seems that his thesis pertains to neither sense of impossibility, but rather to metaphysical impossibility.[1]

As mentioned above, something is metaphysically impossible if the natures of the entities in question preclude it from happening. While setting up his argument, Kim (2005, p. 74) asks: why is it impossible for entities of *different natures* to stand in causal relations with one another? Moreover, Kim (2005, p. 87) concludes that causal interaction between an immaterial mind and matter "is precluded by their diverse natures." And Kim (2005, p. 87) believes he's pinpointed the diversity that precludes such: the nonspatiality of immaterial minds and the spatiality of material bodies. This is so only if the nature of causality requires spatiality, which Kim thinks it does. Thus the nature of immaterial minds and the nature of causality are thought to give rise to the causal pairing problem. This problem amounts to the alleged metaphysical impossibility of a nonphysical mind causing a physical effect; that is, the metaphysical impossibility of mental causation on dualism.

In closing, let's summarize our analysis. The thesis of the causal pairing problem is not that mental causation is physically, logically, or nomologically impossible on dualism. Rather it's that mental causation is metaphysically impossible on substance dualism. The idea is that the nonspatial nature of immaterial minds and the nature of causation, which supposedly requires spatiality, preclude the mind from causing effects. Causality requires spatiality and immaterial minds are not spatial, thus causation on

[1] Andrew Bailey et al. (2011, p. 350, footnote 3) likewise interpret Kim.

dualism is allegedly incoherent.

4.3 Conclusion

The greatest objection to dualism regarding mental causation is the causal pairing problem. As we saw in the previous chapter, the problem raised by Donald Davidson of a lack of psychophysical laws rests on several assumptions dualists need not accept and the causal exclusion problem hinges on a premise dualism doesn't entail in any way. The causal pairing problem, however, is aimed at objecting to dualism on grounds dualists are more inclined to accept. For since the 17th century a mechanistic view of causation has become increasingly favorable, and it's thought to depend on spatiality. Yet according to the most well known substance dualist view, Cartesian dualism, nonphysical minds are nonspatial. Thus a framework of mental causation presupposing such a view of causation and nonphysical minds seems to have an inconsistency, which the pairing problem exposes. That is: causation requires spatiality and minds are not spatial. Thus the pairing problem is aimed at undermining dualism's coherence vis-à-vis mental causation. As such the pairing problem is a grave potential defeater of dualism.

My aim is to defeat this defeater by presenting a dualistic view that offers a coherent framework for mental causation. In the next chapter we shall outline that view before going on to apply it to the causal pairing problem.

5

Neo-Thomistic hylomorphism

"Cartesian dualism has clear and unassailable pride of place as the whipping post on which dualists are ritualistically flailed," notes David Oderberg (2005, p. 71). When it comes to considering and critiquing substance dualism, a depiction of Descartes's view is almost always at center stage. At this point we'll diverge from such orthopraxy as we focus on a different form of dualism—neo-Thomistic hylomorphism.

The aim of this chapter is to summarize neo-Thomistic hylomorphism, which I'll often refer to simply as 'hylomorphism' for brevity.[1] The following two chapters will apply the view to the causal pairing problem and the issue of neural correlates. While these subsequent chapters will deepen our understanding of hylomorphism, this chapter is introductory. The goal is to clarify the view.

I've labeled the view 'neo-Thomistic hylomorphism' because I think it's appropriate to attribute the view to Aquinas. Given that the fundamental principles of the view are derived from his thoughts on human ontology, which were greatly influenced by Aristotle. Yet, for several reasons I call it *neo*-Thomistic. First of all, I make no claim that the view is identical to Aquinas's. Although my neo-Thomistic view is significantly influenced by his ideas about human nature, I give myself the freedom to disagree with Aquinas on certain points or to modify his ideas in order to make the view more defensible. I look to Aquinas as a philosophical authority who provides a good starting

[1] Another common spelling is: hylemorphism.

point, but not as an infallible final word. Furthermore, my focus is not on exegeting Aquinas's works. My intention is not to engage in hermeneutical debates about how to interpret Aquinas. As valuable as such debates are, they are not my focus in this particular work, and I'm aware that other philosophers have different interpretations of Aquinas than I do on key points.[1] My focus is rather on applying a view that's informed by Aquinas to two chief contemporary problems that substance dualism faces. In the end, I hope to have shown that neo-Thomistic hylomorphism can adequately handle them.

While presenting a view of the mind and body is the purpose of this chapter, it would be naïve to think such could be done in a metaphysical vacuum. For Aristotelians, such as Aquinas is, metaphysics is the "engine that drives every other field of philosophy" (Oderberg, 1999, p. ix). I do wish to propose a "mere-hylomorphic" view in the sense that one can adopt the mind-body view presented without becoming a full-blown Aristotelian or Thomist on every philosophical point. Yet I do not wish to propose a "shallow-hylomorphic" view in the sense that hylomorphism is presented in a context devoid of metaphysical presuppositions that are critical to the view. Hence, our considerations of hylomorphism will involve metaphysical tenets importantly related to, but not necessarily proper to the philosophy of mind.

In section 5.1 we'll wade into the waters of Aristotelian-Thomistic metaphysics in order to introduce key terms and concepts. The following section, 5.2, will focus on Aquinas's human ontology and the nature of human persons. Then section 5.3 will specifically discuss the human soul. Our considerations of the soul will move from focusing on the souls relation to the body to clarify the nature of the soul in itself. Once

[1] See Alfred J. Freddoso (2012, p. 6, footnote 5), James Madden (2013, Ch. 8) and Peter King (2012).

the nature of the soul is clarified it will become apparent that the hylomorphic view I'm proposing is a substance dualist position. Section 5.4 will conclude the chapter and offer a summary of neo-Thomistic hylomorphism.

5.1 Aristotelian Terminology

I wish we could just translate all Aristotelian terms into our contemporary vernacular. However, some Aristotelian terms convey specific ideas not entirely captured by contemporary metaphysical terms. So it's worth clarifying some essentials before trying to articulate neo-Thomistic hylomorphism. This section is devoted to doing just that. I won't cover all the terms that will subsequently be employed. But I will introduce enough terms to start us down the path of explicating hylomorphism. The systems of thought referred to as 'Aristotelianism,' 'Thomism,' and 'Scholasticism' have benefited from some of the longest time periods of intellectual consensus and tradition in Western culture. As a result these systems of thought, which share in common their Aristotelian elements, are very substantive as well as nuanced. And I'll merely scratch the surface of an extraordinarily rich intellectual tradition.

Nevertheless, one must begin somewhere. And I'll begin with clarifying the term *hylomorphism.* Then substances will be distinguished from aggregates before we clarify the Aristotelian notion of a *form*. The concept of *matter* will then be discussed. At the end of this section we'll employ the Aristotelian terms already discussed to clarify what a material substance is and to introduce what I'll call an 'en-forming relation.'

5.1.1 Hylomorphism

Fittingly, 'hylomorphism' is a compound Greek word that conveys the idea of a composite of form and matter. The Greek word 'hyle' means *matter*, while the word

'morphe' means *form* (Feser, 2009, p. 13). Put the two together and you get 'hylomorphism.' Christopher Shields (2014) offers the following definition.

Hylomorphism $=_{df}$ ordinary objects are composite of matter and form.

As the words 'hyle' and 'morphe' together amount to 'hylomorphism,' a real form and matter together constitute a concrete hylomorphic object. The key point expressed by this basic definition is that objects have two constituents: form and matter. While this definition is helpful it's quite basic, if not too basic. For according to an Aristotelian-Thomistic ontology, there are aggregates and then there are substances. The constitution of the former is significantly different than that of the latter.

5.1.2 Substance vs. Aggregate

A pile of logs is an aggregate and a tiger is a substance according to Aristotelian metaphysics. In this section substances will be distinguished from aggregates. My discussion will focus on three differences. First, substances are more ontologically fundamental than aggregates since aggregates are composed of substances whereas substances are not composed of further substances (Inman, 2018, pp. 102-106). Second, the parts of a substance (if it has parts) only have existence as a part of the whole substance, whereas the parts of an aggregate have existence that's independent of the whole aggregate. Third, and most importantly, substances have an internal unity that aggregates lack (cf. Marmodoro and Page, 2016, pp. 6-7). This is because one single form grounds the existence and essence of a substance and all its parts. By contrast, the parts of an aggregate are themselves substances with their own individual forms that ground their own individual existence as the kind of substance they are. So an aggregate

depends on the forms that ground the existence of its parts, which are substances, as well as the form that modifies the parts in a way that unites the parts into one aggregate.

Let's unpack these differences, beginning with the fundamentality of substances vis-à-vis aggregates. Substances are metaphysically prior to aggregates. Put differently, substances are more ontologically fundamental than aggregates. The reason is that aggregates are composed of substances and therefore substances are more basic than what they compose. Aggregates depend on the existence of their constituent substances like a pile of rocks depends on the rocks composing the pile. If you take away the rocks, the pile no longer exists. The pile's existence depends on the existence of the rocks. Likewise, any aggregate's existence depends on the existence of the substances that are parts of the aggregate.

My first job as a teenager can help us explicate the second difference between aggregates and substances, which pertains to their parts. My job was to walk through large cornfields in Mattawa, Washington in order to spot sizeable basalt rocks buried in the dirt, remove them from the dirt, and then pile them on the surface of the ground so that tractors could grade the dirt without inadvertently hitting the rocks beneath the surface. Let's assume each individual basalt rock is itself a substance and consider five rocks – r^1, r^2, r^3, r^4, r^5 – ten meters apart from each other. Imagine that after spotting these rocks in the dirt, I dig them out of the dirt and put them in one rock pile – R – that consists of the set of rocks $\{r^1, r^2, r^3, r^4, r^5\}$ and the external spatial relations they stand in to each other. In Aristotelian terminology, R is an aggregate consisting of substances standing in a configuration.

Before R came into existence, the individual rocks existed as basalt rocks, by themselves, apart from one another. After compiling R, my job was to put its constituents into a tractor that would haul the rocks away. Imagine that one of the rocks, r^2, falls out of the tractor as it drives down the bumpy dirt road. Clearly, r^2 would no longer be a constituent of R, lying there on the ground by itself in the middle of Mattawa, as the other rocks (i.e. r^1, r^3, r^4, r^5) continue down the dirt road in the tractor. Although separated from R and its other constituent parts, r^2 would still exist as what it was (i.e. a basalt rock) before it became a part of R and as what it was while a part of R (i.e. a basalt rock). The existence and essence of r^2 remains the same since its existence and essence doesn't depend on being a part of R, given that R is an aggregate and r^2 is a substance. In other words, r^2 is a separable part of R since it has its own existence that does not depend on it being a part of the aggregate R, which it was a part of at one time.

The substances that are the parts of aggregates are separable parts because their existence doesn't depend on being a part of the aggregate. They have their own existence apart from the aggregate; that is, apart from the whole. By contrast, the parts of a substance are inseparable parts that do not and cannot exist apart from the substance they're part of.

The reason why the separable parts of aggregates have their own existence apart from the whole aggregate they're part of and that the parts of substances do not have existence apart from the whole substance they're part of also pertains to the difference of unity aggregates have versus the unity substances have. An aggregate consists of multiples substances that are its parts, and each of these substances has its own individual

form that grounds its existence as the kind of thing it is. So each substance that's part of an aggregate has existence in virtue of its own individual form.

The parts of substance are very different. One form grounds the existence and essence of the whole substance including each of its parts. Such a form is called a 'substantial form' (see section 5.1.3). A single substantial form grounds the existence and essence of the whole substance including all its parts that it's the form of. The parts of the substance are unified in virtue of the existence and essence of each part being grounded by one and the same form. Thus a substance is unified to the highest degree as each of its parts share the same form and exist only as a part of the substance they're a part of (see Inman, 2018, pp. 103-104).

A human body is a common example of a substance. And as will be discussed further below, Aristotle and Aquinas thought the soul is the substantial form of the body, which grounds the body's existence by grounding its unity and essence. Socrates's body, for example, is a unified whole body since the existence and essence of each of its parts is grounded by one individual form, which is Socrates's soul. Unlike the parts of aggregates, Socrates's hand cannot exist apart from the whole substance and the form that unifies it. The parts of substances are inseparable parts. According to an Aristotelian understanding of substances, if Socrates's hand were severed from his body, it would no longer literally be what it once was. We could debate what it would be, but one thing it would *not* be is: Socrates's hand.

We can now summarize the differences here considered between substances and aggregates. To begin with, an aggregate is an entity composed of multiple substances, and the substantial form of each individual substance grounds the existence of each

individual substance that's part of an aggregate. And the existence of the aggregate depends on the substances that are its parts and each of these substances depends on its own individual substantial form. Thus the aggregate's existence depends on multiple substantial forms that ground the existence of its parts. In contradistinction, a single substantial form grounds the existence of a whole substance including its parts. Therefore a substance is fundamental in that it is not composed of further substance with their own individual substantial forms. The parts of a substance have their existence and their essence grounded by the same form that grounds the existence and essence of the whole substance. This is what unites a substance in a way that an aggregate is not united. Unlike the inseparable parts of a substance, the parts of an aggregate don't depend on the same form for their existence and essence.

There are two passages from Aquinas's writings that capture well the foundational differences between substances and aggregates we've addressed. In each, Aquinas uses the example of a body unified by a substantial form and a house composed of substances unified by a configuration that's an 'accidental form'[1]:

> Now the substantial form perfects not only the whole, but each part of the whole. For since a whole consists of parts, a form of the whole which does not give existence to each of the parts of the body, is a form consisting in composition and order, such as the form of a house; and such a form is accidental. But the soul is a substantial form; and therefore it must be the form and the act, not only of the whole, but also of each part (ST 1a 76.8c).

The substantial form of the body grounds the existence of every part of the body as the kind of thing it is. Whereas the parts of a house, assuming they're themselves substances, have their existence and essence grounded in their own distinct substantial forms. The substances composing the house are united by an accidental form, the configuration

[1] See the following section 5.1.3 for an explication of what an accident form is.

they're in. A foundational difference is the oneness (or unity) of the body due to the one form that unites it by grounding the existence and essence of each of its parts:

> For since the body of a man or that of any other animal is a certain natural whole, it will be said to be *one* because it has *one form* whereby it is perfected, and not simply because it is an aggregate or a composition, as occurs in the case of a house and other things of this kind (Aquinas, QDA 10c in Marmodoro and Page, 2016, p. 12).[1]

The body is internally unified because one form grounds its existence and essence as well as that of all its parts. The house consists of substances that have their own existence in virtue of their own substantial forms, and there's a configuration (i.e. external spatial relations the parts stand in to one another) that is the accidental form that externally unites the house's parts. At this point, it behooves us to discuss forms more in depth.

5.1.3 Forms

To understand forms it's important to know that there are both accidental forms and substantial forms. An accidental form modifies an existing entity, whereas a substantial form grounds the existence of a whole substance including its parts. A substantial form grounds the existence of a substance in virtue of grounding its unity and essence, thus it also grounds the properties and powers the substance has and naturally develops due to its essence.[2] In this section, I'll briefly describe accidental forms and then elaborate on substantial forms.

The shape of a statue is a well-known example of a form. When most people think of an Aristotelian form they think of a shape. Yet if a shape is all that comes to mind when one considers the hylomorphist's claim that the soul is the form of the body,

[1] Italics mine. 'Questions on the Soul' is abbreviated 'QDA.' With the exception of this quote, all other references to QDA are referring to James H. Robb's (1984) translation.
[2] For an explication of grounding, see section 5.1.6.

misunderstanding will abound. A shape is an accidental form, whereas the soul is a substantial form.

Further examples of accidental forms are: the whiteness of a bench, the temperature of a body of water, and the firmness of a mango. Notice that these forms do not ground the existence of what they modify. The bench could become pink and still exist. The water could change its temperature without ceasing to exist. The mango could become soft as it ripens while continuing to exist. Each entity could exist without the specified accidental form. Thus such a form doesn't ground the entity's existence. Moreover, the bench could be *what* it is—a bench—with a different color. The water could be water if its temperature changed. The peach could still be a peach if it softened as it ripened. So the specified forms do not ground the essence of the entities in question any more than they ground the existence of the entities.

Unlike accidental forms, a substantial form grounds the existence of what it en-forms (see section 5.1.6 on 'en-forming'). A substantial form grounds the existence of a substance that it's the substantial form of in virtue of grounding its unity and essence (see Marmodoro and Page, 2016, p. 15). This has multiple entailments. First, since the substantial form grounds the unity of the substance by en-forming every part of the substance, the substantial form not only grounds the existence and essence of the substance but also its parts. Second, since the substantial form grounds the essence of the substance and its parts, the substantial form is ultimately what grounds what properties and powers (or 'capacities'/'dispositions') the substance and its parts essentially have and develop. For clarification, a substance and its parts can also have nonessential properties

that are not grounded by the substantial form (e.g. a starfish's spatial location is nonessential and not grounded in its form).

To further elucidate the idea of a substantial form, let's consider an apple tree, assuming that such is a substance. Suppose that in the summer of 2020 I plant a very young apple tree in my yard. Suppose further that the tree is so young it doesn't have limbs or leaves when first planted, and therefore no fruit. Despite this, I can know that the tree will come to have a structure with limbs and leaves in due course, as long as the tree is well kept and maintains good health. Moreover, if it stays healthy for several years it will develop to the point where it consistently produces a fruit with a very standard structure. The structure of this fruit is so standard and predictable that we can imagine the shape of the fruit simply by knowing that the tree is an apple tree.

So about five years after being planted, the tree will predictably develop certain parts – limbs, leaves, and apples – with standard structures. While the structure of the limbs, for example, can vary to some degree, their structure will be standard enough that one could easily discern the apple tree limbs from willow tree limbs, or pine tree limbs, etc. The apple tree will develop these parts with certain structures due to the type of thing it is, which depends on the form that grounds its essence. Thus because the physical material of the apple tree has the form of an apple tree, it will develop to have apple tree limbs, leaves, and apples by the summer of 2025.

But let's entertain the idea that in the autumn of 2025 the leaves and apples fall off the tree, and deer chew off all its young branches. Even so, there's no need to fret. Assuming I maintain the tree well, it will regrow limbs, leaves, and apples over time. The old leaves and apples that grew in the summer of 2025 and fell off that autumn will

decompose. And the limbs eaten by deer will be digested and return to the soil. At the end of this cycle, the apple tree will have new limbs, leaves, and apples. But these new parts will be composed of different matter than the original parts.

Since an apple tree can live for a hundred years, this process of "part regrowth" can happen multiple times. The tree can lose its old parts and then regrow such parts with different constituent matter. Surely by the time the tree is one hundred years old it will have changed significantly and the matter that constitutes it will be different from the matter that constituted it when it was first planted. Yet the tree will persist. Despite the change, the tree that I planted in the year 2020 can live to 2120. That which makes it the same tree throughout the time and change is its substantial form. Since from 2020 to 2120 the tree has the same substantial form, which grounds its existence, it's the same tree throughout the time and change. Thus the substantial form also provides a way of explaining how the tree can persist through significant time and change: The tree persists because its substantial form persists through the time and change.

This is fitting since the substantial form of the apple tree is what grounds the existence of the tree as a unified apple tree at any given time. Since every material constituent of the tree shares the same form that grounds its existence, every material constituent is united as a material constituent of the same organism – an apple tree. Moreover, the apple tree is an apple tree, rather than say a dinosaur, because of the substantial form it has. If it had the substantial form of a dinosaur, it would have different properties, different powers, and different parts with different structures capable of manifesting the different powers. After all, the substantial form of a dinosaur has different properties and powers than the substantial form of a tree. So basically, if the

entity had the substantial form of a dinosaur rather than the form of an apple tree, it would be a dinosaur, not an apple tree.

In the final analysis the substantial form provides the ultimate natural explanation for the substance's existence.[1] In the case of our apple tree, the substantial form grounds the existence of the tree by grounding its unity as well as its essence, and therefore its essential properties and powers. And the parts of the apple tree are en-formed by the same substantial form, which therefore grounds their existence and essence as well. Given that the form grounds the tree's existence and that of its parts, we could say the tree and its parts ontologically depend on the form.

By way of summary, according to Aristotelian metaphysics there are accidental forms and substantial forms. Accidental forms modify that which they are the accidental form of and an entity may have numerous accidental forms that modify it. By contrast, a substance will have only one substantial form that grounds its existence by grounding its unity and essence. Now that we have a basic grasp of forms, let's consider the other constituent of a hylomorphic object.

5.1.4 Matter

Matter is the physical material of an entity. The matter of a ball is the physical material comprising the round ball. The matter of my wedding ring is the physical material

[1] 'Natural' here is not meant to mean 'physical'. Rather, assuming the natural world includes metaphysical facts, the form is thought to provide a metaphysical explanation. So it would provide a natural metaphysical explanation in contrast to either a natural physical explanation on the one hand or a non-natural, super-natural, explanation (e.g. God sustaining it in existence) on the other hand. I'll often use the term 'natural' referring to the regular way things are given the nature of reality. So there can be natural physical facts, but also natural metaphysical facts.

wrapped around my finger. The matter of the statue David is the physical material shaped like the man, King David.

Notice that matter is the physical constituent *of* an entity, on Aristotelianism. All matter is the matter of something (Leftow, 2010, p. 397). And since all matter is the physical constituent of something that exists, it too exists. While Aristotelian and Thomistic metaphysics includes the concept of 'prime matter,' such matter doesn't actually exist (cf. Feser, 2009, p. 14). 'Prime matter' refers to matter that has no form (see Wuellner, 1956, prime matter). But all matter that exists has a form(s), according to Aristotelianism. So prime matter doesn't actually exist. Matter, on the other hand, does exist. And it's a constituent of a particular type of substance, i.e. a material substance.

5.1.5 Material Substance

A material substance is a substance that consists of a substantial form that naturally en-forms matter. Human persons, according to Aquinas, are material substances given that the human soul en-forms matter, constituting a physical body. By contrast, bodiless angels are immaterial substances. The difference between a material substance and an immaterial substance is that the substantial form of a material substance en-forms matter, which is not true of immaterial substances. Given that I've used and will often use the term 'en-form,' I'll discuss it and the related concept 'en-forming relation' in the next section.

5.1.6 En-forming Relation

As just noted, a material substance consists of a substantial form that en-forms matter. This brings us to what I call the *en-forming relation* between the form that en-forms and the matter that's en-formed. I'll use the phrase 'en-forming relation' in reference to the

relation the substantial form and matter of a material substance stand in. When the substantial form en-forms matter, the form and matter stand in an en-forming relation. This relation, on my view, is an explanatory relation that's *not* causal. Rather, this non-causal explanatory relation is a grounding relation.[1] The type of explanation grounding provides is distinct from scientific explanation or causal explanation, it provides metaphysical explanation (Fine, 2012, p. 37). To elucidate this type of explanation let's consider two examples and then applying the concept of grounding to the en-forming relation.

First, imagine a halfpipe that's decorated with graffiti at the notorious Burnside skatepark in Portland, Oregon. Suppose someone spray painted a white, red, and black image of a bloodshot eyeball onto its surface. Thus the halfpipe is colored. One could explain why it's colored by referring to the graffiti artist's actions and the cans of spray-paint used to produce the effect of the skatepark feature being covered in white, red, and black paint. Such a causal explanation would be what most people are interested in.

But a non-causal metaphysical explanation could also be given for why the halfpipe is colored given that it's dressed in white, red, and black paint. The metaphysical explanation is that the halfpipe is white, red, and black and white, red, and black are colors, and therefore the halfpipe is colored. Put differently, the halfpipe is colored in virtue of being white, red, and black. The reality that (*a*) the halfpipe is white, red, and black grounds (*b*) the reality that it's colored.

