

## ABSTRACT

### Cartesian Dualism and the Problem of Interaction

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There are numerous ways to consider the form and essence of humans. This is no less true in the discipline of philosophy. In general, philosophers consider the human in two different ways: either through materialism or through dualism. Materialism, the idea that all things causally significant to the human are physical, stands in direct opposition to the dualist position, that there are some things about the human that cannot be reduced to the physical. In this thesis, I will explain and parse the specific idea called Cartesian Dualism. As a form of *substance* dualism, this position faces the unique challenge of answering how physical and non-physical substances interact. Following a detailed discussion of Cartesian Dualism, I will present this problem of interaction and consider whether it truly poses a significant threat.

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CARTESIAN DUALISM AND THE PROBLEM OF INTERACTION

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## CHAPTER ONE

### Cartesian Dualism

“...*je pense, donc je suis*...”

-René Descartes, *Discourse on the Methods*

#### *Introduction to Dualism*

One of the predominating philosophical quandaries since humans have pursued wisdom is the question “what am I.” While this question takes many forms and produces answers in far-ranging disciplines, one prominent answer is Cartesian substance Dualism. In the sections and chapter to come, I will outline this idea and explain its primary issue, i.e., the problem of interaction. This problem states that physical and nonphysical substances cannot interact in a causally significant way, so Cartesian Dualism must be false. This project will ultimately address that question (i.e., whether there truly is a problem of interaction for Cartesian Dualism) but it must begin by painting the background to the question, “what am I?”

For such a short question, there are numerous ways to study and understand the human being. Some of these methods include the “hard sciences” of biology, chemistry, and physics. In these disciplines, scientists and theorists look to understand the different physical processes that take place inside and around the human. They then use these insights to complete a picture of humans functioning in an effort to explain the nature of the human. However, other fields approach the issue of human nature in a different manner.

As opposed to understanding the human solely in terms of physical and biological processes, fields such as theology, sociology, and philosophy each approach this task with self-defined methods and to self-appointed goals. For theology, this task is understanding how the human relates to God and that divine image. Similarly, sociology approaches the human at the societal level. This includes analyzing institutions, cultures, and distinct people groups in an effort to answer questions about human nature. While these two (i.e., theology and sociology) each address the human being in search of some specifically-defined aspect, philosophy steps back from these singularly-focused approaches. What philosophy does is gather knowledge from both the physical and non-physical disciplines in order to seek the sum total of wisdom.

Furthermore, while the three aforementioned fields (theology, sociology, and philosophy) each have the possibility of representing a special type of non-physical understanding, philosophy has a special task. Because of its resolute and winsome dedication to wisdom, philosophy seeks a complete understanding of the human, which can include both physical and non-physical components. This broadness leads to many philosophical ways of understanding the human; however, the primary concern of this project is to present the Cartesian form of substance dualism. I will discuss Cartesian Dualism later in this section, but now, I will explain the idea that provides its primary conflict.

This conflict arises from materialism, a theory that stands in opposition to dualism when answering the question, “what am I.” Colloquially, materialism evokes the value of physical commodities, but philosophically, materialism is the idea that reality is exhausted by material (i.e., physical) things. Within this short definition is a gradient of

understandings. Some defend stricter forms of materialism, while others argue that materialism is open to broader components. In all, however, materialism has become one of the dominant metaphysical theories of Anglo-American philosophy. Many notable philosophers are drawn to this theory because of its strengths, simplicity, and elegance. Thus, it is important to understand what it purports and what it implies for philosophy of mind.