[1] Here I am only claiming that the en-forming relation is a grounding relation, not that all grounding is relational. Proponents of grounding disagree about whether grounding *necessarily* involves a relation (see Bliss and Trogdon, 2016, section 3).

It's important to notice several things about the grounding of *b* in *a*. First, there's *asymmetry*. It is the case that *a* grounds *b*, but *b* does not ground *a*. After all, *b* doesn't explain *a*, since *b* could be true and *a* could be false. The halfpipe could have been painted different colors and *b* would be true in that case as well. Second, related to this asymmetry is *dependency*; *b* depends upon *a* but not vice versa. Third, notice that *a* is *explanatorily prior* to *b*. We can assume that *a* and *b* became actual simultaneously, and therefore *a* is not temporally prior to *b* which we could assume if *a* provided the causal explanation of *b*. So the sense of priority that's relevant is not causal but rather explanatory. It's not that *a* is temporally prior to *b*, it's explanatorily prior. Given that *a* is true, *b* is true; the former explains the latter. This notion of non-causal priority is fundamental to grounding (see Correia and Schnieder, 2012, p. 1).

Now, let's consider a second example involving David Beckham. Let's assume that he is, at present, a football player on the Manchester United football team. If we wanted to explain why Beckham is a Manchester United football player, we might give several different kinds of explanations. We could appeal to the lucrative salary he was offered to play for Manchester and the psychological influence that had on him, which led to his decision to sign with Manchester. We might call this an economic or psychological explanation. We also might give a physical explanation, such as he's wearing a Manchester jersey and he is passing the ball to other Manchester players.

Yet, a metaphysical explanation could also be given. Such as, Manchester United is a football team consisting of a set of twenty football players and Beckham is a member of this set. In other words, Beckham is a Manchester United football player in virtue of being a member of a set that the Manchester United football team consists of. The reality

that Beckham is a member of the set constituting the Manchester team grounds the reality that Beckham is a Manchester football player. Notice that this doesn't give us a causal explanation of why Beckham is a Manchester player. It gives us a metaphysical explanation in terms of grounding.

Suppose further that we wanted to know why Beckham is a professional football player. Once again we could give a metaphysical explanation in terms of grounding. That is, Manchester United is a professional football team and Beckham is a Manchester United player and therefore he's a professional football player. So the reality that (*A*) Beckham is a member of the set of players that Manchester United consists of grounds (*B*) the reality that he is a Manchester player, which grounds (*C*) the reality that he is a professional football player. Here the fact that grounding can be transitive becomes relevant (see Correia and Schnieder, 2012, p. 8). In this example, *A* grounds *B* and *B* grounds *C*, so *A* grounds *C*.

In sum, the type of explanation grounding provides is distinct from scientific and causal explanation. Grounding provides metaphysical explanation. Furthermore, grounding is asymmetric, it involves asymmetric dependence where what's grounded depends on what grounds it, and what grounds is explanatorily prior to what is grounded. And in some cases grounding is transitive.

There's much more that can be said about grounding and there are issues that different proponents of grounding might disagree on. One issue, for example, is how grounding relates to modality. If *x* grounds *y*, is *y* necessary in every possible world that includes *x*? Or, is it possible for *x* to exist without *y* even though *x* grounds *y*? Different proponents of grounding have different views about whether or not grounding includes

necessity (cf. Audi, 2012; Chudnoff, 2011). Another topic of disagreement is whether or not grounding is analyzable in non-grounding terms or whether it's primitive and unanalyzable. Most proponents of grounding, but not all proponents, think grounding is primitive and unanalyzable (Bliss and Trogdon, 2016, section 2; Correia and Schnieder, 2012, p. 13). The claims I'm defending in this work don't require any particular position on these issues; therefore I won't defend any particular position on these issues here.

Having introduced grounding, let's return to en-forming. The en-forming relation between a substantial form and the matter it en-forms is a grounding relation. Suppose substantial form *x* stands in an en-forming relation to *y*, then *x* grounds *y*. Because en-forming is grounding. The non-causal en-forming relation between a substantial form and matter is an instance of grounding. The form grounds the existence of the matter it en-forms.

As mentioned above, Aristotelian metaphysics includes the concept of 'prime matter,' which is matter that's not en-formed and therefore doesn't exist. Matter, on the other hand, does exist and it exists in virtue of being en-formed, but it never exists as undifferentiated matter. It exists as matter of a particular type of material object. In the case of a material substance, the material entity that consists of the en-formed matter is a unified entity of a particular kind.

In Aristotelian terms, the material entity is a unified entity with a particular essence. And this unified material entity exists in virtue of being en-formed by a substantial form. That is, the substantial form grounds the material entity's existence. And the form grounds the material entity's existence in virtue of the substantial form grounding the unity and essence of the matter that the material entity consists of. So

there's a transitivity of grounding as follows. The substantial form grounds the unity and essence of the matter, and therefore it grounds the existence of the unified material entity of a particular kind.

According to the fundamental principle of neo-Thomistic hylomorphism, which will be discussed in much more detail below, the human soul en-forms the human body. The human soul stands in an en-forming relation to the matter it en-forms. The en-formed matter is the body. In light of our foregoing discussion, we can describe this en-forming relation the soul stands in to the body in terms of grounding. In short, the soul grounds the body. That is, the soul grounds the existence of the body. This is in virtue of the soul grounding the body's unity and essence.

For elucidation, let's consider the soul and body of a particular individual human. Allow 'S' to stand for Socrates's soul and 'B' to stand for his body, which is a unified entity that's a particular kind of thing, i.e. a human body. S *en-forms* B means S *grounds the existence of* B. And S grounds the existence of B because S grounds B's unity and essence. The en-forming relation is a grounding relation.

As I move forward in describing and then applying neo-Thomistic hylomorphism I will use the Aristotelian and Thomistic terminology explicated in this section, including 'en-forming relation.' Yet as I've discussed, what I mean when I say that Socrates's soul en-forms his body is that Socrates's soul grounds the existence of his body. And as we'll see, contra Plato, the body is imperative on the view I'm advocating.

5.2 Human Ontology

This section is devoted to explicating a neo-Thomistic view of human persons. To begin with, Aquinas's view of the whole person will be presented. Then the nature of the

human soul will be our focus. After which the human body will be considered. Subsequently I'll discuss how neo-Thomistic hylomorphism differs from various competing views in the philosophy of mind.

Some may find it odd that the study of human ontology and philosophy of mind will be done in tandem throughout this section. However, rationale for considering Aquinas's philosophy of mind and human ontology together is simple: that's how Aquinas himself approached the subject. It doesn't seem that the two areas of study are disjointed independent areas of inquiry in his mind. After all, his most elaborate discussions of the soul and the body are found in a section of the *Summa Theologiae* known as 'the Treatise on Human Nature' (see Aquinas, 2002). Hence in this section Aquinas's thoughts on the nature of human persons and his philosophy of mind will be discussed in tandem.

5.2.1 Human Persons

It's well known, or at least often thought, that Descartes held that human persons are thinking substances and thus identified human persons with their soul (cf. Descartes, 1996, p. 54).[1] On this Cartesian view it seems there is a disconnect between the nature, or essence, of humanity and the body. Our body is in no sense essential to our humanity. Such a notion is at odds with the intuition that our bodies are integral to us as human

[1] My comments here pertain to the popular reading of Descartes and the view that's commonly labeled 'Cartesian dualism.' Yet, as Stump (2003, p. 512) points out, at times Descartes seems to think a complete human person is a soul-body compound. Keith Ward (2013) makes a very similar point. He thinks Descartes viewed an embodied human person as one substance. It's quite likely that Descartes has been misunderstood. Nevertheless, historical merits aside, the "Cartesian" view I will be referring to throughout this work is the popular understanding of Cartesian dualism. For it is the popular version of Cartesian dualism that's almost always the focus when substance dualism is considered, and it's the popular version of Cartesian dualism that Jaegwon Kim (2005) focuses on when he presents the pairing problem.

beings. An intuition that's evident when we make comments like 'Jordan is two meters tall,' 'Aryn looks beautiful,' or 'Kai is paralyzed from the waist down.' Clearly it is one's body that is a certain height, that looks beautiful, or that is paralyzed. And since it seems that a human person's body is an integral aspect of them, it's fitting to say a human person is a certain height, looks beautiful, or is paralyzed. In short, it seems intuitive that our bodies are integral to us and Cartesian dualism apparently disagrees with this intuition.

Like Cartesian dualism, Platonic dualism also identified human persons with their soul (ST 1a 75.4c; Stump, 2003, pp. 191-192). This view was well known in the thirteenth century, and particularly well known, and *resisted*, by Aquinas (Stump, 2003, pp. 192-194). The body, on Aquinas's view, is not an extra add-on to a human person like one's clothing. One respect in which hylomorphism differs from Platonic and Cartesian dualism is that the body is seen as essential to a human person.

Aquinas's most concise teaching on human ontology is found in the aforementioned 'Treatise on Human Nature' (Pasnau, 2012, p. 350). This work is in the first part (i.e. prima pars) of the *Summa Theologiae*, from questions seventy-five to eighty-nine. The *Summa* is a theological work meant to educate those who are just beginning theological study (Pasnau, 2002b, p. xiii). As Aquinas explicates his views throughout this work he relies on three authorities: Aristotle, Church tradition, and Scripture. As Eleonore Stump (2003, p. 192) points out, Aquinas's general thoughts on human nature were guided by intuitions summed up by two biblical passages: Genesis 3:19b and Ecclesiastes 12:7. The former reads, "…for you are dust, and to dust you shall

return."[1] God is here speaking to Adam as if Adam is dust, and thus a physical being. According to the latter verse, "…and the dust returns to the earth as it was, and the spirit returns to God who gave it." These words are spoken by the Preacher, the son of King David (see Ecclesiastes 12:8; 1:1) about the death of man. Interestingly, this latter passage suggests that human persons have a spiritual constituent that's not identical to the body and that persists after death. Together these passages imply that human persons are physical beings, but not *merely* physical beings. They can easily be taken to suggest Aquinas's view that a human person is composed of matter and soul.

After discussing purely spiritual creatures and merely corporeal creatures, Aquinas (ST 1a 75) turns in the 'Treatise on Human Nature' to consider human beings "who are composed of a spiritual and corporeal nature."[2] The spiritual nature Aquinas is referring to is the soul; the corporeal nature is the body. He thought a human person is a material substance composed of matter that's the physical constituent of the body, and a soul that's the substantial form of the body. Reasoning from what he thinks is true of a particular human to what he thinks of the human kind, Aquinas (ST 1a 75.4c) writes: "For just as it belongs to this human being to be composed of *this* soul, *this* flesh, and *these* bones, so it belongs to the account of human being to be composed of soul, flesh, and bones."[3] Regarding human nature, Aquinas agrees with Augustine who thought "a human being is neither the soul alone, nor the body alone, but the soul and the body together" (City of God, XIX 3, in Aquinas, ST 1a 75.4sc).

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[1] Biblical quotations are from the English Standard Version, unless otherwise noted.
[2] Unless otherwise noted, all references to the 'Treatise on Human Nature' refer to Robert Pasnau's (2002) translation published by Hackett.
[3] Italics are not mine.

On another critical point mentioned above, Aquinas agrees with Aristotle, who thought the human soul must be the form of a material body (see De Anima 412a 20). As the form of the body, the soul "contains the body" and "makes it be one thing" (ST 1a 76.3c). Simply put, it unites the body by grounding the existence and essence of each of its parts. A human person, on this view, is a substance that naturally consists of a substantial form (i.e. the soul) that en-forms matter (i.e. the body). A human person consists of a soul that naturally en-forms its body, which is essential to human nature (cf. Pasnau, 2012, pp. 349-350).

But why is the human soul naturally the form of a body that's essential to human nature? Couldn't it be nonessentially united to a body? Following Aristotle, Aquinas (ST 1a 76.1c) reasons:

> For the soul is the primary principle of our nourishment, sensation, and local movement; and likewise of our understanding. Therefore this principle by which we primarily understand, whether it be called the intellect or the intellectual soul, is the form of the body. This is the demonstration used by Aristotle (De Anima ii, 2).[1]

Here we get introduced to a fundamental reason Aquinas thought the body is essential to human nature and the human soul naturally en-forms a body. The reason is that the human soul depends on the body in order to operate consistently with its nature (ST 1a 84.4c & 89.1c; cf. 75.7 ad 3).

An essential operation Aquinas often refers to is sensing. Humans, like animals, are sensory creatures (Aquinas, SCG II.57). According to Aquinas, human nature includes sense perception and the human soul by nature senses. Though the human soul is an intellectual soul with the capacity to reason, it is also a sensory soul with the capacity

[1] Quoted from the Benziger Brothers (1947) edition, translated by the Fathers of the English Dominican Province.

to sense. But Aquinas did not think the soul could sense by itself without the body; rather it depends on the body to sense. Once again following Aristotle, he thought that in order to sense one must be moved by external objects and therefore the soul needs something that can be so moved, which is the body (Aquinas, SCG II.57). For example, the heat from a campfire affects the body producing a sensation of warmth. Since the human soul is sensory and depends on the body to sense, human persons by nature consist of a soul that en-forms a body, as Aquinas (ST 1a 75.4c) explains:

> But any given thing is identified with what carries out the operations of that thing, and so a human being is identified with what carries out the operations of a human being. We have shown, however, that sensing is not the operation of the soul alone [75.3]. Therefore since sensing is one of the operations of a human being (even if not one unique to humans), it is clear that a human being is not a soul alone, but something composed of a soul and body. Plato, however, since he claimed that sensing belongs to the soul alone, could claim that a human being is a soul using its body.

Here we see a dependence of the soul on the body for its operations, or the exercise of its powers. This idea of soul-body dependence will be taken up again in Chapter 7, as it's integral to the explanation of neural correlates of consciousness that I present.

There is a second line of rationale for the idea that the soul is by nature the form of the body that's essential to human nature. It appeals to soul-body unity. If, as Platonists thought, the body is nonessential to human nature and the soul is not naturally the form of the body, then it's difficult to explain why the human soul is united to a body that's nonessential to human nature. As Stump (2003, p. 194) points out:

> According to Aquinas, Platonists will have trouble explaining the way in which soul and body are joined. Platonists, Aquinas says, are committed to supposing that the soul is united to the body through some intermediary, because diverse, distinct substances cannot be bound together unless something unites them.

Because the body is nonessential to human nature according to Platonists, it will be difficult for them to explain why the human soul is united to a body and they will have to explain it by appealing to an intermediary between the soul and its body. But if, as Aquinas held, the human soul is by nature the substantial form of a body essential to human nature, then it's only fitting for it to en-form a body and appealing to any intermediary that unites body and soul won't be necessary (see QDA 9c). Since Aquinas's view doesn't require postulating something that unites the human soul to its body, his view provides a simpler explanation of why the soul is united to a body. This issue of soul-body unity that Aquinas was concerned with is similar to the causal pairing problem and, as will become apparent in Chapter 6, my response to the causal pairing problem is similar to Aquinas's treatment of this issue.

Yet for now, it's important to further explain hylomorphism before applying it to mental causation and NCC, which I'll do in the next two chapters. While human nature includes the body because humans are sense-perceptible and the soul depends on the body to sense, the body depends on the soul for its existence. The soul doesn't depend on the body for existence, but rather grounds the existence of the body. In Aquinas's (QDSC un. 2 ad. 3) words:

> …It must be said that the soul has subsistent actual being, inasmuch as its own actual being does not depend on the body, seeing that it is something raised above corporeal matter. And yet it receives the body into a share in this actual being in such a way that there is one actual being of soul and of body, which is the actual being of a man.

According to Thomism a human person is one substance that consists of a soul that en-forms matter, which is the body that exists because it's en-formed by a soul. Given that

the body's existence depends on being en-formed by the soul, it cannot subsist on its own apart from the soul that is its substantial form.

It's critical to see that on the hylomorphic view of a human being, the soul (i.e. the substantial form) and the body (i.e. the en-formed matter) are related via an en-forming relation. As the form of the body, the soul en-forms the body. The existence of a particular human body is grounded by a particular human soul. Were the body not en-formed, it wouldn't exist. And not only does an individual human body have existence because it's en-formed by a particular human soul, it's also what it is because it's en-formed by a form of a certain type. Hillary Clinton's body, for example, exists since it's en-formed by a soul, it's a human body since it's en-formed by a human soul, and it's Clinton's body since it's en-formed by her soul. In short, Clinton's body exists and exists as her human body because her soul en-forms the matter her body is comprised of.

At this point, hylomorphists disagree with physicalists who think the existence of the mental ontologically depends on the physical. Such ontological dependence of the mental on the physical would safeguard the explanatory priority of physics, which is critical to physicalism (cf. Kim, 1993, pp. 209-210). Thus many physicalists who hold to mind-body supervenience see it as a relation of ontological dependence, where the mental is dependent on the physical (see Kim, 2011, p. 12). For instance, "according to realizer functionalists, a mental property is to be identified with the first-order physical property occupying (or 'realizing') that mental property's defining causal role" (Tiehen, 2012, p. 223). If that's the case, then the mental property couldn't exist without some physical base property realizing such a causal role. So the mental, on this view, depends for its existence on the physical. Hence the realizer functionalist sees the dependency relation

going in the opposite direction than the Thomistic hylomorphist. For physicalists in general, mental states ontologically depend on the physical. For the Thomistic hylomorphist, the mental soul grounds the physical body's existence, and therefore the latter ontologically depends on the former.

Interestingly, hylomorphism also differs from dualist views that assign ontological priority to the physical, such as property dualism and emergent dualism. Property dualists admit sui generis mental properties, but see such properties as depending for their existence on the physical (see Chalmers, 1996; O'Conner, 1994). Similarly emergent substance dualists think a mental substance emerges from, and thus ontologically depends on, the physical (see Hasker, 1999, pp. 189-190). Given that hylomorphism claims the dependency relation goes in the opposite direction because the soul grounds the body's existence, hylomorphism differs from property and emergent dualism.

Hylomorphism doesn't only distinguish itself from physicalist views or views with physicalist leanings. It also differs from Cartesian substance dualism. The body, on hylomorphism, is a substance only in the sense that it's an inseparable aspect of a single human substance.[1] Apart from being an aspect of a human substance, it's not a substance. In other words, it's not a substance in-and-of itself. However, according to Cartesian dualism the body is a substance in itself, as the soul is.[2] Hence you have two substances on the Cartesian view that exist in-and-of themselves. But according to hylomorphism,

[1] I frequently use the phrase 'inseparable *aspect*' in reference to what metaphysicians call an 'inseparable part,' especially in the context of discussing substances. For the word 'part' conjures up images of separable parts in the minds of most English speakers. And since an inseparable part is very different from a separable part, the word 'aspect' is preferable when conveying the idea of an inseparable part.

[2] At least this is how Cartesian dualism is often described (cf. Stump, 2013, 26:02).

it's not that two substances, which exist in-and-of themselves, form one person consisting of two substances. Rather, a human person is one substance. The body is an inseparable aspect of that one substance, on neo-Thomistic hylomorphism.

Furthermore, the body is critically relevant to human nature from the Thomistic perspective. Accordingly, in *Disputed Question on Spiritual Creatures* Aquinas (QDSC un. 2 ad. 5) writes:

> …It must be said that no part has the perfection of a nature, when separated from the whole. And hence the soul, since it is a part of a human nature, does not have the perfection of its own nature, save in union with the body.

Since Aquinas sees the body as essential to human nature, it's fitting that a human soul devoid of its body is lacking as a human substance on his view. In reference to what's lacking, Aquinas employs the concept of: the perfection of an entities nature. The idea seems to be that a human soul lacks the perfection of its human nature when unembodied. According to Aquinas, the body is required for the perfection of human nature.

What Aquinas (QDSC un. 2 ad. 5) goes on to say in the same passage suggests why. He thought a thing is not "perfect in its own nature unless what is virtually contained in it can be actually brought out." And certain powers of the soul, Aquinas seemed to think, are "dependent on corporeal matter." For "powers which are acts of the organs flow from it." In other words, some actions of the body are the exercise of powers grounded in the soul. If such powers are significant, or essential to human nature, the soul needs the body to be perfected in nature. For without the body, the soul lacks its capacity to exercise such powers. Thus elsewhere, Aquinas (ST 1a 76.4 ad 2) notes that the soul moves the body "…through its potential for producing movement, the actualization of

which *presupposes* a body…"[1] Basically, a human person's body is needed to fully exemplify their human essence, which includes certain properties and powers.

By way of summary, according to this view, a human person is a hylomorphic object consisting of soul and body. Furthermore, the body is essential to a human person. This distinguishes hylomorphism from Cartesian dualism, but also prompts the questions: What qualifies hylomorphism as a substance dualist position? After all, hylomorphism shares common ground with materialist positions like animalism and Peter van Inwagen's materialist human ontology.[2] Yet, my thesis is that neo-Thomistic hylomorphism can overcome the chief contemporary objections to *substance dualism*. While I gladly admit hylomorphists share common ground with materialists, in the following section I'll clarify what makes neo-Thomistic hylomorphism a substance dualist position.

5.3 Incarnate Souls

According to Aristotle (402a 10): "To attain any knowledge about the soul is one of the most difficult things in the world." If that's true, the second most difficult thing is interpreting what Aristotle and Aquinas said about the soul. True, their insights are worth the exegetical labor. Nevertheless, interpreting these two philosophical giants is not always easy. And the nature of the soul on Aquinas view is particularly controversial, especially the issue of whether the soul is an immaterial substance. According to my interpretation of Aquinas described in this subsection, the soul is an immaterial or nonphysical substance. Given that some will think I've misinterpreted Aquinas, I re-emphasis the *neo*-Thomistic element of my neo-Thomistic hylomorphic view. The

[1] Italics mine.
[2] On animalism, see Eric Olson (2007, Ch. 2). For van Inwagen's materialist human ontology, see van Inwagen (1990; 1993; 2007).

primary aim of this subsection is not to defend my interpretation, but rather to explicate the nature of the soul according to neo-Thomistic hylomorphism.

To begin with, let's consider the passage that will guide our exposition. In Question 76.1 of the *Summa*, Aquinas's hypothetical objector challenges his view that the soul is the form of the body on the grounds that the soul subsists, or is a subsistent (ST 1a 76.1 obj. 5). And according to Aquinas (ST 1a 29.2c), a subsistent is a thing that has existence in itself, as opposed to having its existence in another.[1] Essentially, Aquinas's interlocutor claims Aquinas's view that the soul is the body's form is incompatible with his view that the soul is subsists (see ST 1a 75.2c). Aquinas (ST 1a 76.1 ad 5) responds as follows:

> (*Section I*) The soul shares with corporeal matter the existence in which it subsists: from that matter and from the intellective soul, one thing comes about. This occurs in such a way that (*Section II*) the existence that belongs to the whole composite also belongs to the soul itself, something that does not occur in the case of other forms, which are not subsistent.

I've labeled two sections of Aquinas's response, which will guide our considerations respectively. We'll begin with *Section I* and consider the soul as the form of the body. Then we'll move on to *Section II* and consider the soul in itself.

5.3.1 The Form of the Body

I mentioned above that Aristotle and Aquinas considered the soul to be the form of the body. As such, the soul grounds the body's existence. We see this idea described in *Section I* of the passage above. In the description there's one thing that exists in itself –

[1] For example, my dog Anselm is subsistent, but his tail is not subsistent. It exists only as a part of Anselm's body. Strictly speaking, his tail would not exist as his tail if it were separated from his body.

the soul. But also included in the description is something that depends on the soul for its existence. That's the corporeal matter en-formed by the soul – i.e. the body.

The soul "shares" its existence with the body. The soul has existence that doesn't depend on the body, but the soul confers existence on the body. The soul grounds the existence of the body given that it grounds the body's unity making it a unified existing entity that's a human body as opposed to another type of body. The soul exists in itself, whereas the body exists because the soul exits and grounds the unity and essence of the body. In that sense, the soul "shares" its existence with the body. Consequently, there's one hylomorphic object—a human person—that exists. The person consists of a soul that en-forms corporal matter, which is the body.

As the form of the body the soul is meant to be embodied, according to Aquinas (see ST 1a 76.2 ad 6). Since my soul is the form of my body its natural state is to be en-forming my body. Thus it's naturally related to my body via an en-forming relation, as form en-forming matter. According to hylomorphism, a soul is not related to a body through an external relation such as a causal relation that pairs an immaterial substance with a material substance. Rather, there's an en-forming relation where the soul en-forms matter and therefore a single material substance exists.[1] This en-forming relation is an intrinsic relation because it's internal to one substance, rather than between two substances. And as discussed in section 5.1.6, this en-forming relation is a grounding relation. The soul grounds the body's existence.

The body, according to this view, would not exist as a single biological human organism were it not a unified entity. The form of the body, the soul, grounds the unity of

[1] See section 5.1.5.

the body. Moreover, there are other kinds of unified biological organisms. What grounds the fact that the body is a human body, as opposed to some other kind of biological organism, is the fact that a human soul en-forms it. Thus the form of the human body, the human soul, grounds the human body's existence in virtue of grounding its unity and essence.

Given that the substantial form grounds the unity of the body, one might think the form is like what contemporary metaphysicians call bare particulars or bare substratum. A key difference, however, is that bare particulars and bare substratum are *bare* property-less entities (cf. Loux, 2006, p. 84; Mackie and Jago, 2013, 4.5). Substantial forms are not bare. The form of the human body, the soul, has properties and grounds the essential properties and powers of the human being (see Pasnau, 2012, p. 361). So the human soul of hylomorphism should not be thought of as a mere bare substratum, nor tantamount to a powerless "free-floating shape" (2012, pp. 352-353). Souls have properties and powers. As Pasnau (2012, pp. 352-353) notes, souls are agents with causal power.

5.3.2 The Soul Itself

Since we've fleshed out *Section I* of our guiding text, let's now consider *Section II*. Here we read, "The existence that belongs to the whole composite also belongs to the soul itself, something that does not occur in the case of other forms, which are not subsistent." According to Aquinas, the existence of the whole substance belongs to the soul itself. Assuming that, one naturally wonders: How can the existence of the whole belong to the soul without the soul being a substance? The answer reveals that Aquinas is at least an "Aristotelian dualist," as Pasnau puts it (2002b, p. xvii). In short, the soul is a substance.

In Question 75.2 of the *Summa*, Aquinas addresses the question of whether the human soul is subsistent. When briefly stating his position in the said contra, he quotes Augustine as giving an affirmative answer. Directly following, he concludes: "Therefore the nature of the human mind is not only nonbodily, but also a substance – that is, something subsistent" (ST 1a 75.2sc). Not everything that subsists is a substance, but if the soul is a substance then the answer to the question of whether it subsists is affirmative. As Pasnau (2002a, p. 225) points out in his commentary on this text, Aquinas prefers to call the soul a subsistent and is likely bringing his terminology in line with Augustine's use of 'substance.' But Aquinas can do this without miscommunicating his view of the soul because according to his view the soul is both a subsistent and a substance. Pasnau (2002a, p. 225) explains:

> Strictly speaking, the two are not equivalent, and Aquinas always prefers to describe the human soul as subsistent. For something to be a substance, in his strict usage, it must not only subsist but also be the underlying subject of accidents (see I *Sent.* 23.1.1c, *QDP* 9.1c)…The soul *does* meet the second condition, and so does count as a substance, but Aquinas regards subsistence as the more basic notion.

Indeed, the soul is a unique form. According to this reading of Aquinas, the form of a particular type of material substance, a human person, is itself a substance (cf. Pasnau, 2012, p. 353).[1] Moreover, according to Aquinas, it's a rational (that is, thinking) substance (see ST 1a 75.2c & 75.6c).[2] To boot, it's a subsistent that can exist apart from the matter it en-forms—i.e. the body (see Brown, 2005, p. 103). That the soul is capable

[1] Howard Robinson (2016, section 1.2) seems to likewise interpret Aquinas. For a different view on whether the soul is a substance according to Aquinas, see Christopher M. Brown (2005, pp. 55-57).

[2] As I'll discuss in Chapter 7, according to Aquinas's view of cognition there's a role for the brain (see ST 1a 75.2 ad 3, 1a 89.1c). Nevertheless, he thought "the human being thinks, through the soul" (ST 1a 75.2 ad 2).

of such is made clear in the sentence directly following *Section II* of our guiding text. Having just said the existence of the whole composite belongs to the subsistent soul, Aquinas writes: "And for this reason the human soul continues in its existence after the body is destroyed, whereas other forms do not" (ST 1a 76.1 ad 5). Aquinas believed the soul's natural state is to be embodied, that is, to be en-forming the body (see ST 1a 76.2 ad 6). Yet, he also thought it could exist unembodied between bodily death and being bodily resurrected.

To be clear, my aim is to defend a Thomistic view of the soul, *not* a view of the afterlife. I, too, think human souls persist after bodily death and before bodily resurrection (albeit not for the same reasons as Aquinas).[1] Nevertheless I describe Aquinas's view of the afterlife, specifically what theologians call the intermediate state, in order to further clarifying the nature of the soul, on Aquinas's view. In order to embrace neo-Thomistic hylomorphism one need not embrace Aquinas's view of the afterlife.

Given the description of the soul thus far and that mainstream contemporary philosophy consists of various versions of materialism, as Searle (1992, p. xiii) put it, Aquinas is clearly outside orthodoxy. Worse yet, it seem he's committed an unpardonable transgression by crossing the line into substance dualism. However, two superlative Aquinas scholars that I've relied on – Robert Pasnau and Eleonore Stump – are reluctant to place Aquinas in the substance dualist camp.[2] Pasnau (2002b, p. xvii) admits he's a dualist but makes it very clear he's not the same type of substance dualist as Plato and Descartes (see also Pasnau, 2002c, Ch. 2). Stump (2003, p. 212) seems willing to admit

[1] I think such can be demonstrated on theological grounds, but not philosophical.
[2] See also Alfred Freddoso (2012, p. 6, footnote 5) and James Madden (2013, Ch. 8).

"…Aquinas seems clearly in the dualist camp somewhere…" Yet, according Stump's (2003, p. 212) interpretation of Aquinas, the soul is subsistent but not a substance according to Aquinas's criterion for a substance.

Nevertheless she admits the soul can exist without the body on his view, which suggests it's more like substance dualism than property dualism (2003, p. 212). She then suggests:

> Maybe we should invent a new genus *subsistence dualism*, under which substance dualism will be one species and Aquinas's account of the soul another. But perhaps we need not be so fussy. It is clear that Aquinas's account of the soul is more nearly allied with substance dualism than with property dualism; and if we do not take 'substance' in 'substance dualism' too strictly (if it can include subsistent things that are not complete substances), then we can count Aquinas among the substance dualists. In that case, we ought to categorize Aquinas as a non-Cartesian substance dualist and put him in the camp of those opposed to physicalism.

That's not a bad option. Given that the subsistent soul we're talking about seems very much like what contemporary philosophers of mind would call a substance, whether or not Aquinas would according to his technical scholastic terminology. However, after describing this option, Stump (2003, pp. 212-216) apparently rejects it and goes on to use Aquinas's positions as an example that reveals that the category lines between dualism and materialism/physicalism have been misdrawn.

I agree with Stump that we should question the current categorizations. And Aquinas's view certainly challenges the contemporary characterization of dualism. But given the current categories, and the description of substance dualism I provided in Chapter 1, it seems undeniable that Aquinas is a dualist.[1] According to Edward Feser

[1] See Chapter 1 section 1.3.

(2009, pp. 162-163), Aquinas is a dualist indeed, despite the reluctance of some to admit it:

> In their zeal to emphasize the differences between Aquinas's position and that of Plato and Descartes, some of his defenders have tended to insist that he was not only not a materialist, but not a dualist either. But this "pox on both houses" approach, motivated in part perhaps by a fear that contemporary philosophers might be too quick to dismiss Aquinas if he is labeled with the "D word," is not very plausible. As we've seen, Aquinas held both that the intellect is immaterial and that the soul survives the death of the body. Surely that counts as dualism by most people's reckoning, and certainly by the reckoning of most contemporary philosophers…Better, then, just frankly to acknowledge the fact, and to defend Aquinas's position on its merits rather than pretend it is something it is not.

I can't help but agree that Aquinas is a card-carrying dualist, for better or worse. And defending his unique dualist position (or at least my interpretation of it) on its own merits is precisely what I intend to do in the next two chapters. But before doing so, it will be helpful to succinctly summarize the position I intend to defend.

5.4 Conclusion

The aim of this chapter has been to introduce a unique substance dualist position that originated with Aquinas. Using his thoughts as a guide, not as an infallible final authority, I've sketched out a position that I think is the most defensible substance dualist position. We can summarize it like so.

> *Neo-Thomistic hylomorphism*. A human person is a single substance that naturally consists of a substantial form that en-forms matter. The human soul is the substantial form that en-forms matter, constituting a human body. The soul and body stand in an en-forming relation. Thus each person's body is fundamentally related to their soul via an en-forming relation, which is a non-causal grounding relation. The body is a unified biological organism consisting of matter unified by its form, the soul. The soul is a nonphysical rational substance that's not identical to the body, which it en-forms. The soul has properties and powers and grounds the essential properties and powers of the person, including the body.

The next two chapters are devoted to demonstrating that neo-Thomistic hylomorphism is capable of overcoming substance dualism's paramount problems. In other words, I aim to show that this oft forgotten dualist position can defeat dualism's potential defeaters. In Chapter 6 I'll argue that it provides a solution to the causal pairing problem. Subsequently, in Chapter 7, I'll argue that it offers a good explanation of neural correlates of consciousness.

6

Hylomorphism & the Causal Pairing Problem

Now that the causal pairing problem and neo-Thomistic hylomorphism have been clearly presented, it's time to apply the latter to the former. The pairing problem, as I argued in chapter three, is substance dualism chief problem regarding mental causation. At the root of the pairing problem is the charge that if substance dualism were true then mental causation would be incoherent since there's no way for immaterial minds to be causally paired with their effects. The purpose of this chapter is to show that hylomorphism is a substance dualist position that's immune to the pairing problem.

My primary aim is to show that hylomorphism offers a coherent explanation of why a particular mind is causally paired with its effects, and thus provides a solution to the pairing problem. This explanation (or account) of causal pairing capitalizes on the fundamental tenet of hylomorphism, that the soul is the form of the body. I'll present this specific hylomorphic solution of mine in section 6.2. However, there are other alleged hylomorphic solutions to the pairing problem. Thus in section 6.1, we'll reconsider the pairing problem and then I'll explain two other hylomorphic solutions to the pairing problem in order to distinguish them from my own. At that point I'll also offer my rationale for preferring my own hylomorphic solution to the pairing problem over and above these other alleged solutions. Before wrapping up section 6.1 I'll give three preliminary critiques of Kim's argument that don't depend upon hylomorphism. After

explicating my hylomorphic account of causal pairing in section 6.2 I'll respond to the two toughest objections to my account in section 6.3 just before concluding.

6.1 Reconsidering the Causal Pairing Problem

As demonstrated in chapter four, the causal pairing problem alleges that mental causation is metaphysically impossible for the immaterial minds of substance dualism.[1] The nature of causation and the nature of immaterial minds supposedly preclude the possibility of mental causation. In this section, I'll reconsider Kim's argument for the pairing problem. First, a brief summary of the argument will be given. Second, I'll discuss two hylomorphic responses that differ from my own hylomorphic response. My aim will be to distinguish the former from the latter and to provide rationale for why my response is preferable. Third, I'll clarify which premises of Kim's argument I'll object to via my own hylomorphic response. Yet before presenting my response, which aims at providing a solution to the pairing problem, I'll wrap up this section with three preliminary critiques of Kim's argument.

Let's summarize Kim's argument for the pairing problem (cf. Kim, 2005; 2009). Of fundamental importance is the idea that causation requires a pairing relation between a cause and its effect. But unfortunately for substance dualism there is no possible relation that could pair an immaterial mind with an effect, argues Kim. After all, spatial relations are the only type of relation that could possibly pair causes with effects. Yet immaterial minds are not spatial, and thus cannot stand in spatial relations. And since spatial relations are the only type of causal pairing relations, immaterial minds can't stand in

[1] See Chapter 4 for a detailed explication of the pairing problem.

causal paring relations. Hence Kim concludes: mental causation is metaphysical impossible for immaterial minds. I've formally reconstructed Kim's argument as follows:

(1) For every case of causation there is a cause-effect pairing relation between cause and effect.

(2) All cause-effect pairing relations require spatial relations.

(3) An entity/event must be spatial to stand in any cause-effect pairing relation (from 2).

(4) Immaterial minds are not spatial.

(5) Immaterial minds cannot stand in any cause-effect pairing relation (from 3; 4).

(6) Therefore, mental causation is impossible for immaterial minds (from 1; 5).

Neo-Thomistic hylomorphists might respond to Kim's argument in various ways. Before moving on to consider my own line of response, let's consider two noteworthy responses hylomorphists might give that differ from mine.

6.1.1 Two Hylomorphic Responses

The aim of this section is twofold. For one, I hope to clarify two potential hylomorphic responses that differ from mine in order to distinguish my hylomorphic response from these other two responses. Additionally, I'll point out shortcomings pertaining to each response. These deficiencies provide rationale for preferring my response to these other two responses. However, let me admit that such shortcomings fall short of rendering these two responses as dubious dead ends. My aim is not to show that these other responses are irredeemably hopeless. Rather, my twofold aim is to distinguish them from mine and to warrant serious consideration of my proposed hylomorphic response.

The first response we'll consider exploits the hylomorphic tenet that a human person is a single material substance. According to this response, the pairing problem

doesn't arise given that a human person is a single substance. The second response claims that the soul is spatial via the body. Therefore, according to this second response, the soul meets Kim's prerequisite of spatiality for causality.

One might wonder whether these responses are mutually exclusive. It seems to me that the hylomorphist can't endorse both simultaneously. But if she finds that her preferred response fails, she can certainly consider endorsing the other response. In any event, however, I hope it becomes apparent that my hylomorphic response is preferable to each of these two hylomorphic responses.

First Response: Single Substance

As was stated in the previous chapter, according to neo-Thomistic hylomorphism a human person is a single material substance consisting of a form and matter. The soul, according to this view, is a substance in itself that en-forms matter and thus there's one material substance. While the body is not identical to the soul, it's also not a distinct substance apart from the soul that en-forms it. Rather, there's one substance – a human person – and the body is an aspect of that one material substance. Pope Francis, for example, is a single human person consisting of a soul that en-forms matter, which is Pope Francis's body. Given this view of human persons, the hylomorphist can question the very grounds that prompt the pairing problem.

Recall from chapter four that Kim (2005, pp. 73-74) tees up his argument for the pairing problem by commenting on erstwhile arguments presented by historical critics of "Descartes' interactionist dualism." According to common renditions of this dualist view, the immaterial mind and material body causally interact with one another (Kim, 2005, p. 77). Hence the infamous objection: The two substances – the immaterial mind and the

physical body – are of such different categories that it seems impossible for them to causally interact (see Kenny, 1968). As an argument against dualism this objection "is incomplete and unsatisfying…it only expresses a vague, inchoate dissatisfaction of the sort that ought to prompt us to look for a real argument," writes Kim (2005, p. 74). He (2005, p. 74) asks: "Why is it incoherent to think that there can be causal interaction between *things* in 'diverse categories'? Why is it 'impossible' for *things* with diverse natures to enter into causal relations with one another?"[1] Notice the use of the plural 'things' and the concern regarding how these things interact. This is Kim's starting point.

The hylomorphist, however, isn't obliged to start in the same place. Given the hylomorphic view that a human person is a single material substance, the hylomorphist need not start with *things*, plural. Rather, she begins with *thing*, singular. And since there is a thing, not things, you don't have causal interaction between two things, according to hylomorphism (see Feser, 2009, pp. 166-167; Madden, 2013, p. 275). Instead you have an exercise of power by one thing with distinct aspects.

For example, imagine that my soul has a mental intention to run that leads to my legs striding forward. The mental intention to run and the movement of my legs are the intention and movement of the same material substance exercising its power to run. There are not two substances causally interacting, according to hylomorphism. Instead there's one substance that exercises its power(s).

Neo-Thomistic hylomorphism differs from Cartesian dualism in a significant respect. Cartesian dualism says two substances – soul and body – causally interact. But according to hylomorphism, there is no such interaction. And given that there isn't

[1] Italics mine.

interaction between two substances, there is no reason to ask what causally pairs the two interacting substances. At least, that's the central claim of this first response.

Put differently, the starting point of Kim's argument for the pairing problem is available given Cartesian dualism, but unavailable given hylomorphism. This is problematic for Kim's argument because he is ultimately trying to show that if substance dualism were true then mental causation would be incoherent. To do so, he starts with tenets of a dualist view and then tries to show how mental causation would be metaphysically impossible given such tenets. Kim's rendition of Cartesian dualism supplies him with the tenets he needs for his starting point. For according to Cartesian dualism, two substances causally interact. However, neo-Thomistic hylomorphism doesn't supply Kim with such premises. Because according to hylomorphism there is one substance exercising its powers, therefore there isn't causal interaction between two substances. Nevertheless, Kim needs his starting point and therefore he needs the tenets that provide it. But hylomorphism doesn't provide such tenets. Thus the pairing problem simply doesn't arise given hylomorphism. Hence, it seems there is no pairing problem for hylomorphism.

That's the first hylomorphic response. It clearly hinges on the hylomorphic tenet that a human person is one material substance. Given that tenet Kim's starting point for generating the pairing problem is absent and the pairing problem doesn't arise. So if the hylomorphist's aim is to show that her position is consistent given her starting assumptions, which significantly differ from Kim's, then this response is worthy of serious consideration. However, this first response may be unpersuasive to most

physicalist sympathizers since it highlights the different starting points, rather than highlighting common ground and then proceeding.

When it comes to persuasive power, the hylomorphist will be better off if she can grant some ground to Kim and still provide a satisfactory response. One aim of my own response, though not the primary aim, is to meet this desideratum. The hylomorphist that adopts my response can easily grant the validity of Kim's argument in addition to his first and fourth premises, and then merely take exception with his second premise, which entails his third. In light of this, my hylomorphic response to the pairing problem has the potential to be more persuasive than this first response. In due course, I'll present my response and the reader can judge for herself. But beforehand we shall distinguish a second hylomorphic response, which also differs from my own.

Second Response: Spatial Soul

If the hylomorphist *primarily* wants to meet Kim on his own terms, one tempting response is to acknowledge the validity of his argument and accept all but one premise—premise four. According to this premise, immaterial minds are not spatial. The hylomorphist that takes this route of rebuttal denies premise four since she thinks the soul is spatial via the body.

Yet, how can the hylomorphist say the soul is spatial via the body? Basically, she tries to capitalize on the idea that the body, which is spatial, is an aspect of the soul.[1] Given that the body is spatial and an aspect of the soul, she concludes that the soul is spatial since an aspect of it (i.e. the body) is spatial.

[1] Some hylomorphists think the body is a mode of the soul rather than an aspect of the soul (cf. Moreland, 2015, p. 201). This response could be re-articulated accordingly.

Recall that according to the hylomorphic view I outlined in the previous chapter, the soul is a substance in itself and it's also the form of the body. The human soul en-forms matter that's the human body.[1] Thus a human person is a particular type of substance, a material substance. The soul en-forming the body is a material substance since the substance includes en-formed matter. Yet it's important to note that the matter is not a substance in itself apart from the form that en-forms it, i.e. the soul. After all, there's only one substance, and that's the soul. The en-formed matter, the body, is an aspect of the soul. Since the body is an aspect of the soul and the body is spatial, the soul is spatial since an aspect of it is spatial. In other words, the soul is spatial via the body.

If that's true—if the soul is spatial—premise four of Kim's argument is false. Consequently, premise five wouldn't follow, and neither would Kim's conclusion. In brief, the pairing problem says: spatiality is necessary to stand in causal pairing relations and since immaterial minds aren't spatial they can't stand in such relations. If the hylomorphist can justifiably deny Kim's claim in premise four that immaterial minds aren't spatial, it seems that she can undermine Kim's argument for the pairing problem.

As a hylomorphist and as someone who is spatially located, I see the initial attraction of this route of response. For one, it seems obvious to me that I'm spatially located in Washington State at present, not in Antarctica. Secondly, it's perfectly consistent with hylomorphism, and Aristotelian thought at large, to think our souls are spatially located where our bodies are. After all, according to hylomorphism, a person's soul unites the parts of her body making it a unified object, so it's fitting to think her soul is spatially located where her body is.

[1] On this en-forming relation, see Chapter 5 section 5.1.6.

Nevertheless, I doubt this second response can be successful. Suppose Kip's hand rises as the result of his mental intention to raise his hand and flag a taxi. This response says Kip's intention is causally paired with his hand rising because his soul is spatial; thus his soul's intention stands in a spatial relation to the effect. However, the soul is spatial via the body, in the way described above. So according to this response Kip's soul is causally paired with the effect of his hand rising because his soul is spatial since his body, an aspect of Kip, is spatial. According to this line of thought, it seems that some spatial part of the body stands in a spatial relation with the effect and that spatial relation explains the causal pairing relation. If that's the case, ultimately the spatiality of the body is what explains the bodily effect (i.e. Kip's hand rising). And we've just causally paired one spatial part of the body with another spatial part of the body.

Given that, we must ask: What causal work is the soul doing? The answer seems to be: none. After all, the soul is spatial since an aspect of the substance – i.e. the body – is spatial. Simplistically put, the soul's spatiality is the body's spatiality. Thus it must be some spatial part of Kip's body that stands in the spatial relation to the effect, and therefore stands in the causal pairing relation. But if it's a spatial part of Kip's body that stands on the 'cause' side of the cause-effect pairing relation, then a part of Kip's body is doing the causal work, not Kip's soul. So what causal work is the soul doing? It seems it's not doing any causal work, if the tenets of this response are correct.[1] But this response is supposed to explain how the soul, not a part of the body, is causally paired with effects.

At the end of the day, I think this second response fails because a part of the body, rather than the soul, ends up being the cause. Yet, the first response lacks persuasive

[1] Kim (2000, Ch. 2) gives a similar argument against non-reductive physicalism.

power since it focuses on the different starting points; thus leaving the hylomorphist with little common ground upon which to reason with her interlocutors. Given the deficiencies of these two hylomorphic responses, I offer a different hylomorphic response to the pairing problem. In section 7.2 my hylomorphic response will be given. But before we consider it, I'll offer preliminary reasons to doubt Kim's second premise.