For this project, I will broadly define materialism as the position that opposes the core teachings of Cartesian Dualism. Materialism is sometimes called physicalism or naturalism, and while each of these implies a slightly different theory and history, they all purport one basic idea. Insofar as materialism is a theory about human nature, it finds its simplest form in the statement that all things causally significant to humans and their experience are physical.<sup>1</sup> This statement is based upon two foundational principles. First is the causal closure of the physical - the postulation that all things in the physical world (e.g., humans and their environments) are only affected by physical items. In other words, if something happens in the physical world, such as my arm moving, it is completely *caused* by a physical precursor. The second is the exclusion principle, which states that if a certain event is completely caused by one factor, no other factors play a role in causing that event.<sup>2</sup> Working from these two principles, there is no reason to believe in causally-significant mental entities. From here, materialists stand upon a solid base for arguing for their position.

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<sup>1</sup> Oppy, Graham. *The Best Argument against God*. Palgrave Pivot, 2014, pp. 6-7

<sup>2</sup> This dual-theory understanding of naturalism (i.e., materialism) is outlined in Buras, Todd. "On the Failures of Naturalism." *Review & Expositor*, vol. 111, no. 3, 2014, pp. 259-273.

While these two principles are not the only parts of the materialistic argument, they set the stage for a fuller argument against dualism. Part of arguing against Cartesian Dualism is showing the attractiveness of the materialist position. This presentation begins from the fact that most people (including dualists) values objectivity, empiricism, and scientific unity. Put another way, people want their understanding to be: based on facts separate from personal opinion (i.e., objectivity), developed from scientific sensory explorations (i.e., empiricism), and working toward a single idea of what the natural universe entails (i.e., scientific unity). Materialism, with its causal closure and exclusion principles, neatly fits within this mold of understanding, and thus it has experienced a rise in academia and philosophical considerations.<sup>3</sup>

However, this appeal of materialism does not mean the destruction of the dualist tradition. With its own adherents and vast theorization, dualism continues to thrive in the twenty-first century. As broadly defined, dualism is the postulation that there are two sets of items (e.g. predicates, properties, or substances) that form the whole person. Following in the Cartesian tradition, one popular form of this idea is substance dualism. This means the mind and the body are two different substances: one is non-physical (the mind), and one is physical (the body). Furthermore, Cartesian Dualism proposes a causal interaction between these two substances. The actions of the mind can have physical consequences in the body (manifest as actions), and the actions of the body can have non-physical consequences in the mind (manifest as perceptions). However, just like materialism, there

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<sup>3</sup> Stoljar, Daniel. "Physicalism." *The Stanford Encyclopedia of Philosophy*, 2016, [plato.stanford.edu/archives/spr2016/entries/physicalism/](http://plato.stanford.edu/archives/spr2016/entries/physicalism/).

are also less strict forms of dualism, so it is beneficial to understand what distinguishes these varieties.

Apart from substance dualism, one notable form of dualism is property dualism. This is the idea that, while the fundamental nature of the human is physical (as the materialist would define it), the human has both physical and non-physical properties. Simplified, in the human, there is one substance – the physical body - that has two types of properties: both physical (the fundamental) and nonphysical properties. Furthermore, the nonphysical properties (though nonphysical in nature) are explained solely in terms of the causally significant body (the physical substance). For example, when people experience pain, their group C nerve fibers fire. This is a physical outcome, as all the events leading up to the firing of this nerve are the result of a previous physical event. An example of a non-physical (i.e. mental) property is the human’s personal experience of the pain.<sup>4</sup> In all, this idea is a weaker form of dualism because it does not require the actual existence of two different substances. While this theory does carry its own proponents, rationalizations, and challenges, it is important to distinguish it from the central focus of this project: Cartesian Dualism.

In contrast to property dualism, substance dualism explains human nature via two distinct substances. One way to define a substance is the thing that makes up humans and “possesses” the various properties realized in them.<sup>5</sup> So, while property dualism was the idea that humans are one substance with two types of properties, substance dualism is the

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<sup>4</sup> Levine, Joseph. “Materialism and Qualia: The Explanatory Gap.” *Pacific Philosophical Quarterly*, vol. 64, no. 4, 1983, pp. 354–361.