6.1.2 Questioning the Necessity of Spatial Relations

My explicitly hylomorphic response to the pairing problem will question Kim's second premise, which says all cause-effect pairing relations require spatial relations. This premise is essential to Kim's argument and entails premise three, which says that an entity/event must be spatial in order to stand in any cause-effect pairing relation. Basically I'll try to show that, contra Kim's second and third premises, hylomorphism can account for why a mental cause is paired with its effects without appealing to spatial relations. Yet before giving a particularly hylomorphic response to the problem, it will be helpful to weigh some general reasons to doubt that spatial relations are necessary to pair causes with effects. In this subsection such general reasons, which don't depend on hylomorphism, will be given.

To begin with, I'll consider Kim's rationale for premises two and three. Secondly, I'll point out an unstated assumption that Kim's argumentation rests upon. Thirdly, two justified beliefs that are inconsistent with the idea that spatiality is necessary for causality will be brought to bear on the issue. At this point I'll unearth a threat posed to premises two and three by Kim's own view of qualia. Lastly, I'll draw attention to a flaw regarding the logical structure of Kim's reasoning.

Kim's Case for Premises 2 & 3

Let's consider Kim's justification for his second major premise, which entails his third major premise. The following is his rationale for the claim that all cause-effect pairing relations require spatial relations.

2.1 In clear cases of physical causation, spatial relations account for cause-effect pairing relations.

2.2 Besides spatial relations we do not know what could account for cause-effect pairing relations.

2.3 Therefore, spatial relations are necessary for all cause-effect pairing relations (from 2.1 & 2.2).

Note that 2.3 does not necessarily follow from 2.1 & 2.2, so we shouldn't take this as a deductive argument. It's either an inductive or abductive argument for the idea that spatial relations are necessary for cause-effect pairing relations.

Secondly, let's note that Kim also gives justification for each of these sub premises. In support of 2.1, Kim (2005, pp. 78-79) offers an example of physical causation involving two guns, A and B. The guns are simultaneously fired and simultaneously cause the deaths of Adam and Bob. Spatial relations, such as the distance gun A is from Adam and its orientation toward Adam, explain why the firing of A caused Adam's death. The same can be said for the firing of gun B causing Bod's death. So Kim (2005, p. 79) concludes, "spatial relations seem to serve as the 'pairing relations' in this case, and perhaps for all cases of *physical* causation involving distinct objects."[1]

[1] Italics mine. The hylomorphist who responds to Kim's argument by way of the first response considered above might want emphasize the words "involving distinct objects." Since the hylomorphist could agree with Kim on this score and go on to point out that according to the hylomorphic view a person doesn't consist of two distinct objects, but rather two distinct aspects of one substance.

Yes, perhaps, spatial relations serve as pairing relations for all cases of *physical* causation. But this hardly supports the idea that spatial relations must "serve as pairing relations" for all cases of causation, including those involving immaterial causes. Hence the need for 2.2.

In support of this sub premise, 2.2, Kim (2009, pp. 32-33) offers the following line of reasoning:

> …I can state my fundamental assumption in general terms, and it is this: It is metaphysically possible for there to be two distinct **physical** objects, *a* and *b*, with…the same causal potential or powers; further, one of these, say *a*, causes a third object, *c*…Now, the fact that a, but not *b*, causes *c* to change must be grounded in some fact about *a*, *b*, and *c*. Since *a* and *b* have the same intrinsic properties, it must be their relational properties with respect to *c* that provide an explanation of their different causal roles vis-à-vis *c*. What relational properties, or relations, can do this job? The **only** plausible answer seems to be that it is the spatial relation between *a* and *c*, and that between *b* and *c*, that are responsible for the causal difference between *a* and *b* vis-à-vis *c* (*a* was in the right spatial relation to *c*; *b* was 'too far away' from c to exert any influence). At least, there is **no other possible explanation** that comes to mind.[1]

The question is: Why did one *physical* object, rather than another *physical* object with the same causal powers, cause an event? Kim wants an explanation of what grounds the fact that *a*, but not *b*, caused a particular event. And he thinks this explanation must depend on a particular type of relation that the physical objects stand in. The only answer that comes to his mind hinges upon spatial relations.

However, if the question included immaterial souls (rather than physical objects) as the alleged causes, then another relevant relation might come to mind for those sympathetic to dualism. Perhaps, an immaterial mind is paired with bodily effects simply in virtue of the relation of unity between a person's mind and body. For example, Smith's mental intention could be causally paired with Smith's hand rising because Smith's soul

[1] Bold mine.

is united to his body. Likewise, Jones's intention might be paired with his hand rising since his mind is united to his body.

But the problem is that one's soul and body are united via a causal relation, according to Kim's reading of Descartes. So "the 'union' of a mind and a body that Descartes speaks of, therefore, presupposes mental causation" (2005, p. 77). Given this, Cartesian dualists would in effect be saying that Smith's mind causes his body because his mind causes his body. This circular explanation won't do. And supposedly there are no other relations that are good candidates for pairing causes with effects. Yet in causal cases involving physical objects spatial relations seem to pair causes and effects. So spatial relations are the only relations that could pair causes with effects, even when it comes to mental causation involving immaterial minds. At least that's Kim's rationale for premises two and three, which claim spatial relations are necessary for causal pairing relations and hence only spatial entities can stand in such relations.

Unstated Assumption

Kim (2005, p. 87) ultimately concludes that if substance dualism were true, mental causation would be precluded by the "diverse natures" of mind and matter. Kim thinks that the natures of immaterial minds, if such exists, must be significantly different than the nature of matter. Given the diverse natures of physical substances versus nonphysical substances, it seems fitting to assume that the nature of causation involving a physical cause is probably different than the nature of causation involving a nonphysical cause. However, Kim assumes the opposite.

He assumes that the principles governing physical causation must also govern causation involving nonphysical causes. From the outset he presupposes that examples of

physical causation are paradigmatic for all causation, even causation involving immaterial substances. When Kim (2009, p. 32) attempts to prime the pump of our intuitions, he asks us to "consider an example of physical causation." But why should we expect that causation between merely physical objects would provide us with a causal framework that applies to causation involving immaterial substance? After all, if immaterial substances are so different in nature from material substances, shouldn't we expect the nature of causation involving immaterial substances to be different than the nature of causation involving merely physical objects? We should at least be open to the possibility.

Yet, Kim tacitly assumes that causation produced by nonphysical substances must mirror causation produced by physical substances. He assumes that causation involving immaterial minds will be based on the same principles as causation between merely physical objects. So after using his examples of physical causes to show us that spatiality is necessary in such cases, he concludes that spatiality is necessary in every case of causation. But without Kim's unspoken assumption, the steps he takes to arrive at his conclusion are too hasty and unjustified. For causation between merely physical objects could be exactly as Kim describes it, and yet causation involving nonphysical substances could differ in nature. Put differently, Kim may have identified the essential principles and necessary conditions for physical causation, but that doesn't justify the idea that causation involving immaterial minds must be based on the same principles and require the same conditions. Kim just assumes the latter.

At the very least, Kim owes us justification for his unstated assumption, which doesn't fit well with the idea that physical and nonphysical substances are very different

in nature. Such justification may be hard to find apart from presupposing physicalism. Nevertheless, it's needed.

Inconsistent Beliefs

Some might think Kim's claim that an entity must be spatial to stand in a causal pairing relation doesn't demand much justification because it's obvious. Indeed, for the materialist, it may seem obviously true. After all, there may be nothing else in her ontology that could possibly account for causation. However, the idea that spatiality is necessary for causality seems much less plausible when it's shown to be inconsistent with justified beliefs. In this subsection I'll point out two justified beliefs that seem to be inconsistent with the idea that entities must be spatial to stand in causal pairing relations. The first belief is classical theism. The second is Kim's own belief about qualitative states of consciousness, coupled with the fact that pinpricks cause pain. I won't here defend the justification of these beliefs. I'll merely assume they're justified. My aim is to point out that given certain justified beliefs, Kim's second and third premises are not obviously true, but rather seem false.

To begin with, classical theism contradicts Kim's claim about the necessity of spatiality. According to classical theism, God is nonspatial and the creator of the universe. As such, God is the cause of the universe and all of spacetime coming into existence.[1] So according to theism, God is the nonspatial cause of the universe and spacetime. This clearly contradicts Kim's claim that an entity must be spatial to be causally paired with an effect. Thus assuming that the theist's belief is warranted (see

[1] Some might quibble with this position on the basis that God is omnipresent and go on to infer that God must therefore be spatial. But even if such were so, it wouldn't threaten the nonspatiality of God prior to the creation of all things including space.

Plantinga, 2000) or justified (see Swinburne, 1996), she can justifiably deny Kim's second and third major premises (cf. Plantinga, 1984). After all, she's justified in believing that there was a nonspatial cause of the universe and spacetime, and therefore she is justified in believing that a nonspatial entity can stand in a causal pairing relation. Clearly, I haven't argued here that theistic belief is justified. Rather the point is: assuming theistic belief is justified, theists can justifiably deny Kim's second and third premise.

Secondly, Kim's own view of qualia seems inconsistent with his claim that spatiality is necessary for an entity/event to stand in a causal pairing relation. At the end of *Physicalism, Or Something Near Enough*, Kim (2005, p. 170) concludes that qualia are physically irreducible. Qualia are the felt sensations of what it's like to be in particular mental states (see Shoemaker, 1995). For example, a state of pain caused by a pinprick feels different than tasting chocolate. The difference in feeling is a difference in qualia. The point that concerns us here is that Kim thinks qualia are physically irreducible. In other words, according to Kim, qualia are nonphysical mental states.

Recall that Kim thinks nonphysical minds would be nonspatial if they existed, given that they would be nonphysical. He also doesn't think there is a way of locating such nonphysical minds in space that would help dualist overcome the pairing problem (see Kim, 2005, pp. 88-90). Now, assuming that Kim would consistently apply his thinking about nonphysical minds to nonphysical qualia, it's fair to suppose that nonphysical qualia would be nonspatial according Kim's view. Granted he doesn't explicitly say this, but if there is an advantageous way for him to locate nonphysical qualia in space it seems dualist could do the same regarding nonphysical minds. Yet,

according to him dualist can't do so, thus it seems that nonphysical qualia can't be spatially located, according to Kim's line of thought.

One might object that if qualia are properties rather than substances, then they can be spatially located where their bearers are. However, there are at least two considerable responses to this objection. First off, Kim's commitments seem to exclude this solution. Kim claims that if souls were spatial, then spatial exclusion would apply to them and they couldn't be co-located in the same space as their bodies (see 2005, pp. 89-90). He seems to think spatial exclusion applies to anything and everything that's spatial. Assuming such a position, if qualia are spatial, then spatial exclusion applies to them in addition to their physical bearers. Consequently, qualia couldn't be co-located where their physical bearers are any more than spatial souls could be co-located where their bodies are.

Thus, given Kim's commitments, the prospect of locating qualia where their physical bearers are faces the same problem that Kim alleges Cartesian souls face. Granted, this is no fatal problem for qualia or souls. It's likely that nonphysical qualia could be spatially located in relevant proximity to their physical bearers, if not in the exact location. And if mental causation does depend on such spatiality, then the necessary condition would be preserved. However, if such is possible for qualia with respect to their bearers, I see no reason why it couldn't be possible for souls. In other words, if nonphysical qualia can be spatially located in some helpful way to preserve mental causation, then the same is probably true of souls.

This brings me to my second response. Kim makes no attempt to preserve the causal efficacy of qualia, and that's what would motivate an attempt to locate qualia in space. In fact, he cuts the causal cord and surrenders nonphysical qualia, the irreducible

"mental residue", to epiphenomenalism (2005, pp. 170-171). According to epiphenomenalism, there are sui generis mental properties that are causally impotent. Regarding nonphysical qualia, Kim says: "It has no place in the causal structure of the world and no role in its evolution and development" (2005, p. 171).

Kim's willingness to give up on the causal efficacy of qualia is consistent with his aims. After all, if you allow nonphysical qualia to have causal jobs, you're cracking the door open for other nonphysical aspects of reality to obtain causal jobs. To boot, that might take such jobs away from physical entities. "May it never be!" says the primacy of physics. Put differently, if nonphysical qualia can be causally efficacious that compromises the causal closure of the physical domain, which would compromise the primacy of physics (cf. Kim, 1993, pp. 209-210). By claiming that qualia are epiphenomenal, Kim avoids this possibility. Moreover, assuming that qualia are epiphenomenal, he has no need to explain how they're spatial and thus capable of causation. In sum, Kim's tenets imply that nonphysical qualia are nonspatial and he has no reason to locate them in space, but reason not to.

Kim's tenets haven't been haphazardly adopted; they're needed to secure the pairing problem. However, they imply that nonphysical qualia are nonspatial. But here's the rub: Qualia often stand in cause-effect pairing relations. For example, pinpricks often cause pain. And the felt sensation of what it's like to be in pain is a qualitative state.[1] Thus, some qualia – i.e. states of pain – are caused by pinpricks. So nonphysical qualia,

[1] Kim (2005, p. 170) does say "ordinary sensory concepts, like 'pain'…have motivational/behavioral aspects in addition to qualitative/sensory aspects" and that the former aspects are functionalizable and thus reducible. But this qualifier doesn't negate his prior claim: "Pain as a sensory quale is not a functional property" (2005, p. 169). Thus he thinks that a state of pain, as a quale, is a part of the mental residue that's not functionalizable, and therefore, irreducible and nonphysical.

which Kim's tenets suggest are nonspatial, stand in cause-effect pairing relations, albeit on the 'effect' side of the relation. But according to Kim's second and third major premises, nothing can stand in a causal pairing relation if it's not spatial. So it seems that if Kim is correct about the irreducibility of qualia, then qualitative states of pain caused by pinpricks refute his second and third major premises.

To conclude, Kim's own view of qualia, coupled with the fact that pinpricks cause pain, provides reason to doubt Kim's second and third major premises. For there's a clear inconsistency between these premises and the nonspatiality of qualia, which is implied by Kim's tenets that secure the pairing problem. Hence it's not only that these premises seem false from the theist's vantage point, Kim's own view of qualia justifies doubt regarding these premises. Granted, those who don't share Kim's view of qualia will be unmoved by this point. However, the idea that qualia are irreducible is not without warrant and is gaining noteworthy traction in philosophy of mind (see Chalmers, 1996; 2003; Kim, 2011, Ch. 10; Robinson, 2012).

Non Sequitur

Lastly, Kim's second major premise doesn't actually follow from the justification he offers for it. His first sub-premise 2.1, says that we know that spatial relations pair physical causes with physical effects. His second sub-premise 2.2, says that we don't know what other type of relations could pair causes with effects. What follows is: If there are nonphysical causes, we don't know what type of relation would pair such causes with their effects. And that's inconsequential for the prospect of nonphysical causes. After all, there are many facts about the world that we're ignorant of and one such fact could be what type of relation pairs nonphysical causes with effects.

Of course, Kim thinks that what follows from 2.1 and 2.2 is that all pairing relations necessarily require spatial relations. But that doesn't actually follow. That would only follow if we necessarily know what type of relation would pair all causes with their effects. Yet it's possible for there to be a causes-effect pairing relation(s) and something that pairs the cause with the effect, and yet we're presently ignorant of what exactly that is. Basically, Kim's conclusion only follows if we know, in every case of causation, what relation pairs the cause with its effect. However, we may not have such knowledge in certain cases of causation. And such lack of knowledge on our part would do nothing to affect the existence of causal pairing relations that we are yet to understand. All that would follow is that there's more for us to learn.

Furthermore it may be that when the physicalist considers what type of relation could possibly pair a nonphysical cause with its effect, no other type of relation other than a spatial relation "comes to mind" (Kim, 2009, p. 33). However, for this hylomorphist another type of relation does come to mind – that is, an en-forming relation. The en-forming relation that the soul stands in to the body, according to neo-Thomistic hylomorphism, provides the basis of my hylomorphic solution to the pairing problem.

6.2 The Proposed Hylomorphic Solution

In section 7.1 I distinguished two hylomorphic responses to the pairing problem that differ from my own hylomorphic response. I also gave reasons, which don't depend upon hylomorphism, to doubt Kim's rationale for his second major premise that says spatial relations are required for causes to be paired with effects. Now in this section I'll give my

own unique hylomorphic response to the pairing problem.[1] My response denies premise two, which entails premise three, of Kim's argument and justifies such a denial by showing that the hylomorphist can appeal to an en-forming relation to account for causal pairing. In a nutshell, my proposed solution says a person's soul is causally paired with her body via the en-forming relation that her soul stands in to her body.[2] Given this, the hylomorphist can justifiably deny Kim's second major premise, which entails his third, while agreeing with Kim's first and fourth major premises.

This section will be entirely devoted to presenting and explaining the proposed hylomorphic solution. Following this section I'll explicate and respond to the two most forceful objections to my hylomorphic account of causal pairing.

6.2.1 En-forming Relation & Causal Pairing

Recall that the causal pairing problem says that if substance dualism is true mental causation is metaphysically impossible. This impossibility is said to arise because nonphysical minds, or souls, are nonspatial. Such nonspatiality is critical because, according to Kim, spatial relations are the only relations that could possibly pair mental causes with effects. Thus nonphysical, nonspatial minds can't stand in causal pairing

[1] I'm grateful to those who gave this material a preliminary hearing at the Northwest Philosophy Conference in October 2015 and October 2016, as well as the Society of Christian Philosopher's Pacific meeting in April 2017. To my knowledge, no one else has developed this route of response to the pairing problem. However, in a pre-published version of his chapter 'In Defense of Thomistic-like Dualism' that he sent me in March 2017, J.P. Moreland commends the type of response I'm advocating here, though we describe the en-forming relation differently (see Chapter 7 section 7.5). Moreland's chapter was published in the *Blackwell Companion to Substance Dualism*, edited by Jonathan J. Loose, et al. (2017). In the pre-published version, Moreland's commendation was in a paragraph in section III.1 of his chapter. While Moreland doesn't develop the response, I find his commendation confirming. That's not to say, however, that he would fully agree with how I've developed, articulated, and defended the response.

[2] For a description of this relation, see Chapter 5 (especially section 5.1.6).

relations. Hence they're disqualified from all causal work, including mental causation. That's the problem. And it hinges on Kim's second premise – all cause-effect pairing relations require spatial relations – which is true if, and only if, spatial relations are the *only* relations that can pair causes with effects.

The Cartesian dualist might be inclined to think that a causal pairing relation can be explained by appealing to a relation of mind-body unity. However, Kim makes a significant point that's worth recalling. According to his reading of Descartes, Cartesian dualism says a person's mind is united to their body via a causal relation (2005, p. 77). In other words, a mind-body relation of unity is explained by a mind-body causal pairing relation. Given that, if Cartesians try to explain a causal pairing relation between one's mind and body by appealing to mind-body unity, they'll rely on the very pairing relation that they're attempting to explain.[1] As Kim (2005, p. 77) points out, such an explanation "presupposes mental causation." Consequently, Cartesians can't appeal to mind-body unity to explain causal pairing. For mind-body unity itself is supposedly explained by causal pairing. Since the causal pairing relation is explanatorily prior to the relation of mind-body unity, the latter can't be appealed to in order to explain the former. Hence the problem for Cartesian dualism, as Kim depicts it.

On the neo-Thomistic hylomorphic view that I presented in the previous chapter, there's a very different account of mind-body unity. According to Aquinas (ST 1a 76.3c), Plato thought the soul is united to the body as mover to moved. This Platonic view is much like Kim's description of the Cartesian account of mind-body unity. Aquinas (ST

[1] It should be noted that the Cartesian might think that the causal pairing relation is fundamental and therefore doesn't need a natural or metaphysical explanation. In that case, she wouldn't give one and thus wouldn't fall prey to Kim's following refutation.

1a 76.1c, 76.6c, 76.7c) explicitly rejected Plato's account (cf. Stump, 2003, p. 200) and postulated that the soul is "immediately united to its body as form to matter" (ST 1a 76.7c). Simply put, the soul is united to its body as its form (ST 1a 76.6 ad 3).

The mind, or soul, is *not* united to the body via a causal relation. Rather, the body is en-formed matter, and the form that en-forms that matter is the soul. Therefore the soul stands in an en-forming relation to the matter of the body. The soul is the form of the body. As such the soul grounds the existence of the body as a unified biological organism of a particular kind (i.e. a human body). The soul, qua form, grounds the unity and essence of the body. Without the soul en-forming the body, the body wouldn't exist.

Let's use Kim's character examples Smith and Jones to illustrate the form-matter en-forming relation as it pertains to human persons. According to neo-Thomistic hylomorphism, Smith's soul en-forms his body. This means that Smith's body is a unified entity and has the essential properties and powers it has, due to the form that en-forms it – i.e. Smith's human soul. The existence of Smith's body depends on Smith's soul en-forming it. If the matter of Smith's body wasn't en-formed by Smith's human soul, his human body wouldn't exist. Likewise, Jones's body exists as a unified whole that's his human body since his soul en-forms it. The existence of each person's body is grounded by the human soul that en-forms it. Consequently each person's soul is united to their body as the form of their body.

The critical point for our purposes is: each human soul stands in an en-forming relation to the matter of the body it en-forms. According to this hylomorphic view, the en-forming relation is the most fundamental relation the soul stands in to the body. Moreover, the soul is the form of the body before it's the cause of bodily movements. But

let me be clear that I'm not speaking here of temporal priority, since that's not my concern. The en-forming relation is explanatorily prior to any causal relation the soul stands in to the body that it en-forms. Given that, we might deduce that no causal relation would be temporally prior to the en-forming relation either. Nonetheless, what's imperative is that the soul stands in an en-forming relation to the body *explanatorily* prior to any causal relation.

In light of this, let's reconsider Kim's (2005, p. 76) thought experiment involving Smith and Jones. Recall that these two unfortunate individuals are psychologically synchronized. Consequently, whenever Smith wills to raise his hand Jones wills to raise his hand too. As a result their hands rise simultaneously. This prompts Kim's (2005, p. 76) vital question: "So why is it not the case that Smith's volition causes Jones's hand to go up, and that Jones's volition causes Smith's hand to go up?" Put differently, why is Smith's soul, and thus his volition, causally paired with the rising of his hand, not Jones's?

The hylomorphist has an answer: Smith's soul en-forms Smith's body, not Jones's; therefore Smith's soul is causally paired with his body, not Jones's. On this view, the fact that Smith's soul en-forms Smith's body explains why his volition is causally paired with his hand going up. Basically, his soul is causally paired with his body since his soul en-forms his body. On the other hand, Jones's soul en-forms Jones's body, therefore his soul is causally paired with his body.

It's perfectly fitting that a particular body that's en-formed by a particular soul would be causally paired with the soul that en-forms it. Indeed it would be extremely odd if Donald Trump's soul en-formed his body but was causally paired with Theresa May's

body that's en-formed by May's soul. To the contrary, if Trump's soul en-forms Trump's body, we would expect his soul to be causally paired with his body. Hence this hylomorphic explanation easily avoids being ad hoc. The hylomorphist is explaining causal pairing by appealing to the en-forming relation that's absolutely fundamental to Aristotelian-Thomistic human ontology.

Another benefit of the hylomorphic account I'm offering is that it's not circular. It doesn't presuppose a causal pairing relation that allegedly accounts for mind-body unity in an attempt to explain a causal pairing relation, as Cartesians are accused of doing. For the en-forming relation that the soul stands in to the body is explanatorily prior to causal pairing relations. In the explanatory chain, Smith's soul is united to his body as its form before the question of why his soul is causally paired with his body arises. The very existence of a person's body depends on that person's soul, which grounds the unity of the individual's body as well as its nature. Given that, it's fitting for a person's soul to be causally paired with the person's body.

To summarize, Kim's second and third premises claim that only spatial relations can pair causes with effects and thus entities must be spatial to stand in causal pairing relations. I've objected by putting forth another relation that's capable of pairing causes with effects. That relation is an en-forming relation. The neo-Thomistic hylomorphist can account for causal pairing by appealing to the en-forming relation the soul stands in to the matter of the body. Therefore, the hylomorphist can justifiably deny premises two and three of Kim's argument.

6.3 Objections

Now that my own hylomorphic response to the pairing problem has been given it's time to address objections to it. In this section I will evaluate and respond to two objections. First, I'll address the objection that my account simply pushes the pairing problem back one level of inquiry. Second, I'll evaluate the charge that my hylomorphic explanation of causal pairing, like the Cartesian explanation, presupposes a causal relation. Surely these two objections are not the only objections to my account. Yet given limited space, I've chosen to focus on these two objections in order to sufficiently respond. And such requires ample space since these objections are the most threatening objections that have been brought to my attention.

6.3.1 First Objection: Pairing Problem Reduxed

The most common objection to my hylomorphic explanation of causal pairing is the charge that it simply pushes the causal pairing problem back one level of inquiry. According to this objection, my account explains why one's soul is causally paired with her body, but now we're left wondering why one's soul en-forms her body. We started with a causal pairing problem; we're left with an en-forming pairing problem. At least that's the claim of this objection that charges my account with reduxing, or pushing back, the problem I set out to explain. My response is as follows.

To begin with, it's important to notice that the initial question differs from the follow-up question. At the outset, the question is: What explains why soul *X* is causally paired with body *Y*? My hylomorphic answer is that soul *X* is causally paired with body *Y* because *X* en-forms *Y*. Given this, a different question arises: What explains why soul *X* en-forms body *Y*? In light of my response to the causal pairing problem, this follow-up

question arises. Notice, however, that the follow-up question is not the same as the initial question. The new question pertains to Aristotelian metaphysics generally, since all material substances consist of en-formed matter. The initial question, however, is germane to philosophy of mind. Since the two questions being asked at each level of inquiry are different questions that address different issues, it's not true that the initial question is simply being pushed back. Rather, a different question comes into view in light of my hylomorphic explanation of causal pairing.

One might retort that it's equally troubling that my account leads to a further question that differs from the initial one. However, the fact that my hylomorphic explanation does so isn't necessarily problematic either. For such is true of most good explanations. When explanans explain an explanandum we often wonder what explains the explanans. For example, when we discovered that oxygen gets to our working muscles because red blood cells carry oxygen to them, we didn't say "okay that's the end of our inquiry, let's stop asking questions." Rather, our inquiry moved forward to investigate further questions, such as: Why do red blood cells, rather than other cells, do such? Given this, we could say that the physiologist who discovered the initial fact about red blood cells progressed our inquiry. It's not a problem that the physiologist's explanation raised further questions requiring further research. (Such is considered by many to be a theoretical virtue called *fertility*.) Likewise, the fact that my explanation brings to the fore a new question isn't necessarily a mark against it. Many good explanations lead us to further questions.

Secondly, the question my hylomorphic explanation of causal pairing raises is a metaphysical question that all Aristotelians must deal with. The question 'what explains

why soul *X* en-forms body *Y*' is difficult to answer. However, anyone who thinks material substances consist of form and matter will have to wrestle with this question (and other related questions) as it pertains to the form and matter of any hylomorphic material substance (cf. Lowe, 2012, p. 235; Marmodoro, 2013; Rea, 2011). For example, we could ask what explains why form *P* en-forms tree *Q*, or what explains why form *R* en-forms frog *S*, and so on. As long as you have a form en-forming matter, you can ask what explains that fact. Therefore, the question my hylomorphic account leads to is a metaphysical question pertaining to standard Aristotelianism. Thus it's every Aristotelian's problem; it's not a problem unique to my hylomorphic account of causal pairing.[1] And lest one is tempted to think that makes it worse, it should be acknowledged that all competing metaphysical views have difficult questions to answer. So unless one simply doesn't subscribe to any view that entails metaphysical doctrines, they will also have to face challenging metaphysical questions.

Thirdly, the question 'what explains why soul *X* en-forms body *Y*' can evoke a misleading caricature of the human person as a mereological aggregate consisting of two parts that are somehow united (cf. Marmodoro, 2013, pp. 5-6). Such a caricature is *not* consistent with the neo-Thomistic hylomorphic view I'm proposing. It's worth reiterating that the body, according the hylomorphic view I'm advocating, is not an entity that's united to the soul that is its form. There aren't two substances being united. Rather, there is one material substance and an aspect of that substance is the body, which is en-formed matter. Recall that a human soul is a unique substantial form in the sense that it's a substance in itself and in its natural state it en-forms matter; the en-formed matter is the

[1] I'm indebted to Nikk Effingham for bringing this point to my attention.

body. Given that, we might say that the soul, in its natural state, is a substance that's an *en-mattered form*.[1] An 'en-mattered form' is simply a form that's en-forming matter. It's important to see that the body isn't an entity in itself, which the soul then en-forms. On this view there is one material substance and the body exists as an aspect of that substance.

Since the body exists only as an aspect of the human person and it's not an entity in itself without the soul that en-forms it, the question 'what explains why soul *X* en-forms body *Y*' is misleading. After all, there isn't a self-existent substance called the body that the soul then en-forms. Instead there is en-formed matter, and that is the body. The body is not a body without the form. So whenever you're talking about the body, you're talking about matter en-formed by the soul.

Let's consider an imperfect example (which involves a different type of form) that's nevertheless illuminating. The statue David could not be what it is without the form that is the shape of the statue.[2] The statue doesn't exist apart from its shape, so to ask why it has its shape is like asking why it is what is. Given this and that every explanatory trail must stop somewhere, lest an infinite regress ensue, the Aristotelian can justifiable say that it's just a brute fact that the statue David has the shape it has and that there's no natural physical or metaphysical explanation. Likewise, since a human body wouldn't be what it is devoid of the soul that en-forms it, the same could be said of it and its form. For without the soul, there is no body to speak of according to hylomorphism. Therefore, it

[1] I got the term 'en-mattered form' from Marmodoro (2013, p. 5).
[2] As previously mentioned (see 6.1), the common example of a statue and its shape has shortcomings when it comes to explaining the nature of a substantial form and a material substance. Nevertheless it can help us understand the specific point made here.

seems legitimate for the hylomorphist to claim that natural explanations stop here and it's a brute fact that a particular soul en-forms a particular body.

Lastly, with the above having been said, let me note that the hylomorphist can give a supernatural explanation of why a particular soul en-forms a particular body if she endorses theism and one element of Aquinas's theology of divine simplicity.[1] Aquinas's explication of the doctrine of simplicity implies that there are various facets of it (see ST 1a 3.1-8). Nevertheless, it's clear that Aquinas understood simplicity to at least include the idea that God is not composed of form and matter. It's this idea that I wish to capitalize on here.

In his 'Treatise On the One God,' Aquinas writes: "it is impossible that God should be composed of matter and form" (ST 1a 3.2c). He thinks God is "…of His essence a form; and not composed of matter and form" (ST 1a 3.2c). One might think that if God consisted of form and matter something would have to explain why God's form en-forms the matter it does (cf. ST 1a 3.7c). But given that God is not composed of form and matter, no such explanation is needed. Thus the explanatory trail of all hylomorphic objects can ultimately stop with God. Since God is not a hylomorphic object requiring the same type of explanation, it's possible that God's creative and sustaining will provides the ultimate explanation of why the form of any hylomorphic object en-forms the matter it does. The idea is that God, who is simple, willed and continues to will that each particular form shall en-form the matter it does with regards to all hylomorphic objects.

One might object: If you're going to appeal to God, why not appeal to God directly to explain causal pairing relations? However, such an appeal would be premature

[1] For an overview of Aquinas's doctrine of simplicity, see Eleonore Stump (2012).

and therefore unjustified. According to theism, God is the ultimate explanation of the universe and all things in the universe. But that universe, which God created and sustains, is filled with natural explanations of natural phenomena.[1] Given that, one should appeal to natural explanations insofar as there is reason to think there could be such explanations. However, it's reasonable to appeal to a supernatural explanation when it's reasonable to think there can't possibly be a natural explanation. And since form and matter are most fundamental in the Aristotelian's ontology, there is nothing more fundamental to appeal to as a natural explanation. Therefore, the theist can justifiably appeal to the supernatural explanation of God's creative and sustaining will to account for why forms en-form the matter they do. Granted, materialists won't find this line of thought convincing. Nevertheless, if there are hylomorphic objects, it seems to me that a metaphysically simple God provides a sufficient explanation of why forms en-form the matter they do.

To summarize this subsection, I've addressed the most common objection to my hylomorphic response to the causal pairing problem, which claims that my response simply reduxes the problem. First, I pointed out that the follow-up question my account brings us to is a different question than the initial question, and good explanations often lead to new questions. Then I mentioned that the follow-up question my account raises is germane to standard Aristotelian metaphysics; so it's not a problem unique to my mind-body hylomorphic position. Before making my final point I clarified that on hylomorphism the body doesn't even exist devoid of a form, and therefore it's fair to say there is no further natural explanation of why a form en-forms the body it does. Lastly, I

[1] 'Natural explanations' here refers to physical and metaphysical explanations.

offered a supernatural explanation that exploits the theological doctrine of divine simplicity. Let's now consider a second objection, which I think might be the strongest objection to my hylomorphic account of causal pairing.

6.3.2 Second Objection: Presupposed Causal Relation

Recall that a key charge against the Cartesian dualist is that she can't explain mind-body causal pairing by appealing to mind-body unity, since she explains such unity via a causal relation. Such an explanation would presuppose and depend on the very relation it is supposed to explain (see Kim, 2005, p. 77). The same problem besets my hylomorphic explanation of causal pairing, according to this second objection. After all, says my interlocutor, the en-forming relation that I appeal to in order to explain causal pairing is itself a causal relation.

The objection is fairly straightforward and can be put as follows. My hylomorphic account says soul *X* is causally paired with body *Y* since *X* en-forms *Y*; therefore it hinges on an en-forming relation that is itself a causal relation. And since the en-forming relation appealed to in order to explain the causal pairing relation between *X* and *Y* is itself a causal relation, it presupposes the pairing relation it's meant to explain. Therefore, according to this line of reasoning, my account falls prey to the same charge leveled against Cartesian dualism because it too presupposes the very pairing relation it allegedly explains.

That's the objection and it faces a fatal dilemma. Either the key premise – the en-forming relation is a causal relation – is false, or else the objection commits the fallacy of equivocation. Regarding the former possibility, if efficient causation is the only type of causation, the necessary premise is false. But if the premise is true then there are at least

two types of causation and two corresponding senses of 'cause' that the objection equivocates between. Either way, the objection is fatally flawed. Let's consider each horn of the dilemma in turn, beginning with the possibility that the key premise is false.

In Aristotle's day he could claim in *Physics* "…things are called causes in many ways…" (195a 4). Hence his infamous four causes: material cause, formal cause, efficient cause, and final cause.[1] Most moderns, however, disagree with Aristotle's conception of causation. Although an Aristotelian view of causation was commonly held prior to the 17th century, during the time of Rene Descartes and Francis Bacon a shift pertaining to our understanding of causality began to take place (see Gilson, 2009, pp. x-xi). Today there's a "…modern general conceptual commitment that only efficient causes are causes" (Marmodoro, 2014b, p. 221). The modern view of causation denies formal causality.

Thus the modern view of causation entails that the key premise of this second objection – the en-forming relation is a causal relation – is false. After all, if the en-forming relation is a causal relation, it's not one of efficient causation, but rather one of formal causation. Momentarily I'll clarify the distinction between efficient and formal causality. But for now, the main point is: given the modern view of causation, the en-forming relation cannot be a causal relation since causal relations must be efficient causal relations according to the modern view, not formal causal relations. Yet, if the en-forming relation is a causal relation, it's one of formal causation, not efficient causation. Simply put, if the modern view of causation is correct, the en-forming relation isn't a causal relation and the key premise of this second objection is false.

[1] For an introductory explanation of Aristotle's four causes, see (Shields, 2014).

To clarify the difference between efficient causality and formal causality, let's consider an example of a particular human embryo *E* coming into existence. To make things easier we'll assume, contra Aquinas, that a human soul is present from the moment of conception.[1] So in this example we're assuming that *E* is en-formed by a human soul from the moment it begins to exist. If we wished to give an Aristotelian explanation of *E*'s origination, we "would wish to know *what it is*, *what it is made of*, *what brought it about*, and *what it is for*" (Shields, 2014). These aspects of our inquiry would approximate to Aristotle's four causes. Since we need only clarifying the distinction between two types of causes – formal and efficient – I'll focus only on 'what it is' and 'what brought it about.'

The formal cause of *E* explains what *E* is; the efficient cause explains what brought *E* about. Thus, the efficient cause is a sperm fertilizing an egg. Had that not happened, *E* wouldn't have come to be. But without the formal cause *E* wouldn't exist as the type of thing it is. The formal cause is what explains why *E* is a human embryo. And what explains why *E* is a human embryo is that it's en-formed by a form of a particular type, namely the form of a human person – i.e. a human soul.

The formal cause explains why *E* is a human embryo since the form of the embryo grounds its unity and essence, and thus its existence. The form grounds the essence of the embryo since the essence is determined by the type of form that en-forms it. Accordingly, the characteristic physical properties the embryo develops depends on the form, but the development happens via the means of biological causes that do the efficient causal work, which the form does not do (see Chapter 7 section 7.5). The form

[1] Aquinas thought an embryo first has only a sensory soul and then later comes to have a human intellective soul (see ST 1a 76.3 ad 3).

grounds the unity of the embryo, as all the material parts of the embryo depend for existence on the same form. Such unity of a substance that's grounded by its substantial form is very different than, say, the unity of a group of pencils united by a rubber band squeezing them together. Such squeezing would be efficient causation, not formal causation.

Of course, many moderns will hear my explication of formal causation and say: that's not causation! I agree. That's why I described the en-forming relation as a non-causal explanatory relation of grounding in the previous chapter (see section 5.1.6). But given that the en-forming relation is not a causal relation the key premise of this second objection is false. And given that its key premise is false, the objection fails. That's the first horn of the dilemma that the objection faces.

Perhaps, however, some will think there are multiple types of causation and formal causality is one type of causality in addition to efficient causality (e.g. Ellis, 2009, pp. 77-78). But if that's true, the objection equivocates between two senses of 'cause,' the two senses being *efficient cause* and *formal cause*. This is the other horn of the dilemma.

If it's true that the en-forming relation is a causal relation, it's a relation of formal causality, not efficient causality (cf. Marmodoro and Page, 2016, p. 16). Therefore, if my account appeals to a causal relation to explain a causal relation, then it appeals to a relation of formal causality to explain a relation of efficient causality. As a result, it's false to claim that my account presupposes what it's meant to explain, for it presupposes a different type of causal relation than the one it explains. The objection only appears to be successful because it equivocates between two senses of 'causal relation.'

So to summarize, this second objection faces a fatal dilemma. If it's true that there is only efficient causation, which is what the modern view of causation says, then the key premise of the objection is false. But on the other hand, if the key premise is true then the objection fallaciously equivocates. Either way, it seems that this second objection is fatally flawed.

6.4 Conclusion

The causal pairing problem is dualism's chief problem pertaining to mental causation. In this chapter I've tried to show that there is a substance dualist position – neo-Thomistic hylomorphism – that provides a solution to the pairing problem. According to the hylomorphic solution I've proposed, a person's soul is causally paired with her body because her soul en-forms her body. So for example Hillary Clinton's soul stands in a causal pairing relation with her body because her soul stands in the more fundamental en-forming relation to her body. Given that Clinton's soul is the form of her body, it's fitting that her soul is causally paired with her body, rather than say, Barack Obama's body.

This chapter brings us halfway to demonstrating that neo-Thomistic hylomorphism is a substance dualist position capable of overcoming the two paramount objections to dualism. We have now dealt with the first objection by demonstrating that hylomorphism can overcome the causal pairing problem. In the next chapter I'll apply hylomorphism to the issue of neural correlates of consciousness in order to deal with the second objection.

7

Hylomorphism & Neural Correlates of Consciousness

Since discussing neural correlates of consciousness in Chapter 2, we've covered much terrain. Our focus on objections to substance dualism took us into mental causation in chapters three and four. Dualism's chief problem regarding mental causation – the causal pairing problem – became our focus. After introducing neo-Thomistic hylomorphism in the fifth chapter, I argued it's immune to the causal pairing problem in the previous chapter. Now in this chapter, our focus will return to neural correlates of consciousness (for brevity NCC), upon which rests the second chief objection to dualism.

Recall that in Chapter 2 I introduced the subject of NCC, discussed what exactly they are, how we identify them, and most importantly: what they imply. As discussed in some detail, neural correlates themselves don't entail any particular view of the mind (see section 2.3). As leading NCC researcher, Christof Koch (2016), pointed out to me:

> Note that the NCC themselves are neutral from the point of view of physicalism/materialism or one of the various shades of dualism. Under any reading, consciousness will have physical correlates.

Given that, one can't undermine dualism by simply pointing to neural correlates. Philosophical argumentation is also needed in order to show that the correlations imply dualism is false; hence the simplicity argument for the identity theory. In the remainder of the second chapter, I presented and critically analyzed the simplicity argument and found it insufficient to undermine dualism.

My aim in this chapter is to show that neo-Thomistic hylomorphism is not only consistent with NCC, but also provides a good explanation of NCC. To accomplish this I will build upon the work of other Aristotelian and Thomistic hylomorphists. Since I'm not the first Aristotelian sympathizer to explore the new world of modern neuroscience, my goal is simply to advance the exploration.[1]

To begin with, in section 7.1 I'll give a very brief historical sketch of contemporary discussions pertinent to hylomorphism and neural correlates of consciousness. Although there are both materialist and dualist leaning hylomorphists, my focus will be toward the dualist side in order to clarify the context surrounding my own hylomorphic account of NCC. This first section will also serve to clarify my objective and the nature of my proposed hylomorphic explanation of NCC. The following four sections focus on explicating the conceptual foundation for the proposed hylomorphic model.

While my primary aims are not exegetical, sections 7.2 and 7.3 introduce and explain principles derived from the work of Aristotle and Saint Thomas Aquinas. Section 7.2 introduces relevant ideas regarding Aristotle's ontology of powers. Section 7.3 discusses the dependence of the mind on the body, a principle evident in Aquinas's *Treatise on Human Nature*. Applying principles gained from Aristotle and Aquinas, in section 7.4 I'll explicate what I call 'mind-body powers.' The explanation of the conceptual framework situating the proposed hylomorphic account is finalized in section 7.5, which discusses the grounding for biological regularities like NCC. Section 7.6

[1] The list of predecessor includes: De Haan (forthcoming; 2014); Lowe (2000); J.P. Moreland (2016); Oderberg (2005); Oomen (2003). See also (Ellis, 2009, p. 78) and (Penfield, 1975, p. 81).

applies the principles clarified in prior sections to construct the proposed neo-Thomistic hylomorphic explanation of NCC.

7.1 Some Recent Hylomorphic History

A decade and a half after Francis Crick and Christof Koch (1990) instigated the contemporary search for neural correlates of consciousness, David Oderberg (2005, p. 90) claimed: "for the hylemorphic dualist, such correlations are only to be expected since persons as embodied beings require corporeal activity in order to interact with the world."[1] If the mind depends on the body to fulfill the functions of a human person, then there will be neural correlates of mental activity, Oderberg reasoned. Recently, J.P. Moreland has (2016, pp. 116-119; cf. 2017) contributed to this line of thought and argued that a Thomistic-like version of hylomorphism *entails* NCC.

Moreland (2016, p. 116) arrives at his conclusion by appealing to concepts he believes reflect two versions of "Aristotelian-style dualism." One is what Moreland (2016, p. 119) calls *Organicism*, according to which the structure and function of body parts are determined by the functional demands of the soul that's "the *first efficient cause* of the body's development."[2] As it stands, this principle is not part of my explanation of NCC in what follows. As I'll discuss in section 7.5, I agree with Moreland that the soul determines the structure and function of the body's parts; that much is standard Aristotelianism and part of my hylomorphic explanation of NCC. However, I deny the idea that the soul is an efficient cause of the body's development. In section 7.5, the reason for my denial will be discussed.

[1] 'Hylomorphism' is often spelled 'hylemorphism.' Oderberg follows the latter spelling.
[2] Italics mine.

The other principle Moreland appeals to – mind-body dependence – is vital to my own explanation, yet I elaborate on it significantly. Moreland (2016, p. 117) appeals to this principle held by the late medieval Aristotelians as it's articulated by Dennis des Chene (2000, p. 71):

> …by its nature [the human soul] presupposes union with a body, and moreover with a particular kind of body, a body with organs, in order to exercise all its powers – even reason insofar as reason needs the senses to give it material for abstraction.

The basic idea is that there's a relation of dependence between the mind and the body, and the mind relies on the body to manifest its powers. According to the late Aristotelians: "Even the intellect requires, so long as the soul is joined with a body, a certain disposition of the brain" (des Chene, 2000, p. 96; see Moreland, 2016, p. 117).

As I'll discuss in section 7.3, the idea that the body is integral to the soul's functions is evident in Aquinas's writings (e.g. ST 1a 77.8c). The late Aristotelians concurred, and the same is true of many Aristotelian leaning thinkers today. Both John Haldane (1998, pp. 271-272) and E.J. Lowe (2006, pp. 11-19) seem to embrace this idea when discussing the relationship between mental intentionality and neurophysiology.[1] And in the context of the contemporary debate about causal overdetermination, naturalist leaning hylomorphist, William Jaworski's (2016, p. 281) appeals to this concept to show that mental and bodily causes are both necessary and thus there's no overdetermination (see section 7.6).[2]

According to Oderberg (2005, p. 90) and Moreland (2016, p. 117), this idea that the soul relies on the body to exercise its powers suggest that we should expect neural

[1] To be clear, while Lowe is Aristotelian leaning he does not endorse hylomorphism.
[2] According to the problem of overdetermination, irreducible mental causes are moot because physical causes do all the causal work (see Chapter 3 section 3.2).

correlates of consciousness. Moreland (2016, p. 117) moves from the idea of mind-body dependence to the conclusion that NCC are entailed. Oderberg and Moreland's objectors will allege that their reasoning is too hasty since the dependence of the mind on the body doesn't necessarily explain or entail patterned processes at the neuronal level, such as NCC.[1] As Moreland (2016, p. 126) acknowledges, there's more to be said. Additional premises are needed. Details must be filled in.

7.1.1 The Present Objective

I intend to progress this line of thought by filling in details. My aim is to give a detailed hylomorphic explanation of NCC. My proposed explanation will include the mind's dependence on the body referenced by Oderberg and Moreland, but I'll go beyond Aristotelian and Thomistic philosophy of mind and anchor my hylomorphic explanation of NCC to fundamental principles in Aristotelian metaphysics of causation.

I'll take what I've learned from Aristotelian leaning philosophers – such as David Oderberg, John Haldane, J.P. Moreland, E.J. Lowe, Anna Marmodoro, and William Jaworski – and employ those ideas I agree with in order to present a more robust hylomorphic explanation of NCC. At certain points I'll agree; at certain points I'll disagree. At other points I'll partly agree and modify ideas as I see fit. And at times I'll arrive at the same conclusion, but via a different route. Regardless, the goal is to stand on the shoulders of my predecessors and build upon their work in order to produce a more detailed and satisfying hylomorphic explanation of NCC.