<sup>5</sup> Robinson, Howard. “Dualism.” *The Stanford Encyclopedia of Philosophy*, 2017, plato.stanford.edu/archives/win2016/entries/dualism/.

idea that humans are two substances with multiple properties. The two substances that make up the human are not simply one or the other: they are independent and irreducible. An example of these two substances (with various properties) working together would be the planning and carrying out of a preconceived action. The mind (the non-physical substance) plans the action of going to the store to buy groceries. Planning is a property of the mind, but the mind is the substance that possesses the property. Further, the mind initiates the physical outcome of going to the store to buy the groceries. At this point, the physical substance, the body, travels to the store via the control of the mind. There are various biological reactions that “move” the body to the store, but it is the mind, as a distinct substance, that drives this action.

From the beginning, substance dualism has encountered problems about the relationship between completely independent substances. The contrast between the two is so stark because materialist preconceptions and universal conservation of energy laws rule out the open systems of dualism. This differentiation results from the materialists definition of the physical. To borrow George Berkley’s definition, the physical (the stuff that that accounts for causality and form in the world) is “[matter], an inert, senseless substance, in which extension, figure, and motion do actually subsist”.<sup>6</sup> While concise and straightforward, this detailed definition requires a closer analysis. First, the physical matter that accounts for causality and form is both an inert and senseless substance. This means that no part of it has to do with morality, rationality, a soul, or a mind. Next, this matter has the special properties of extension, figure, and motion. These are terms of the

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<sup>6</sup> Berkeley, George, and R. S. Woolhouse. *Principles of Human Knowledge ; and, Three Dialogues between Hylas and Philonous*. Penguin Books, 2004.

physical sciences that can mean the matter being analyzed aligns with our current understanding of matter. Both qualifications play a significant role in the mind body problem. However, this definition leaves out any notion of the non-physical.

The non-physical, as it applied to Descartes' theory of human nature, was a separate substance. In today's vocabulary, non-physical substance is sometimes called the soul, the mind, or the spirit, but these need not imply some sort of religious connotation. All they mean is that some other substance, besides physical matter, plays a causal role in human nature. More directly, this non-physical substance, hereafter referred to as the mind (unless individually noted), plays a role in causing events to happen in the physical world (causality via interaction). Even though this initially seems like a type of physical substance, the difference comes when considering how the two exist separately.

The difference comes in this: Descartes considered the mind to be an animated, sense-adapted "thing" that did not obey the traditional physical laws of extension, figure, and motion.<sup>7</sup> In today's language, the mind could not be considered physical matter because it is alive, dynamic, and outside the orderly confines of universal conservation of energy laws. While the specifics of the mind's relation to physical time and space could be debated, the bottom line for Descartes was that there is some separate substance, apart from the actions of our brains, that causes events to happen.

Here is another way of considering a non-physical substance. Contra the "strong" *substance* dualism position, some would argue that the outcomes that we recognize as being above and beyond physical happenstance is merely the result of a specific property

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<sup>7</sup> Cf. Descartes, Rene. *Meditations on First Philosophy: with Selections from the Objections and Replies*. Translated by John Cottingham, Cambridge University Press, 2011.

of physical matter. In this way, property dualism differs from substance dualism because it does not require a separate substance, only separate non-physical properties. This distinction is crucially important for understanding the Cartesian position of dual substances, and the conflict of these two theories helps elucidate what a non-physical substance is. Whereas the property dualist says that our thoughts are merely non-physical properties of a fundamental, physical matter (i.e. the way our brain is structured), the substance dualist says that these recognizable non-physical properties must belong to some type of non-physical substance. To summarize: thoughts, emotion, and will (along with a host of other properties) are non-physical *properties* of a non-physical *substance*.