[1] It's worth noting that dualist critic, Jaegwon Kim (2005, p. 124) acknowledges that some substance dualist views entail NCC. If that's true of any dualist view, it's true of a Thomistic version. Furthermore, to secure his conclusion Moreland can also appeal to organicism and the soul being holenmerically present to the body and an aspect of the body (see Moreland, 2017, sections I.2.2 & III.2). However, my neo-Thomistic hylomorphism doesn't include organicism as described by Moreland (see section 7.5.1).

As I pointed out in Chapter 2 (see section 2.4.3), substance dualism is not an empirical theory or hypothesis and dualists do not claim that dualism is true because it's the best empirical theory of neuroscience data (cf. Moreland, 2011b, p. 33). Rather dualists typically think dualism is justified on philosophical grounds and not on the basis of empirical data from neuroscience (see Chapter 1). So how can I be consistent and now argue for dualism by giving a hylomorphic explanation of NCC?

For one, my overall aim is not to argue that substance dualism, or specifically neo-Thomistic hylomorphism, is true. My objective is more modestly to defeat two potential defeaters of substance dualism. One potential defeater was dealt with in the previous chapter regarding the causal pairing problem. In this present chapter, I hope to defeat the other potential defeater I'm concerned with that fundamentally relies on NCC.[1] I am not arguing that dualism, or my hylomorphic view in particular, is true because it provides the best explanation of neural correlates. My claim is that substance dualists who adopt neo-Thomistic hylomorphism can give a good explanation of NCC that's perfectly consistent with fundamental principles in Aristotelian philosophy of mind and metaphysics. If that's true, a paramount potential defeater of dualism is defeated, or at least deflated.

Furthermore, and more importantly, my hylomorphic explanation of NCC is not an empirical scientific theory. It's a metaphysical explanation of neural correlates of consciousness, not a neuroscientific or physical explanation.[2] As will become clear, my hylomorphic explanation of NCC is anchored in Aristotelian and Thomistic metaphysical

[1] For a detailed explication of this objection, see Chapter 2.
[2] On the value of metaphysical explanations or analysis, see Tahko (2012, pp. 37, 39, 40-42), Laudan (1977, Ch. 2), Lowe (1998, p. 9), and Ellis (2014).

principles regarding causal powers and how the mind manifests its powers. It provides a coherent metaphysical framework for understanding NCC that also motivates further NCC research (cf. Moreland, 2017, section I.2.1). Given such a framework, we can seek to further understand the physical details of neural correlates empirically by means of modern neuroscience, which is invaluable for such a task.

The next four sections explicate Aristotelian-Thomistic principles that provide the conceptual framework for the proposed account of neural correlates of consciousness. With that framework in place, I'll present my neo-Thomistic hylomorphic model of NCC.

7.2 Aristotelian Powers Ontology

When introducing my neo-Thomistic hylomorphic position in Chapter 5 I mentioned two desiderata, albeit competing desiderata. The first is that the view be as minimal as possible, in that it commit adherents only to tenets that are essential. I want it to be possible to adopt the view without becoming a full-blown Aristotelian on every metaphysical topic. With that said, the second desideratum is for the proposed hylomorphic model to be as defensible as possible and as capable as possible of overcoming serious objections. Sometimes a more minimal version of a position is more defensible because there's less to defend. But sometimes a more robust version is more defensible. A common reason for this is that additional tenets can allow a view to explain more phenomena, or give a view more explanatory power.

To overcome the pairing problem in the previous chapter, we only needed the most fundamental tenet of hylomorphism that says the soul is the form of the body. In this chapter, however, I'm going to put Aristotelian powers to work in my account of NCC. To do so, I'll need to commit to certain Aristotelian concepts regarding powers. In

this section I'll clarify and explain such concepts. Throughout this section I'll rely heavily on Anna Marmodoro's (2014a) reading of Aristotle with regards to powers. In due course, the concepts I glean from Marmodoro's interpretation of Aristotle will be applied to my neo-Thomistic hylomorphic account of NCC.

7.2.1 Powers

Aristotle thought objects have powers. According to Aristotelian metaphysics a power is the capacity to produce change or undergo change (see Marmodoro, 2014a, p. 13).[1] In *Metaphysic* (V 12), Aristotle provides this general definition:

> Capacity [i.e. power] then is the source, in general, of change or movement in another thing or in the same thing *qua* other, and also the source of a thing's being moved by another thing or by itself *qua* other.

Aristotle here characterizes a power as a source of change. It's important to notice that this source of change includes that which brings about change and also that which undergoes the change (Marmodoro, 2014a, p. 12).

The capacity to bring about change is the *active power*, whereas the capacity to undergo change is the *passive power*. Active powers are what they are due to the type of change they can produce and passive powers are what they are due to the type of change they can undergo. Both types of powers have two potential states. A power can be manifested, or in other words 'activated' or 'exercised.' But a power can exist even when it's not being manifested in a state of potentiality, according to the Aristotelian powers ontology I'm endorsing. So for example, an ordinary bowling ball has the power to roll whether or not it's currently rolling. When it is rolling, its power to roll is manifested.

[1] Klaus Corcilius (2015, pp. 32-33) makes the point that *dunamis*, according to Aristotle, also applies to the ability to be. Regardless, my account of NCC focuses on powers as the capacity to produce change.

When it is not rolling, it still has the power to roll, but the power is in a state of potentiality. Because the bowling ball has the power to roll even when it's sitting still on a ball rack, it makes sense for the bowler to take it off the rack and try to roll it down the bowling isle.

A unique feature of Aristotelian powers is that active and passive powers depend on one another for their manifestation; that is, active powers depend on passive powers and passive powers depend on active powers (Marmodoro, 2014a, p. 13). "Aristotle defines an active power as one that exercises its powerfulness on a corresponding passive one" (Marmodoro, 2014a, p. 13). To use Aristotle's well-known example of a teacher and learner, the manifestation of the teacher's active power to teach depends on the learner's passive power to learn. If the learner doesn't manifest the passive power to learn, the teacher's active power to teach won't be manifested.

Furthermore, the teacher's active power to teach is manifested or actualized in the learner, who is taught by the teacher. Aristotle explains in *Physics* (III 3):

> It is not absurd that the actualization of one thing should be in another. Teaching is the activity of a person who can teach, yet the operation is performed in something—it is not cut adrift from a subject, but is of one thing in another. There is nothing to prevent two things having one and the same actualization (not the same in being, but related as the potential is to the actual).

The manifestation of the active power to teach is realized in the manifestation of the passive power to learn, and in this way the manifestation of the active power ontologically depends on the passive power (see Marmodoro, 2014b, pp. 243-244). Another example that illustrates this point is a hot metal pot's power to heat the water it contains, which is realized through the manifestation of the water's passive power to be heated.

Now, running with this example I want to make a point about some complexity regarding active and passive powers. To do so, I'll make the example more complex, but also more realistic. Suppose the metal pot is heated by a hot stove plate so that the surface of pot reaches 150°C. Let's also assume that the water in the pot initially had a temperature of 5°C, but since the surface temperature of the pot has risen to 150°C the temperature of the water rises. In this scenario, which is still relatively simplistic compared to many causal instances in nature, things have become quite complex.

The hot stove plate is manifesting its active power to heat the pot. The pot is manifesting its passive power to be heated as well as its active power to heat the water. And anyone who has ever heated a metal pot with cool water in it knows that it takes longer than heating an empty metal pot because the water acts on the pot as a cooling agent. So the water is also manifesting its active power to cool the pot, which is manifesting its passive power to be cooled. And as the water affects the pot's surface temperature, we can reasonably assume that this cools the hot stove plate, however minor the cooling effect may be. The picture that's emerged here is one where the stove plate, the pot, and the water are all acting on one another and being acted on by one another. In other words, each item involved is manifesting active powers and passive powers simultaneously and there's mutual causation taking place.

Is this problematic for Aristotelian powers? Well, as Marmodoro (2014a, p. 41) points out, "Aristotle acknowledges, for example in *Physics* (202a5-12), that in most causal interactions in nature the change is mutual." While our complex example isn't simple, it better represents the causal complexity in nature, which is even far more complex than this example illustrates. Yet what is still taking place, despite the

complexity, is that things with active powers are producing change and things with passive powers are being changed. And despite the complexity of real causal cases, simplistic examples have their place. Simple examples help us understand the concepts involved, even if they don't accurately capture the complexity of exactly how they're involved in the reality of nature in all its complexity. I have already given such simplistic yet effective examples, and will continue to do so.[1] The reader can safely assume that the reality of causation is more complex than the examples, while the general concepts being conveyed are thought to nevertheless apply in all the realistic complexity.

To recap, according to Aristotelian metaphysics powers are a real objective feature of the world and things have powers.[2] Some powers are active and some are passive. An active power is the capacity to produce change in something, whereas a passive power is the capacity to undergo change. The manifestation of active powers depends on the manifestation of passive powers, and vice versa. Certain active powers depend on certain passive powers for their manifestation. In other words, Aristotelian powers "…depend for their activation on the activation of their mutual partner-powers"

[1] Such practice is common in all areas of study. For example, many of us might be surprised to learn that a neuron's axon can be a meter long because all the example images of neurons we've seen scale the image for teaching purposes. As a result the axon usually appears to be only about two to three times longer than the width of the cell body. While these images are useful for teaching, we have to keep in mind that things are more complex.

[2] Powers are irreducible, according to this view. Contra Hume (2007, p. 55), powers on the Aristotelian view are not a mere projection of ours about reality, but rather powers are objective features of reality (Mayr, 2016). Entities in the world have powers that cannot be reduced to non-powers. Following Ryle (1949, p. 31), attempts have been made to reduce powers (or dispositions) by giving a conditional analysis of our statements about powers or by reducing powers to non-power properties (cf. Choi and Fara, 2016; Mayr, 2016). According to the Aristotelian powers ontology I'm advocating, such reductivist strategies do not sufficiently describe powers, which seem to be a real feature of the world.

(Marmodoro, 2014a, p. 32). The following tenet offers a succinct summary of the most important content discussed in this section.

> *Interdependent Partner-Powers* (IPP): Things have active and passive powers. The manifestation of an active power ontologically depends on the manifestation of its corresponding passive power, and vice versa.

In due course, I'll apply this concept regarding corresponding (or, correlated) active and passive powers to neural correlates of consciousness. But before doing so, I need to introduce the idea of mind-body dependence and then what I shall call 'mind-body powers.'

7.3 Mind-Body Dependence

To account for NCC I'll employ another principle that's distinct from IPP, but in a sense an application of it applied to the manifestations of mental and bodily powers. Simply put, the idea is that the soul manifests its powers via macro body parts (e.g. organs) and micro body parts (e.g. cells) that are organized and structured in certain ways to manifest certain powers. This principle has exegetical origins in the works of Aquinas, and in this subsection I'll briefly go over some key texts to point this out. However, since my focus is not exegetical, my hermeneutical work will be minimal. Before concluding this section I'll hone and clarify the aforementioned tenet.

As one reads Aquinas it's easy to see that he thought powers of the human soul rely on the body. Aquinas (ST 1a 76.8c) makes it clear that powers of the soul are manifested through bodily organs and even located in such organs. Given this, he thought certain powers cease being exercised when the body ceases. According to Aquinas (ST 1a 77.8c), these powers "virtually remain in the soul" but their manifestation depends on the body, "for the action of such capacities occurs only through a corporeal organ." And it's

not as though any organ will suffice to carry out any power. Rather certain parts of the body exist to carry out certain powers of the soul, and are thus structured accordingly. The power to see, for example, depends on the eyes, which are structured accordingly and the power to run depends on the legs that are also structured accordingly.

The idea that certain powers of the soul are in and manifested through corporeal organs that are structured to carry out such powers can be applied to the micro level of cells as well. Granted, Aquinas didn't apply it in this way, but given that he allowed empirical findings to inform his philosophical positions, I think he could've developed this principle in such a way if he knew what we now know from microbiology. And when the principle is so modified it suggests that there would be nerve cells (i.e. neurons) that manifest certain powers that ultimately belong to the soul.

So far so good, when it comes to most powers, those familiar with Aquinas's work might say. However, they might continue, rationality is trickier. Like Aristotle, Aquinas considered rationality to be definitive of humanity.[1] And he made a case for the immortality of the soul that relies on the power of rationality (see ST 1a 75.2c, 75.3c, & 75.6c). He argued that the human soul is immortal and continues to exist after bodily death and before the resurrection of the body because it has its own operation independent of the body – i.e. rational cognition. In other words, Aquinas thought the soul is immortal because the manifestation of rationality didn't require a bodily organ (Pasnau, 2002b, p. xvii).

It's easy to misunderstand Aquinas at this point. In light of Aquinas's prevalent acknowledgement of the body's integral role in the manifestation of the soul's powers,

[1] This idea is seen throughout their works regarding human nature. For an example in Aristotle, see *Metaphysics* (I 1); for Aquinas, see (ST 1a 75.4 ad 1).

one expects to see the same regarding rationality. But in several places Aquinas seems to suggest that the body plays no role in rational thought (e.g. ST 1a 76.1c, ad 1). However, I don't think this is Aquinas's position because in other places he clearly affirms the role of the body in the exercise of rational thought. For example, Aquinas (ST 1a 84.4c) writes:

> But a body seems necessary for the intellective soul above all for its proper operation, which is to understand. For the soul does not depend on the body for its existence. But if the soul were naturally suited to receive intelligible species solely through an influx from certain separate principles, and if it did not take in species through the senses, then it would not need a body in order to understand and so it would be pointless for it to be united to its body.

This passage makes it hard to deny that Aquinas thinks the body plays a role in understanding. And in another place Aquinas even seems to pinpoint the brain as the organ of thought. After saying that "…capacities do not exist on account of organs, but organs on account of capacities" in Question 78 article 3, in the next article Aquinas (ST 1a 78.4c) says that physicians have assigned a definite organ to "particular reason," that organ being "the middle part of the head." Robert Pasnau (2002a, p. 283) comments that Aquinas followed the contemporary science at the time in holding that the four internal senses are in the brain.[1] Given this, it's not surprising that Aquinas thought that damage to the organ relevant to understanding impedes understanding (ST 1a 84.7c).

So how can we make sense of Aquinas apparently contradictory affirmations? On the one hand, it seems that he is saying human rationality is manifest independently of the body. Yet on the other hand, he seems to affirm that the body plays a role in rational thought. I think Aquinas's view can be summarized as follows: The soul has an

[1] The four internal senses are: common sense, imagination (i.e. phantasia), cogitative power, and memory (Pasnau, 2002a, p. 281).

independent operation in that it does not metaphysically necessitate a bodily organ, although its natural operation uses a bodily organ that's necessary in this natural sense.

This reading finds textual support where Aquinas says that the soul thinks through what he calls *phantasms* (or, sense images) that depend on the body. So for example, Aquinas (ST 1a 89.1c; cf. 75.7 ad 3) writes:

> Therefore with respect to the mode of existence by which the soul is united to a body, the appropriate mode of understanding for the soul is to turn toward the phantasms of bodies, phantasms which exist within bodily organs. But once it has been separated from its body, the appropriate mode of understanding for the soul is to turn toward intelligible things straightaway—just as is appropriate for other separate substances. So turning toward phantasms is, for the soul, its natural mode of understanding, just as being united to a body is natural. But being separated from its body is foreign to the character of its nature, and understanding without turning toward phantasms is likewise foreign to its nature. So it is united to a body in order to exist and operate in keeping with its nature.

Simply put, it seems there's a sense in which the defining capacity of humanity – i.e. rationality – does not necessitate the body for its operation and there's a sense in which it does. Regarding the former sense, it's metaphysically possible for the soul to manifest rational thought apart from the body. However, regarding the latter sense, the soul is naturally en-forming a body through which the human soul's defining capacity is manifested through, but in an indirect way involving phantasms.

Clearly, there's much more to say about how to interpret Aquinas. Since that's not my focus, let me simply clarify the principle I'll glean from Aquinas's thought and apply in my account of NCC. That principle is that powers of the soul are located in certain bodily organs that are structured in such a way to manifest such powers. This idea coupled with IPP informs the following principle that I'll employ in my neo-Thomistic hylomorphic account of NCC.

> *Mind-Body Powers* (MBP): There are mental powers of the soul and physical powers of the body that are interdependent partner-powers. The natural manifestations of active powers (whether mental or physical) ontologically depend on the manifestation of passive powers (whether mental or physical), and vice versa.

Before applying this tenet regarding mind-body powers to NCC, I'll explain it further in the following section. Then I'll present my hylomorphic account of NCC that capitalizes on the notion of mind-body powers.

7.4 Mind-Body Powers

According to neo-Thomistic hylomorphism, human persons have mental powers and physical powers of the body that are interdependent partner-powers. I've dubbed such powers: mind-body powers. My hylomorphic account of NCC critically relies on these powers for its explanatory power, so it will be helpful to clarify in this subsection exactly what these powers are.

7.4.1 Interdependence

It's easy to imagine powers of the body that can be manifested apart from mental powers. For example, my body is digesting my lunch without the exercise of mental powers. And we can imagine a mental power that manifests without depending on a bodily power. For example, we can imagine a mind perceiving God in the intermediate state after the death of one's body and before what Christian theologians refer to as the general resurrection.

Such powers, whether or not they exist, are of no concern to me here. Rather, I'm interested in powers of the body and mind that naturally require mutual manifestation, or co-manifestation. Put differently, my focus is mental and physical interdependent partner-powers, which I call mind-body powers.

To illustrate the concept of mind-body powers let's use an example of a voluntary act of running undertaken by Olympic gold medalist, Allyson Felix. Let's keep things simple and stipulate that the voluntary act of running relies on the mutual manifestation of the following partner-powers. Felix manifests a mental active power: (*M-Power*) choosing to run. As a result, she manifests passive bodily powers: (*B-Power*) neurons fire, muscles contract, and her legs stride one in front of the other. In actuality things are much more complex, especially on the physiological level. (The bodily physiological powers will include countless manifestations of active powers and passive powers as well as powers that are both active and passive.) But our example need not include all the nuances to illustrate the key idea regarding mind-body powers. And that is, both *M-Power* and *B-Power* are needed for this voluntary act of running undertaken by Felix.

The reason neurons start firing and ultimately Felix's legs begin striding forward is because she chose to run, and because she chose to run the manifestation of *B-Power* is part of a voluntary act of running. In this way the manifestation of *B-Power* ontologically depends on the manifestation of *M-Power*, choosing to run. Yet it's also true, according to my account, that *M-Power* could not be manifested without *B-Power*. Granted, Felix could manifest the power to intend to run without the correlated *B-Power*, but intending to run is not the same as choosing to run. One can only choose to do something that she has the choice to do, and she only has the choice to do *x* if she can do *x*. *B-Power* makes it possible for Felix to run and thus possible for her to choose to run. So in this way the power to choose to run – that is, *M-Power* – ontologically depends on *B-Power*.

Aquinas once made a similar claim. According to Aquinas (ST 1a 76.4 ad 2), the soul moves the body "…through its potential for producing movement, the actualization

of which presupposes a body." The soul has the power to move the body, but this power can't be manifested without a body. But notice that Aquinas writes that the power to move the body presupposes *a* body, not this particular body or that particular body. A body will do. Getting back to our example, Felix need not have the exact physiological makeup that she in fact has in the actual world in order to have and manifest *M-Power*. She could have had a different physiological makeup with different physical powers that still resulted in legs striding forward as a result of the manifestation of *M-Power*. This is important because it allows for multiple realizability, which will be applicable in section 7.5.

Our example involves an active mental power. However, we could have given an example with a passive mental power, such as a pinched nerve being the active power that changes one's felt experience to a state of pain. There can be active mental powers and active bodily powers. Likewise, there can be passive mental powers and passive bodily powers. Regardless of whether an active power is physical or mental, its manifestation ontologically depends on the manifestation of its correlate passive partner-power. Likewise, mental and physical passive powers depend on correlated active powers. These interdependent mental and physical bodily partner-powers are mind-body powers.

7.4.2 Ontological Extension

Now, it's tempting to picture in our minds an external relation relating an active power to its correlated passive power. However, my hylomorphic account includes an Aristotelian concept eluded to above and summarized well by Marmodoro (2014b, p. 244):

> …The causal interaction of the active and the passive powers is not reified by Aristotle as a relation, but as an ontological extension of the agent onto the

> patient. Aristotle does not posit a relation between active and passive powers to explain the mechanism of causation, but treats the active power as 'extending' onto the passive one, not through a relation but by 'spreading itself' onto the patient – by making the patients constitution part of the agent's own constitution; by having the patient as the ground of realization of the agent's own causal power.

The manifestation of the passive power is a constituent of the active power's manifestation. The manifestation of the active power comes to be completely realized in the manifestation of the passive power.

Recall Aristotle's example of the teacher and the student. For the teacher to manifest her power to teach, the student must manifest her power to learn. If the student doesn't learn the teacher doesn't teach. The act of teaching is partly realized in the student's act of learning. More precisely, the teacher's active power to teach is partly realized in the manifestation of the student's passive power to learn. The teacher's power to teach is not reducible to the student learning, but the manifestation of the student's power to learn is a constituent of the manifestation of the active power to teach.

Returning to our example of Allyson Felix's voluntary act of running, her act of choosing to run is realized in neurons firing, muscles contracting, and legs striding forward. That is, the manifestation of Felix's *M-Power* is realized in the manifestation of *B-Power*. That doesn't mean *M-Power* is reducible to *B-Power*. But it does mean that the manifestation of *B-Power* is a constituent of the manifestation of *M-Power*. Since *B-Power*'s manifestation is a constituent of *M-Power*'s manifestation, the manifestation of *M-Power* ontologically depends on the manifestation of *B-Power*.

The account of causal pairing I gave in the previous chapter is substantiated by the ontological dependence between a person's active and passive powers in cases of

mind-to-body causation or body-to-mind causation. Marmodoro (2014a, pp. 46-47) comments on Aristotle's account of active and passive power interdependence:

> Aristotle puts flesh on the bones of his account of dependence between active and passive powers in a causal pair during their activation. During the causal interaction, the mover moves in actuality, and the moveable is actually moved. These two actualities are not casually coincident. The occurrence of the first requires the occurrence of the second.

The active power is causally paired with the passive power because the manifestation of the active ontologically depends on the co-manifestation of the passive.

In the case of Felix's voluntary act of running the manifestations of *M-Power* and *B-Power* are at one level of explanation causally paired via their ontological dependence on one another. At this point, one could ask what explains this relationship of ontological dependence. That is, why do Allyson Felix's mental powers ontologically depend on her body powers rather than, say, Michael Johnson's body powers? This is just a rendition of the causal pairing problem. Thus the answer brings us back to my explanation of mind-body causal pairing developed in the previous chapter: Felix's soul en-forms her body not Johnson's body, therefore her mental powers are paired with her body power, not Johnson's.

7.4.3 Requisite Physical Properties

Two ducks recently flew past my office window. I would really like to fly like a duck on my own strength without the aid of technology such as a plane or wingsuit, but I will never be able to do so. Flying like a duck is simply impossible for me. The reason is obvious: Ducks have a different type of body with different body parts capable of manifesting different bodily powers. And certain actions require bodily powers manifested by body parts with sufficient physical properties.

A critical tenet of the hylomorphic view I'm advocating is that certain types of mental powers require certain types of bodily powers, and vice versa. Moreover, certain types of bodily powers require certain types of bodily features. So in other words, certain types of mental powers cannot be naturally manifested apart from the manifestation of certain types of bodily powers that require certain types of physical characteristics in the body. The manifestation of Felix's mental power to choose to run requires the bodily power to stride forward with one's legs. And this bodily power to stride forward requires a type of physical bodily feature, namely legs. Felix could have various types of legs and still run, but she does need legs of some type.