#### *Introducing the Problem of Interaction*

Descartes' ideation of these two distinct yet interacting substances produced the greatest problem for Cartesian Dualism: the problem of interaction (POI). Though the following chapter will provide a detailed analysis of this issue, the current section will work to establish the ongoing tradition of POI. Historically, Princess Elisabeth of Bohemia was one of the first to raise this problem for Cartesian Dualism. In her correspondence with Descartes, she noted that the Cartesian mind lacked properties traditionally applied to physical substances (e.g., specific location and divisibility). Furthermore, the contemporary understanding matter did not allow substances to interact if they did not have these specific physical properties. This paradox led her to question the causal interaction of the mind with the physical body?

Following in Elisabeth's tradition, Gilbert Ryle took up the POI argument in 1949 with his work *The Concept of Mind*. Ryle raised two questions: first, whether causation can be postulated without a theory of interaction, and second, how dualists would portray

the laws repressing interaction between physical and non-physical substances.<sup>8</sup> Much of his work followed the development of modern science. Though I will discuss this development in the following chapter, it is helpful to note that POI persisted (and perhaps became stronger) during this explosion of scientific knowledge. Furthermore, despite a reemergence of the dualistic position in the 1980s and 1990s (due to questioning of Ryle's POI formulation), POI continues to plague Cartesian Dualism today.

In addition, POI has not only survived to today's philosophical considerations, but has also seemed to become the predominating problem for Cartesian Dualism.

Summarizing many of the problems for Cartesian Dualism, William Lycan laid out the strengths and weaknesses of nine primary objections.<sup>9</sup> Of these nine problems, Lycan, a self-proclaimed materialist, finds that Cartesian Dualism can easily reply to many of the objections. Of the remaining objections with which Cartesian Dualism struggles, all reduce to some form of POI. In concluding remarks, Lycan finds that, POI still acts as a thorn to the Cartesian theory.

Even with the issue of POI, many modern philosophers and scientists have found the Cartesian Dualism framework attractive and useful in understanding the mind-body relationship. These include works which use dualism as a framework for analyzing other

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<sup>8</sup> Ryle, Gilbert. *The Concept of Mind*. Routledge, 2009, pp. 15, 103.

<sup>9</sup> Lycan, William G. "Giving Dualism Its Due." *Australasian Journal of Philosophy*, vol. 87, no. 4, 2009, pp. 551–563.

issues<sup>10</sup> or works which further the dualistic position via theory adjustment.<sup>11</sup> While the primary aim of this project is not a literature review, these works pay homage to the two primary topics of discussion: Cartesian Dualism and POI. Acting as bookends to this quasi-historical analysis, these modern authors realize something similar to what Princess Elisabeth and Ryle realized: POI is a serious problem for Cartesian substance dualism. Furthermore, given this long history and persistence in the literature, POI may always be a problem for this strong form of dualism.

### *Review of the Introduction*

In review, dualism is the theory that there are two types of things present in an explanation humans and their nature. Descartes' historically and academically important theory, Cartesian Dualism, has represented a large portion of philosophy and culture since his publication of *Meditations*. Even though his ideas prospered in certain circles, some objections have been raised to its credence. Of the multiple objections to Cartesian Dualism, the problem of interaction (POI) poses one of the greatest stumbling blocks to this idea. In its simplest form, POI questions whether two different substances, which obey opposite laws and have contradictory properties, can interact in a practical, causally relatable manner. From Princess Elisabeth to Ryle to many of the top philosophers of mind today, this problem is strong enough to dismiss Cartesian Dualism as metaphysical

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<sup>10</sup> Cf. Uzan, Pierre. "Deciding the Mind-Body Problem Experimentally." *Axiomathes*, vol. 27, no. 4, 2016, pp. 333–354, or Lee, Joseph. "Brain-Computer Interfaces and Dualism: a Problem of Brain, Mind, and Body." *Ai & Society*, vol. 31, no. 1, 2014, pp. 29–40.

<sup>11</sup> Cf. Engelhardt, Jeff. "Property Reductive Emergent Dualism." *Philosophia*, vol. 43, no. 1, 2014, pp. 63–75.

theory. In fact, even without a philosophical background, many cite the “mind-body problem” as reasons to be skeptical of the non-physical mind. Therefore, POI is seemingly intrinsically tied to Cartesian Dualism. While the two may forever be discussed as a pair, the purpose of this project is to investigate this succinct thesis question: is there truly a problem of interaction for Cartesian Dualism?

## CHAPTER TWO

### The Problem of Interaction

Building from the thesis question introduced in Chapter One – whether there truly is a problem of interaction for Cartesian Dualism – this chapter will parse POI. In the end, it will work to present a strong and persuasive “yes” answer to the thesis question, thereby formulating a strong objection to Cartesian Dualism. Toward the chapter’s conclusion, the “yes” answer will be so significant that it will be difficult to see how one could argue against the existence of POI.

#### *Initial Issues*

Understanding POI requires grasping two general components: first, POI in more detailed and explicit terms; second, how this problem relates to Cartesian Dualism. Following the explanation of these two components, two initial types of POI will naturally emerge: weak and strong - an explanation of these two types will follow shortly. For review, POI goes something like this: as the mind and the body are two different yet interacting substances under Cartesian Dualism, there seems to be an issue with the interaction between these two substances. The issue comes when considering that the mind, described by Descartes as primarily a “thinking thing,” does not share many of the most basic properties or form of physical things.<sup>1</sup> For example, physical things are divisible - one can physically separate the components of some physical thing and

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<sup>1</sup> Descartes, Rene. *Discourse on Method and Meditations on First Philosophy*. Translated by Donald A. Cress, 4th ed., Hackett Publ, 1998, p. 65.

properly describe these divisions as separate parts of the initial physical body. Another example is the mechanistic causality of physical bodies. Originally, interaction was thought of as the classic billiard ball interaction - one ball strikes another, causing it to move. As nonphysical substances are not extended in space, they do not interact in this manner and thus do not share the physical property of mechanistic causality.

Accordingly, nonphysical substances, particularly the minds described by Descartes, do not share typical physical properties. Nonphysical minds have separate sets of properties that both distinguish them from physical substances and result from the specific essence of the nonphysical. In his *Meditations*, Descartes described some of these properties. Using his philosophical analytical method, he questions, “But what then am I [referring to the mind]? A thing that thinks. What is that? A thing that doubts, understands, affirms, denies, wills, refuses, and that also imagines and senses.”<sup>2</sup> Each of these properties and actions (doubting, understanding, affirming, etc.) play a critical role in understanding what the mind is, because through these properties the essence of the nonphysical substance becomes clearer. The nonphysical is not some “concatenation of members...[nor] some subtle air infused into these members, nor a wind, nor a fire, nor a vapor, nor a breath”.<sup>3</sup> These are each things that are commonly confused with the nonphysical (such as gas or the “breath of life”).

These properties of the nonphysical mind describe the essence of a substance that seems to be particularly at odds with the physical body. This is initially how Elisabeth

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<sup>2</sup> Ibid., p. 66.

<sup>3</sup> Descartes, Rene. *Discourse on Method and Meditations on First Philosophy*. Translated by Donald A. Cress, 4th ed., Hackett Publ, 1998, p. 65.

developed POI - a complaint about the strangeness and impossibility of interaction between a physical and nonphysical substance. Leading from this initial outline of POI, there seem to be two paths the argument can take. The first is what I will call the weak argument. This argument is “weak” because this form of the problem asks a question meant to detract from Cartesian Dualism. This will be compared to the strong argument, which attempts to refute directly Cartesian Dualism.