It seems that this concept is at home in Thomism. Aquinas thought that the human soul has a variety of powers and therefore the human body must have a variety of powers so that the soul's various powers could be manifested. In Question 76 article 5 of the first part of the *Summa Theologiae*, Aquinas addresses the question: What type of body should have the human soul as its form? In this context, Aquinas (ST 1a 76.5 ad 3) writes the following about the human soul, or as he calls it, the intellective soul:

> For although it [i.e. the intellective soul] is one in essence, nevertheless, due to its perfection, it has *multiple powers*. Hence for its various operations it needs *various dispositions in the parts of the body* to which it is united. This is why we see that perfect animals have a greater *diversity of parts* than do imperfect animals…[1]

Notice that Aquinas moves from the powers of the soul to the powers of the body to the parts of the body. To manifest its various powers the soul needs various bodily powers, which themselves require certain bodily parts.

[1] Italics mine.

If the powers of the soul could be manifested with the co-manifestation of just any body power using just any body part, then any type of body would do and there would be no need for a variety of bodily powers and bodily parts. You could just have the soul manifest its powers through any bodily power in any body part. So if any body part would do, you would only need one part or at most one type of part. But according to Aquinas, the human soul requires a body of a certain type, namely one with a variety of bodily parts with various bodily powers. Such a body is needed because the soul's various powers depend on the co-manifestation of certain bodily powers and not just any bodily power, according to Aquinas. And particular bodily powers require the body to have certain types of physical features. So the body's form, that is the soul, and the soul's powers determine the characteristics of the body.

This idea that the soul's powers require certain bodily powers and thus certain bodily parts was applied by Aquinas on the macro level of bodily organs. For example, he (ST 1a 54.5c in Stump, 2003, p. 199) wrote: "In our soul there are certain powers whose operations are exercised by means of corporeal *organs*, and powers of this sort are acts of certain parts of the body, as vision in the eye and hearing in the ear…"[1] This is just one example where Aquinas applies this idea that the soul's powers rely on bodily powers that use certain types of bodily parts to the level of organs (ST 1a 76.8c, ad 4, ad 5). However, this same concept can be applied at more micro levels, which is what I aim to do in the next section. Yet before doing so, let's state the basic principle as clearly as possible.

[1] Italics mine. In this passage Aquinas goes on to say that the intellect and will don't rely on a bodily organ (cf. ST 1a 76.5 ad 2). For an explanation of how this can be consistent with his statements suggesting that rationality relies on the body, see section 7.2 above.

> *Requisite Physical Properties* (RPP): From macro to micro levels, body parts must have sufficient types of physical properties in order to naturally manifest the bodily powers that co-constitute mind-body powers.

Without legs of some type, Allyson Felix can't choose to run. Without a voice of some kind, I can't literally speak what's on my mind. Without sensory organs, one can't feel a pinprick. Certain types of bodily organs that have certain physical properties are needed to manifest certain mental powers, according to Aquinas. Due to advances in microscopes and imaging technology in general since Aquinas day (1225-1274 A.D.), today we know much more about the body beyond the level of organs. In the light of modern science, we can apply Aquinas's line of thought about requisite physical properties to micro levels of bodily composition. From macro to micro levels, we can infer, body parts with certain physical properties or types of properties are needed in order to manifest certain bodily powers that are interdependent partner-powers of mental powers. The basic idea is that mind-body powers require certain types of physical properties at every level of bodily composition. So it's true from the macro level of body parts that includes arms and ears to the most micro, sub cellular level.

The requisite physical properties can pertain to anything physical, from structure to complexity, to electrical charge, to a certain chemical composition, and so forth. The physical properties might be something very specific or simply a type of physical characteristic, such as eyes of some type that allow one to see. Of course, we'll want to know what bodily powers and physical properties the body must have and why it must have them in order for mental power X, Y, or Z to be manifested? And this is where the empirical sciences, such as neurobiology and neurophysiology, can be invaluable.

In any event, the key concept for our purposes is that the natural manifestation of mental powers requires the co-manifestation of certain bodily powers that require certain types of physical properties at every level of the body's composition. This concept, which I think is an aspect (or at least implication) of Thomistic thought, can help us account for NCC. Yet before constructing my account of NCC, I must specify one last principle of neo-Thomistic hylomorphism that pertains to the form of the human body grounding its biological regularities.

7.5 From Form to Biological Regularities

One thing about NCC that invites an explanation is the regularity with which particular neural processes correlate with certain types of mental states throughout a species. Consider the famous (but perhaps mistaken) example of firing C-fibers and the mental state of pain. It's not just that C-fibers fire in Mary's brain when she is in a state of pain, but that C-fibers fire in John's brain, Eleonore's brain, Cecilia's brain, Juan's brain, and Aryn's brain when each is in pain, and the list goes on and on. There is, according to this standard example, a regular consistency of the NCC throughout the human species. Such consistency is a standard feature of NCC and entailed by what it means to be an NCC.[1] It's the consistency of correlations across a species that makes it possible to map a particular type of brain, such as the mouse brain or the human brain (see brain-map.org).

My proposed hylomorphic account of neural correlates will explain the consistent regularities of NCC across the human species by appealing to the idea that all humans have the same type of form. And that form, according to the account, determines the

[1] See Chapter 2, specifically section 2.1.

sameness (or regularity) of biological structures and process in the body at the macro and microbiological levels.[1] In this section I'll briefly describe this idea.

To begin with I'll clarify how my view is consistent and inconsistent with J.P. Moreland's organicist view. We both agree that the human soul, the form of the human body, determines the biological structure and processes of the body from the macro to the micro level. What we disagree on is whether the form of the body does this via efficient causation. As I'll explain, this is relevant to my account of causal pairing that I gave in the previous chapter. After making this clarification, the position I'm endorsing will be explicated further. Before concluding this section, I'll clarify how my view is consistent with neuroplasticity, which is the nervous system's capacity to reorganize its structure, function, and connections in response to internal and external stimuli (see Cramer et al., 2011; Owen, 2016). After this section, in section 7.6, the primary aim of this chapter will be in center focus – that is, to propose a hylomorphic account of NCC. This section is the final step in establishing the conceptual foundation for the proposed account.

7.5.1 Regularities Without Organicism

As mentioned in section 7.1, J.P. Moreland (2016, pp. 116, 118-119) argues that his Thomistic-like dualism entails NCC by appealing to organicism. According to Moreland's (2016, p. 119) description of organicism, the structure and function of body parts are determined by the functional demands of the soul that's "the *first efficient cause* of the body's development."[2]

[1] My view sounds similar to William Jaworski's (2016), but our views differ in that he seems to think the form is the structure, whereas I think the form is distinct from the structure it determines.
[2] Italics mine.

There is significant common ground in this area between Moreland's view and my own, but also an important difference. I agree with Moreland that the soul is the form of the body and that as such it determines the structure and function of the body. I also agree that the functional demands of the soul play a role in this determination (see Moreland, 2016, p. 119). Furthermore, I agree with Moreland's (2017, section I.2.2) claim that the form provides the information for the body's organization and structure like a blueprint provides the organizational and structural plan of a building. We also seem to agree that the form of the body determines information in DNA that guides the development of the body (cf. Moreland, 2017, section I.2.2).

However, I disagree with Moreland's claim that the soul is the first efficient cause of the body's development. If I agreed with Moreland on this point then I would undermine my proposed solution to the causal pairing problem in the previous chapter. My proposed solution explains a relationship of causal pairing between the soul and body during efficient causation by appealing to a more fundamental relation the soul stands in to the body, i.e. an en-forming relation. But if that en-forming relation includes efficient causation, I can't appeal to it in order to explain soul-body causal pairing relations of efficient causation (see Chapter 6 section 6.3.2). Thus I disagree with the idea that the soul is the first efficient cause of the body's development.

So my position does not include Moreland's organicism as he articulates it. But according to my view, the form still ultimately grounds the biological regularities of organization and biological structure and processes across a species. A key difference is that this determination doesn't involve the form as an efficient cause of the body's development. I would echo the words of John Haldane (1998, pp. 275-276):

> I wish to maintain that form may be a determinant of the substantial nature, including the characteristic activities, of a substance without that being a matter of efficiently constraining the location and behavior of basic particles…what form brings is order, but it does not do so by pushing things this way or that. Its existence is testified to not by force detectors but by the fact that what exists, and how existents act, exhibit natural order.

The idea is that forms determine natural order by determining the standard features and activities of substances, but they do not do this via efficient causation.[1] As I'll explain in the following subsection, I think the substantial form determines the standard biological structures and processes across a species, but the efficient causation of their development is merely biological causes.

7.5.2 Same Form, Same Biology

There are countless biological regularities in our world. Examples are easy to come by: dogs naturally have four legs, tadpoles become frogs, North American bull elk have antlers that they annually shed, and the list goes on and on. The type of biological regularity we're concerned with at present is the sameness in structure and function of biological body parts across a species, from the macro to the microbiological level. An example of a macro biological regularity would be the sameness in structure and function of the human heart throughout the human species. An example of a microbiological regularity would be the common information encoded in DNA throughout the human species.

According to hylomorphism such regularities across a species are ultimately grounded in the fact that the members of the species have the same type of form. The idea is that there are the same biological structures and processes on the macro level and

[1] See also Marmodoro and Page (2016, p. 16). They likewise emphasize that a substantial form is not an efficient cause.

micro level across a species because there's the same type of form en-forming the individual members of that species. Assuming these regularities are biological laws, I agree with Alexander Pruss's (2013a, p. 131) thesis that such laws of nature are grounded in forms.[1] Substantial forms ground the essential properties and powers of the organisms they en-form, which determines the developmental parameters of the organism (cf. Pruss, 2013a, p. 131). This guides the patterns of biological development that produce organized structures with standard functions via biological causes, which are the efficient causes of such development. Given that, I can say with Aquinas (ST 1a 76.5c) that "…the reason why matter is such as it is must be drawn from the form, not vice versa."

According to this view, on one level there's the form that determines the structure and standard function of the organism. On another level there's the biological processes of development that are the efficient causes that produce the structures and standard function of the organism's biological parts. A helpful analogy might be train tracks and the trains that run on the tracks. The tracks fix where the train moves like the form determines the body's development. But the form is not the efficient cause of the body's development, and similarly the train tracks are not what cause the train to move down the tracks. The train engine is what causes the wheels to turn, the effect of which is the train's movement down the tracks. And this is analogous to the efficient biological causes producing the biological structures with standard functions.

For further illumination let's consider an example pertaining to the Integrated Information Theory of consciousness (for brevity IIT). According to IIT, the physical

[1] We may disagree, however, on exactly how laws are grounded in the form. I don't think the grounding relation is in any sense a relation of efficient causality and if Pruss thinks otherwise, that's a significant difference.

substrate of consciousness is an integrated structure in the central nervous system that exhibits maximal intrinsic cause-effect power (Tononi et al., 2016, p. 450). In view of that, a unified neuronal structure manifesting an integrated network of causal inputs and outputs would be a physical prerequisite for maximal consciousness.

This idea of the physical necessity of a sufficient neuronal structure is consistent with the principle explicated in the previous section – that is, RPP.[1] Let's assume it's correct and that there are three possible structures sufficient for maximal consciousness in humans. Suppose there's Structure^{I}, according to which the conscious state of tasting chocolate correlates with firing X-fibers. There's Structure^{II}, according to which tasting chocolate correlates with firing Y-fibers. And there's Structure^{III}, according to which tasting chocolate correlates with firing Z-fibers. Each structure will have X, Y, and Z-fibers; it's just that pain has different NCC depending on the structure.

It's possible, according to this example, for tasting chocolate to correlate with firing X, Y, or Z fibers. But suppose that a healthy human's central nervous system always has Structure^{I}. This biological regularity has the same fundamental natural explanation that countless biological regularities have according to hylomorphism. The presence of Structure^{1} in nervous systems across the human species is fundamentally explained by the fact that each human has the same type of substantial form. According to hylomorphism, the ultimate natural explanation of the sameness throughout the species is that each member of the species has a human form. And the form grounds the essential

[1] Some proponents of IIT identify consciousness with the physical structure manifesting the causal inputs and outputs, and that would be inconsistent with my position (cf. Fallon, section 3.c). Yet the idea that such a physical structure is needed to naturally manifest a maximal level of human consciousness is perfectly consistent with my view, which I think could actually lend support to the idea.

properties and powers of the body, which determines that the body develops to have a particular structure with certain functions or processes.

Even though Structure^{II} and Structure^{III} are also sufficient for maximal human consciousness, the regularity of Structure^{I} in human bodies grounded in the human form benefits the species. It guarantees that each individual human will have a structure sufficient for maximizing consciousness. In this way it's advantageous for human persons to have a form that grounds the body's essence, which determines the organized structure and function of the body from the macro to the microbiological level. Even though there are other possible structures that could maximize human consciousness, it's beneficial that the human form guarantees that one of these possible structures in particular will be manifested in individual members.

7.5.3 Consistency with Neuroplasticity

It is well known that traumatic brain injuries that affect brain structure can impair mental capacities. This supports the idea of a correlation between neuronal structure and conscious capacities. However, as mentioned in Chapter 2, we also know that due to the neuroplasticity of the brain it can undergo traumatic injuries affecting its structure and adapt so as to retain or regain mental capacities that typically rely on damaged brain regions (see Cramer et al., 2011; Goodrich et al., 2013; Munoz-Cespedes et al., 2005).

In light of this, let's continue our example regarding structure and NCC and add a character, Mr. Macintosh, who doesn't like to wear a helmet while downhill mountain biking. As a healthy adult Macintosh's central nervous system has Structure^{I}, according which the conscious state of tasting chocolate correlates with firing X-fibers. But after a hard crash on his downhill mountain bike Macintosh's central nervous system loses

Structure^{I} and the brain area where X-fibers are located. Consequently, he no longer has the NCC of tasting chocolate that he once had as a healthy adult manifesting Structure^{I}. However, suppose his brain adapts accordingly and he regains his ability to taste chocolate and Y-fibers become the new NCC of his conscious state of tasting chocolate.

This type of scenario is possible. Such a possibility might at first seem incompatible with the Aristotelian idea that the form of the human body determines that its parts will have particular structures and functions. However, the compatibility of the hylomorphic view I'm endorsing and the neuroplasticity of the brain becomes more apparent in light of the idea that the form of the body also determines what's possible and impossible for the biological organism it en-forms. For example, since I'm a human soul that naturally en-forms my body, it's impossible for me to be naturally disembodied.[1] That's one example of a form determining impossibility.

Yet, the same form determines possibilities, some of which will never be manifested. The same form, a human soul, grounds the possibility that I could learn German. This possibility, however, will likely never be actualized. I would like to know German, but learning a new language is difficult and it takes time that I would prefer devoting to learning Greek or Latin. So I'll never learn German, but it's possible that I do so. This is an example of a possibility grounded in a form.

Bringing this back to our example with Mr. Macintosh, the form of his body determined that his central nervous system develop Structure^{1} prior to his bike accident. Given this, his conscious state of tasting chocolate correlated with firing X-fibers, which

[1] This is not incompatible with the Christian doctrine of the intermediate state, which Aquinas held. The impossibility of naturally existing in such a state does not entail an impossibility of unnaturally existing in such a state. Moreover, the idea that such a state is unnatural can support the doctrine of the general bodily resurrection.

is true amongst all healthy adult humans (we're supposing for this example). However, the form of his body also grounds certain possibilities that may or may not be actualized. One of these possibilities is that under certain conditions, such as his loss of X-fibers, Macintosh's mental state of tasting chocolate will correlate with firing Y-fibers. Like the regularity of healthy adults having Structure[1], this alternative possibility is grounded in the type of form that en-forms Macintosh's body, which is a human form. Macintosh's loss of X-fibers results in this possibility being actualized.

Alternative possibilities such as this that are grounded in the form benefit the species as they allow individual members of the species to adapt and overcame ailments. It's similarly to a Boeing engineer designing a Boeing-747 airplane according to a standard plan with standard exits, but also with some possible alternative exits in case something becomes amiss. Even if the engineer could design the plain in several different ways with equally effective exits, a sufficient level of efficiency is guaranteed by having a standard structure. And it's good for the standard design to have backup possibilities built in, in case something goes wrong.

To summarize this section, I've sketched out a fundamental account of biological regularities across species that's part of the neo-Thomistic hylomorphism that I'm advocating. According to this account the form of the body is not an efficient cause of the body's development. Yet it does ground biological regularities such as macro and microbiological structures and functions in the human body throughout the human species. The efficient causes of the body's development are biological causes in the organism that accord with the essence of the organism, which is determined by the type of organism it is – i.e. a human body. Although the type of organism it is hinges on the

type of form it has – i.e. the form of a human body. Thus fundamentally, and most importantly, the biological sameness across a species is grounded in the sameness of form across the species. I offer a summation of the primary take away in the following principle.

> *Forming Biological Regularities* (FBR): The form of the human body fundamentally determines biological regularities in the body throughout the human species, such as macro and microbiological structures and functions of the body's constituent parts. Thus the same type of form en-forming individual human bodies grounds such biological regularities across the species.

With this principle in place, the conceptual framework for my hylomorphic account of NCC is finalized. In section 7.2, I introduced the principle of interdependent partner-powers (IPP), according to which things have active and passive powers that co-manifest. I built upon this principle in section 7.3 in order to present the idea of mind-body powers (MBP). According to MBP, there are mental powers of the soul and physical powers of the body that are interdependent partner-powers. Regardless of whether the active power is mental or physical, its natural manifestation depends on the manifestation of its passive partner-power, and vice versa.

Section 7.4 focused on further explicating mind-body powers. Out of this explication came the principle of requisite physical properties (RPP). This principle says that from the macro to micro levels, body parts must have sufficient types of physical properties to naturally manifest bodily powers co-constituting mind-body powers. And the standard physical properties of body parts manifesting such bodily powers are determined by the form of the body, according to the position I've articulated in this section. Now that the conceptual framework is in place, I can propose my hylomorphic model of NCC.

7.6 A Hylomorphic Account of NCC

In this section I'll construct my neo-Thomistic hylomorphic account of NCC. It fundamentally relies on the concept of mind-body powers and the requisite physical properties for their manifestation. While my hylomorphic account is dualistic it shares commonality with non-dualist Aristotelian accounts of human action. Consider, for example, how William Jaworski's (2016) hylomorphic view avoids causal overdetermination, the worry that physical causes do all the causal work and irreducible mental causes don't truly make any causal contribution. With this problem in mind, Jaworski (2016, p. 281) clarifies the distinct roles of the mental and the physical:

> Beliefs and desires cause or contribute to actions in one kind of way—they rationalize actions—and neural events cause or contribute to actions in a different kind of way—they trigger muscular subsystems involved in actions.[1]

The mental cause is not reducible to the physical cause and both are needed. Since the action requires both the mental and the physiological causes, there's no overdetermination.

I share common ground with Jaworski's account of mental causation at significant points. However, there are key noteworthy differences. First, Jaworski is addressing the problem of causal overdetermination, whereas I am addressing the issue of NCC. Secondly, and more significantly, he's defending a non-dualist hylomorphic view, whereas my position is a version of dualism. Nevertheless Jaworski's hylomorphic account of human action is similar to my hylomorphic account of NCC in the following way: both claim that the mental and the physical make distinct yet interdependent causal

[1] Cf. Donald Davidson (1963).

contributions. Here I think we share common ground with Haldane (1998, pp. 271-272), Moreland (2016, p. 117), and Oderberg (2005, p. 90), as mentioned in section 7.1.

What I call 'mind-body powers' are interdependent mental and physical partner-powers. To account for NCC, I'll employ this concept and the idea that bodily powers require physical properties. To begin with, the proposed account will be illustrated through an example involving a bee sting, in which the relevant mental power is passive. Then to elucidate the proposed account I'll explicate it in the light of David Chalmers's definition of an NCC. Before concluding a second example will be given, this time involving an active mental power as someone signs a check.

7.6.1 Example Involving Passive Mental Power

To illustrate how mind-body powers apply to NCC, let's start with considering the felt sensation (or qualia) that Freddy feels when a bee stings his foot. Freddy's mental state – the vivid feeling of a bee sting – is irreducibly mental, but it's not without requisite physical causes. When Freddy feels the bee sting his mental power to feel such is manifested because the body exercised certain physiological powers. In fact, the manifestation of his mental power in this case requires the co-manifestation of certain physical powers of the body. It would not genuinely be the feeling of a bee sting if there were not a physical stinger that penetrated Freddy's skin and injected melittin that caused physiological reactions, which in this case include firing synapses sending an electrical signal to a region in his brain. Without a bee stinger and the resulting physiological reactions, perhaps he could have a "phantom" sensation of a bee sting, but it would not genuinely be the felt sensation of a bee sting.

For Freddy to feel a bee sting his mental power to feel such must be manifested. But it also must be the result of physical events in his body as certain physiological powers are manifested. This is where mind-body powers apply. There's a required co-manifestation of the mental power Freddy has to feel a bee sting (MP^{sting}) and the bodily physiological powers (BP^{sting}). This co-manifestation of powers entails a correlation between the manifestation of the mental power and the bodily physiological powers. Thus we could expect correlations between mental events when the mental powers are manifested and physical events when the corresponding bodily powers are manifested (cf. Moreland, 2016, p. 117; Oderberg, 2005, p. 90). After all, the mental and physical powers are interdependent partner-powers. So the concept of mind-body powers leads us to expect a correlation between the manifestations of mental and physical bodily powers.

However, this correlation between mental and bodily powers does *not* itself imply a correlation between the mental and specific neuronal states or activity. More is needed to arrive at and account for neural correlates of consciousness. Of aid is the concept introduced above regarding bodily powers requiring physical properties – RPP. From macro to micro levels, body parts must have certain physical properties or types of physical properties in order to naturally manifest the bodily powers that co-constitute mind-body powers. In other words, the manifestation of a bodily power that's the interdependent partner-power of a mental power requires a body part(s) with sufficient physical properties. That's the claim of this principle, RPP, which is a natural part (or implication) of Aquinas's thought. Thus in reference to our example, the manifestation of Freddy's bodily powers (BP^{sting}), which correlates with his mental power, naturally requires physical bodily parts with certain types of physical properties.

So neo-Thomistic hylomorphism, as I've described it thus far, claims human persons have mind-body powers consisting of interdependent mental powers of the soul and physical powers of the body. And the physical powers of the body require certain physical properties from the macro to the micro level in order to manifest. Due to this and the fact that the brain manifests such bodily powers, certain parts of the brain down to the neuronal level with sufficient physical properties will correlate with the interdependent mental powers. For such mental powers depend on bodily powers that need to be manifested via body parts with appropriate physical properties.

Moreover, the correspond body parts will be the same in Freddy as they are across the human species. This is due to FBR, the Aristotelian principle articulated just above that says the same type of form en-forming individual human bodies grounds biological regularities across the species. These regularities include macro biological regularities like sameness of organs such as a brain, as well as microbiological regularities such a neuronal structure and function.

When Freddy or any healthy developed human feels a bee sting, certain neurophysiological bodily powers are manifested – i.e. BP^{sting} – and particular body parts with sufficient properties manifest these powers. Specific to our focus is the power to receive and send a signal corresponding to the bee sting. This power is manifested by firing synapses in the peripheral nervous system (given the bee stung his foot), but also his central nervous system, which we can label N^{sting}. These firing synapses have the physical properties that manifest BP^{sting}, which correlates with Freddy manifesting his mental power to feel a bee sting – i.e. MP^{sting}. This mental power is manifested via Freddy's conscious state of feeling a bee sting, which we can label C^{sting}. Putting this

altogether, C^{sting} manifests MP^{sting} that's a correlated partner-power of BP^{sting} manifested via N^{sting}. Consequently, N^{sting} is the NCC of C^{sting}. And this NCC would be consistent throughout the human species comprised of members with the same type of form enforming their human body.

For illumination, let's apply to our example David Chalmers's (2000, pp. 31) definition of an NCC:

> An NCC is a minimal neural system N such that there is a mapping from states of N to states of consciousness, where a given state of N is sufficient, under conditions C, for the corresponding state of consciousness.

In our example the minimal neural system N is N^{sting}. And there's a mapping from N^{sting} to Freddy's conscious state C^{sting} of feeling a bee sting because the powers manifested by each (BP^{sting} and MP^{sting} respectively) are interdependent partner-powers that correlate with each other. And the same would be true of any healthy developed human manifesting C^{sting}, according to the proposed hylomorphic account. The conditions C are background conditions, such as the heart pumping blood, that enable N^{sting} and C^{sting} (see Tononi and Koch, 2015, p. 2).

To illustrate the account let's have ↔ represent the metaphysical interdependence between the active bodily power and the passive mental power. And ⇔ represent the resulting natural correlation between the neural process and the conscious state. In addition, let's have two vertical lines represent the bodily and mental powers being manifested through the corresponding neural processes and conscious state.

$$\begin{array}{ccc} N^{sting} & \Leftrightarrow & C^{sting} \\ | & & | \\ BP^{sting} & \leftrightarrow & MP^{sting} \end{array}$$

On the bottom level, we have the active bodily powers manifested through the standard neural processes on the left side, and the passive mental power manifested through the conscious state on the right. These are the interdependent mind-body powers. On the top level, which is what we empirically study through neuroscience, we have the NCC represented. On the left is the neural correlate manifesting the bodily powers of the conscious state on the right that manifests the mental power.

Our diagram illustrates how the proposed hylomorphic model of NCC applies to our hypothetical scenario of Freddy's mental state and the corresponding neural correlate. Although Freddy is just a hypothetical healthy adult and the NCC is just hypothetical, if they were real this diagram would not just reflect Freddy's NCC. Because human bodies are en-formed by the same type of form that fixes standard biological bodily structures and functions, there's homogeneity across humanity in neurophysiology. Thus the diagram representing Freddy's NCC would reflect the same NCC across the human species.[1] And the top level of the diagram would reflect a natural neurophysiological regularity across humanity in the actual world. So the top double arrow (that is: ⇔) would be representative of a natural biological regularity or law in our world.

However, it's important to note that ⇔ does *not* represent a strict relationship of either logical or metaphysical necessity. According to the definitions proposed by Chalmers (2000, pp. 31) and Koch (2016, p. 307; 2007), neural correlates are said to be sufficient for the correlated conscious state. But neither Chalmers nor Koch claim that

[1] While we can speak of homogeneity and sameness regarding neurobiology and NCC across a species, it's necessary to keep in mind that we're speaking of homogeneity regarding biological regularities that permit some degree of variation. Variations pertaining to NCC can be due to variations in overall conscious experiences or variations in individual brains across a species (see Chapter 2 section 2.1).

neural correlates are logically or metaphysically necessary for the corresponding consciousness. Speaking as though a bee actually stung Freddy, ⇔ represents a metaphysically possible NCC that's an actual NCC in the actual world. But many philosophers think it's possible for beings such as animals or aliens with different neurophysiology than humans to have some of the same conscious states that humans have (see Kripke, 1981; Putnam, 1967).

According to this concept of multiple realizability, an alien with different neurons composed of different materials could be stung by a bee and have the same conscious state as Freddy (i.e. C^{sting}). Consequently, it would have a different NCC of the same conscious state. Given the possibility of multiple realizability, a viable account of NCC must be consistent with it and avoid ruling it out. In addition, there are cases where subjects lose a part of their brain with neural correlates of certain types of conscious states, but do to neuroplasticity a different part of the brain with different neurons begins to fulfill the same role (see section 7.5.3).[1] Loosely speaking, this is like multiple realizability taking place in the same brain. Given such possibilities, it's important to keep in mind that ⇔ is not representing a relationship of logical or metaphysical necessity.

Rather, it represents the neurobiological reality that in the actual world the conscious state C^{sting} corresponds to the neural correlate N^{sting} in healthy developed human brains. Is it possible for a human person to undergo a brain injury and lose N^{sting} and yet have the same conscious state with a different neural correlate, say $N^{sting\text{-}alternative}$?

[1] While my hylomorphic account is consistent with such cases, I have to admit that Moreland's (2017) Thomistic-like position that includes organicism has the potential to account for such cases better than my position that's devoid of organicism.

According to neo-Thomistic hylomorphism, the answer is 'yes' as long as human neurophysiology allows for the possibility that C^{sting} correlate with $N^{sting\text{-}alternative}$ in cases of brain injuries or the like where N^{sting} is lost. Clearly there are cases of brain damage that result in a permanent loss of mental function and cases where it's possible for mental function to be regained as new neural correlates are established via neuroplasticity. As discussed above, such impossibility or possibility is ultimately grounded in the form of the human body (see section 7.5.3).

Is it possible for there to be an animal or an alien with a different form and thus different neurophysiology that's capable of having different neural correlates, $N^{sting}*$, of the same conscious state? Yes, according to my proposed model, as long as the neural correlates are the type of physical entity that can manifest the requisite bodily powers for the experience to be a bee sting. In such a case, there would be different bodily neurophysiology capable of manifesting BP^{sting} that does so. For such a case a new diagram could be drawn that simply replaces N^{sting} with $N^{sting}*$.

$$\begin{array}{ccc} N^{sting}* & \Leftrightarrow & C^{sting} \\ | & & | \\ BP^{sting} & \leftrightarrow & MP^{sting} \end{array}$$

According to this model, we don't know what neural states and processes are the correlates of particular conscious states. What we do know, assuming the model, is that the natural manifestation of MP^{sting} via C^{sting} requires the co-manifestation of BP^{sting} via some physical state or process that has the requisite characteristics to manifest BP^{sting}. And accordingly we can assume that there is such a physical state or process if we know that MP^{sting} is being manifested via C^{sting}. So there is strong motivation to find out just what physical process in the body is manifesting BP^{sting}. More precisely, there's good

reason to do empirical investigation using the tools of modern neuroscience in search for neural correlates of consciousness (cf. Moreland, 2017, section I.2.1).[1]

7.6.2 Example Involving Active Mental Power

Since our example with Freddy feeling a bee sting involves a passive mental power, let's briefly considering an example involving an active mental power. We can use an example provided by Dennis Patterson's (2003) as a starting point:

> Suppose I place my signature on a document. The act of affixing my signature is accompanied by neural firings in my brain. The neural firings do not "explain" what I have done. In signing my name, I might be signing a check, giving an autograph, witnessing a will or signing a death certificate. In each case the neural firing may well be the same. And yet, the meaning of what I have done in affixing my signature is completely different in each case. These differences are "circumstance dependent," not merely the product of my neural firings. Neural firings accompany the act of signing but only the circumstances of my signing, including the intentions to do so, are the significant factors in explaining what I have done.

Patterson points out that he could affix his signature to a document to accomplish several different actions. The act depends on Patterson's intention for signing the document and the correlated neural activity. His claim that the neural activity could be the same even if his intention differed may be mistaken. Nevertheless, he makes an important point: There will inevitably be a neural process and what ultimately defines the act as signing an autograph or witnessing a will is his intention for signing.

In fact, we can imagine a scenario where you have sufficient neural events to produce Patterson's signature, but the lack of an appropriate intention makes a definitive difference. Imagine a possible world in which philosophers are like rock stars and a mob

[1] Moreland (2017, section I.2.1) and I arrive at the same point, but the route that we took in arriving at this point differs in so far as mine hinges upon the interdependence of active and passive Aristotelian partner-powers.

of fans surrounds Patterson after he finishes presenting a paper at a conference. Suppose that unbeknownst to him, one of his undergraduate philosophy students has him sign a paper that's actually a note excusing that student from the final exam. Patterson intended to give his autograph to one of his devoted philosophy fans, but instead he affixed his signature to a contract excusing his conniving student from the exam.

Now clearly, the contract excusing the student is phony and need not be legally followed. The reason involves the overall circumstances, but principally the fact that Patterson's intention was to sign his autograph, not a contract. Patterson's action relied on appropriate firings synapses that manifested the requisite bodily power constituting the action of signing his autograph. For the same physiological processes to manifest the bodily power constituting the act of signing a contract, Patterson's intention would have had to be different. Namely, he would have had to intend to sign a contract.

Just as the active bodily powers in the previous example were determinative and hence Freddy genuinely felt a bee sting, the active power in this example determines the nature of the action and the constituent passive powers. As Aquinas (ST 1a 80.2c) noted, "a passive capacity takes its proper nature from its relationship to what acts on it." So the power manifested by the neurophysiology in this example is determined by the active power manifested by Patterson's mental intention to sign his autograph. If there were other neural processes that could have manifested the same passive powers, the model allows for that. And the same would be true in such scenarios: the active power would have determined the nature of the passive power and the action. And that action, due to Patterson's intention, was the act of signing his autograph and not the act of signing a contract. Consequently, the conniving student is not excused from the final exam.

Let's now explicate and illustrate this example in the light of the proposed hylomorphic model. Patterson's mental power to intend to sign his autograph ($MP^{sign\text{-}auto}$) was manifested via his conscious state of intending to sign is autograph ($C^{sign\text{-}auto}$) and the correlated bodily powers ($BP^{sign\text{-}auto}$) were manifested via the correlated neural events ($N^{sign\text{-}auto}$). As was done above, we can represent these relationships with a diagram.

$$\begin{array}{ccc} C^{sign\text{-}auto} & \Leftrightarrow & N^{sign\text{-}auto} \\ | & & | \\ MP^{sign\text{-}auto} & \leftrightarrow & BP^{sign\text{-}auto} \end{array}$$

As with the above diagrams, on the bottom level the active power is on the left and the correlated passive power is on the right. These are the interdependent mind-body powers. On the top level, we have the NCC represented. The mental state manifesting the active mental power is on the left and the neural processes manifesting the bodily powers is on the right. This time the mental power manifested through Patterson's conscious intention is the active power. Accordingly, the bodily powers manifested through the neural processes are passive, being triggered by Patterson's intention to sign his autograph (cf. Jaworski, 2016, p. 281).[1]

Patterson's conscious intention correlates with the corresponding neural processes since they manifest his mental and bodily powers that are interdependent partner-powers. And the same would be true for all humans who have the same neurophysiology due to their body being en-formed by the same type of form. The metaphysical explanation of the correlation between $C^{sign\text{-}auto}$ and $N^{sign\text{-}auto}$ is that they manifest $MP^{sign\text{-}auto}$ and $BP^{sign\text{-}auto}$, respectively, which are correlated partner-powers. Simply put, since the

[1] Recall a clarification offered in section 7.2.1, that something can simultaneously manifest passive and active powers. The neural processes manifest passive power as they're triggered by Patterson's intention, but active power as they trigger other physiological events included in the act.

manifestation of the mental and bodily powers correlate, the conscious state and neural processes that manifest these powers correlate.

In summary, this section has presented my neo-Thomistic hylomorphic model of NCC. In order to elucidate the proposed account of NCC two hypothetical examples were offered. The first example involved a passive mental power. The second example involved an active mental power. According to the model, whether the mental power is active or passive the correspondence between consciousness and neural correlates is explained by the interdependence between active and passive powers of the mind and body. Thus according to this hylomorphic account, the NCC studied by neurobiology are fundamentally grounded in the metaphysics of interdependent mind-body powers.

7.7 Conclusion

Aquinas (ST 1a 77.3c) claimed the human soul is "…at the boundary between spiritual and corporeal creatures, and consequently the powers of both come together in it." With this general idea as a starting point, I've constructed a metaphysical explanation of NCC. To accomplish this objective, four principles derived from Aristotelian and Thomistic thought were explicated and exploited.

The first principle claims things have interdependent active and passive powers. The manifestation of an active power depends on the manifesting of its corresponding passive power, and vice versa. According to the second principle, there are mental powers of the soul and physical powers of the body that are interdependent partner-powers, which need to be co-manifested. I call these mind-body powers. According to the third principle and forth principle, the bodily powers co-constitute mind-body powers

rely on macro and microbiological body parts with sufficient physical properties that are grounded in the form.

I've proposed a neo-Thomistic explanation of NCC that integrates these principles. According to this model, NCC are explained by the interdependence of the mental and bodily powers co-manifested via the conscious state and its neural correlate. Since the mental power and bodily power are correlated given their mutual dependence as active and passive powers, their manifestations through sufficient neural processes and conscious states are correlated.

Powers: Taking Stock

In this overall work I have responded to two chief objections to substance dualism regarding causal pairing and neural correlates of consciousness. Such objections, it's often thought in contemporary philosophy of mind, undermine the viability of substance dualism, which is often considered obsolete. In response, my aim has been to demonstrate that there is a particular substance dualist position, neo-Thomistic hylomorphism, which provides a solution to the causal pairing problem and a good explanation of NCC. Given my overall objective of showing that a view informed by Aquinas who relied on Aristotle can respond to substance dualism's chief objections, I've responded to these objections in light of Aristotelian-Thomistic thought.

This chapter has focused on how neo-Thomistic hylomorphism can account for NCC. The aim has been to provide a coherent explanatory account or model of NCC that is informed by Thomas Aquinas's view of human nature and Aristotle's metaphysics of powers. In this chapter I've relied on elements of an Aristotelian powers ontology to explain NCC, since doing so fits with my overall objective. One might wonder, however,

whether I need all the commitments regarding powers that I have embraced in light of my objective in this chapter and overall work?

In answering this question, let me first say something important about what I have done. I have taken ideas from an Aristotelian ontology of powers that includes principles that apply to causation generally and specifically applied the ideas to the particular issue of neural correlates of human consciousness. My focus has been to account for NCC pertaining to human consciousness. Strictly speaking, given this focus it's the claims I've made specifically about the powers of human persons and how these powers apply to NCC that are central to my model of NCC.

My model depends on the idea that human persons have interdependent mental and bodily powers, or 'mind-body powers.' NCC in human persons are explained by *the interdependence of their mental and bodily powers co-manifested via conscious states and corresponding neural states/process*. This essential idea, as I've presented it here, is informed by Aquinas and Aristotle's thought given my aim to demonstrate that neo-Thomistic hylomorphism can account for NCC. But what commitments regarding powers are actually required by the model?

First, powers must exist. Otherwise human person couldn't have mental and bodily powers, which is a prerequisite for there to be mind-body powers. In my project I am applying an Aristotelian understanding of powers to NCC. And I follow Marmodoro (2018, p. 15) in thinking "Aristotelian powers are pure powers…all there is to a power is its powerfulness; nothing inert, or impotent is needed in the power's nature to anchor the power to reality." Therefore, I've discussed powers accordingly, but not with the intention to suggest the model necessarily requires power powers. If those who hold a

different view of powers can give the same explanation of NCC that I've given, or can take advantage of the model I've presented (perhaps adjusting it accordingly), that would be a welcome possibility that I have not aimed to preclude nor demonstrate in this work.

Second, my model requires that there be some interdependent powers. Otherwise, human persons couldn't have interdependent mental and bodily powers. The idea that there are interdependent powers flows out of the Aristotelian understanding of active and passive powers, which Aquinas embraced. So an Aristotelian understanding of powers provides a natural basis for interdependent powers that fits well with my aim to defend a hylomorphic view informed by Aquinas who looked to Aristotle as a philosophical guide. However, I am not claiming that only an Aristotelian powers ontology can support the idea of interdependent powers. If one has a different understanding of powers that doesn't include active and passive powers, but nevertheless includes interdependent powers, it would be well worth considering how she could employ the explanation of NCC I've given while being consistent with her own view of powers.

Third, my model requires the idea that there are interdependent powers in human persons that naturally manifest in conjunction with each other. Here too, I developed this idea by appealing to the Aristotelian idea of active and passive powers that manifest in conjunction with each other. But what is essential to the model is that: *human persons* have interdependent powers that co-manifest with each other. This could be true without all powers, everywhere, at all times requiring co-manifestation.

In conclusion, in order to demonstrate that the neo-Thomistic hylomorphist can explain NCC, I've relied on the thought of Thomas Aquinas and the one he often called 'the Philosopher'– i.e. Aristotle. I hope to have shown that neo-Thomistic hylomorphism

is not merely consistent with neural correlates of consciousness but also capable of providing a good explanation of them.

8

Conclusion

In the first chapter of this work I highlighted the reconsideration of dualism that's taking place in contemporary philosophy of mind. Dualism of any kind is still unpopular and physicalism is still the reigning paradigm. Nevertheless, substance dualism is being reconsidered. This reconsideration, however, will not last long if in fact mental causation is incoherent given dualism or if modern neuroscience has proven that the mind is neural states or events. If mental causation is necessary for agency and is impossible given dualism, then dualism should be rejected. If the facts of the world discernable through neuroscience prove that the mind is brain states or processes, then dualism should be rejected.

According to proponents of the causal pairing problem, mental causation is impossible for the nonphysical minds of substance dualism. And it's often thought that modern neuroscience has proven that the mind is neural correlates of consciousness that contemporary brain imaging techniques have allowed us to identify. These lines of thought constitute the most threatening objections to dualism. I've tried to demonstrate that neo-Thomistic hylomorphism is a version of substance dualism that can overcome these two objections. I've argued that neo-Thomistic hylomorphism provides a solution to the causal pairing problem and a good explanation of NCC.

My accounts of mental causation and NCC do not demonstrate that neo-Thomistic hylomorphism or any other dualist position is true. However, that has not been my

objective. Rather, I've focused on defeating dualism's paramount defeaters. My aim has been to adequately respond to the two strongest objections to substance dualism. I've tried to show that neo-Thomistic hylomorphism provides a solution to the causal pairing problem and a good explanation of neural correlates of consciousness. If I've met this objective, then the causal pairing problem and neural correlates of consciousness do not provide sufficient grounds for rejecting dualism. And perhaps contemporary reconsiderations of dualism shouldn't focus solely on Cartesian dualism, for there's another version worth focusing on in forthcoming research (cf. Moreland, 2016, p. 126; Oderberg, 2005, p. 71).

8.1 Future Research

There are three areas in which I plan to apply my research on neo-Thomistic hylomorphism. First, I want to explore the continuity and discontinuity between hylomorphism and a prominent theory of consciousness in neuroscience, the Integrated Information Theory (IIT). Second, I want to apply neo-Thomistic hylomorphism to the topic of the persistence of human persons throughout the late stages of Alzheimer's disease. Third, I think my model of NCC can be fruitfully applied in the area of philosophy of religion and analytic theology to the Christian doctrine of the Incarnation.

Recently the Integrated Information Theory of consciousness has emerged as a prominent view in neuroscience (see Tononi, 2004).[1] As mentioned in Chapter 7 (section 7.5.2), according to IIT the physical substrate of consciousness is an integrated structure in the central nervous system that exhibits maximal intrinsic cause-effect power (see

[1] Throughout this section on IIT, I'm indebted to Christof Koch for very helpful discussions about IIT and hylomorphism.

Tononi et al., 2016, p. 450). In view of that, a unified neuronal structure manifesting an integrated network of causal inputs and outputs would be a physical prerequisite for maximal consciousness. While this idea is not entailed by neo-Thomistic hylomorphism, it's perfectly consistent with it.[1] And it seems to me that there are several further points of common ground that IIT shares with hylomorphism in general.

For example, the two leading proponents of IIT, Christof Koch and Giulio Tononi, have clarified that what they mean by information is not the idea of passing content. "Instead, IIT refers to 'information' in its original sense, with its root *inform*, meaning 'to give form to'" (Koch and Tononi, 2017). Here they seem to be speaking of information in a way that a hylomorphist can speak of the form of the body, which determines the body's organizational structure (see Chapter 7 section 7.5). Furthermore, I think there's common ground between IIT and hylomorphists pertaining to ontological priority and powers. The IIT theorist considers the unity of consciousness as a starting axiom (Fallon, section i.). And it's inferred from this axiom that "consciousness's integration into a unified whole implies that the system must be irreducible" (Fallon, section ii.). This may indicate common ground with the hylomorphist who thinks a whole unified substance has ontological priority vis-à-vis its parts. Additionally, IIT theorists and hylomorphists both seem to be realist about causal powers.

Nevertheless, I think there are two areas of dissimilarity as well, where the two views might be able to benefit from each other. On the one hand, IIT offers hope of being able to measure consciousness. As a nonphysicalist, I doubt this is possible. However,

[1] As in Chapter 7 section 7.5.2, I'm not referring here to any identity claims regarding the mental being reduced to the physical that IIT proponents might make. I'm only referring to the need for a sufficient neuronal structure.

that's not to say that such efforts are futile. For if there's even a correlation between consciousness and an integrated system of causal inputs and outputs, I think it might be at least theoretically possible to detect levels of consciousness. If IIT theorists can develop useful ways of doing so in an attempt to measure consciousness, this will be applicable in areas of applied ethics that many hylomorphists care about. For example, if we can show that a comatose patient has a certain level of consciousness, there can be significant ethical implications.

On the other hand, IIT addresses the *nature* of consciousness, but not the *bearer* of consciousness, which hylomorphism does address.[1] And ultimately, in ethical matters we not only want to show that consciousness is present, but that a conscious subject is present. To do so, IIT will need to have an account of not only what consciousness is, but also what bears consciousness. Hylomorphism can help.

This brings me to the second area of forthcoming research. Since neo-Thomistic hylomorphism addresses the bearer of consciousness and not only the nature of consciousness, I think it can provide a framework for thinking about the persistence of human persons in the late stages of Alzheimer's disease. Furthermore, according the model of NCC I constructed in Chapter 7, mental powers require the co-manifestation of bodily partner-powers, which require sufficient neural structures and processes. I think that neo-Thomistic hylomorphism can explain how human persons can persist as their neural tissue deteriorates and they lose autobiographical episodic memory, and perhaps even their ability to recall their own identity.[2]

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[1] Here I'm indebted to Mihretu Guta, who brought this to my attention in conversation.
[2] Autobiographical episodic memory is a person's memory of past events or episodes in one's life.

Finally, in recent years analytic philosophy has been applied to the Christian doctrine of the Incarnation of the Son of God (cf. Davis et al., 2002; Marmodoro and Hill, 2011; Owen and Sanders, forthcoming). Neo-Thomistic hylomorphism might be capable of making a fruitful contribution in this area by appealing to the idea of mind-body powers and the model of NCC that I've presented. The doctrine of the Incarnation makes the bold claim that an omnipotent and omniscient divine person became a historical man, who apparently had limited knowledge and power. By appealing to the idea that mental powers require the co-manifestation of their bodily partner-powers, I think the analytic theologian can explain how a divine person can be omniscient, for example, and yet have limited knowledge in his human consciousness.

These are just three examples of further research projects relevant to neo-Thomistic hylomorphism. They certainly do not exhaust the possibilities.[1] There's much fruitful research to be done relevant to hylomorphism generally and neo-Thomistic hylomorphism in particular.

[1] For example, Daniel D. De Haan (2012) has applied Thomistic hylomorphism to neuroplasticity and drug addiction.

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