### *Weak POI*

In order to contrast these two forms of POI, I will first present the weak POI and consider its strengths. Weak POI goes like this: Cartesian Dualism adequately describes the difference between physical and nonphysical substances, and it also posits that these two interact on a regular basis. However, Cartesian Dualism and the theories that have followed from it do little to describe *how* these two dissimilar substances practically interact. Furthermore, the theories for this interaction seem to stretch causality in uncomfortable ways. So, how do physical and nonphysical substances, understood in their fullest sense, interact? Scott Calef notes that this question can take the forms of: “How is mind-body interaction possible? Where does the interaction occur? What is the nature of the interface between mind and matter? How are volitions translated into states of affairs?”<sup>4</sup> As manifestations of the “how” question, these questions do more than raise curiosity. The “how” question is a type of POI: it is meant to detract from and add difficulties to the Cartesian Dualism understanding of human essence. Instead of drawing

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<sup>4</sup> Calef, Scott. “Dualism and Mind.” *Internet Encyclopedia of Philosophy*, [www.iep.utm.edu/dualism/](http://www.iep.utm.edu/dualism/).

a hard line in the sand that Cartesian Dualists must answer, it begins raising questions that are meant to derail the theory.

In addition to detracting from Cartesian dualism, it also begins setting up a convenient framework for materialism. By asking the question “how do two different substances interact?” this weak form of POI indirectly assumes a physical, (possibly) mechanistic causality framework - one thing strikes or extends to another thing, thereby interacting with it and causing change. One of the strongest and most simple theories available to answer this question is materialism. Via this theory, everything that brings about change in the human is already physical, so any event that takes place involving the human already has a built-in, physical, mechanistic explanation. This subtle suggestion acts as one of the strengths of weak POI - Cartesian Dualism goes down “negative-one point” and materialism goes up “positive-one point” because materialism can answer it simply.

When considering the overall strengths of weak POI, two attract attention. First, weak POI is straightforward and legitimate. The “how” question follows naturally from the proposal of a theory of interaction. Once one understands the nature of physical and nonphysical substances to their fullest degrees, one will likely see a problem for the interaction between the two and immediately be led to ask “how?” This question carries philosophical weight because, strictly stated, philosophy is the pursuit of wisdom and understanding. Arguing from the materialists’ position, understanding the “how” of materialism makes this position better than Cartesian Dualism – primarily because Cartesian Dualism has a harder time answering the question (because it posits to methods of changing physical matter). So, weak POI seems to have philosophical strength.

Second, via the assumption of strictly physical causality, weak POI acts as both an argument against Cartesian Dualism and an argument for materialism.

However, even with these two evident strengths, a Cartesian Dualist could provide rebuttal to the “how” question. Though I will discuss this rebuttal in following sections, it seems like POI should do more than question Cartesian Dualism. It does just this in another, arguably stronger, form of POI. This remaining form, which I call strong POI, delves further into the understanding of physical and nonphysical substances, relying on each to refute directly the proposal of an “interactionist” substance dualism. So, while weak POI could be the sole focus of a philosophical argument against Cartesian Dualism, the longstanding tradition of POI implies something stronger. This strong POI, analyzed in the following section, comes closer to the crux of the issue surround interaction and Cartesian dualism.

### *Strong POI*

This section outlines the second iteration of POI - the strong argument. It begins by establishing what makes this argument “stronger,” and it ends with an explanation of mechanistic physics to support POI.

Following a similar line as weak POI, strong POI carries the argument one step further, relying on the defining features of physical and nonphysical substances to reject (or attempt to reject) Cartesian Dualism. I have called this form of POI “strong” because of its direct rejection of Cartesian Dualism. Instead of questioning the theory (and thereby challenging it), strong POI points to a supposed flaw in the theory and exploits this flaw to explain why Cartesian Dualism could not possibly be true. The strong argument goes like this: physical substance requires mechanistic interaction. These mechanistic

pathways follow the classical definitions of physical substance, which includes extension, location, and divisibility. However, nonphysical substance interacts with physical substance and causes events via non-mechanistic pathways. It does not possess the characteristics required to interact with the physical. Based on this mechanistic understanding of the physical and nonphysical, it is impossible for the nonphysical to interact with or cause events in the physical. Thus, Cartesian Dualism cannot account for causality, and it must be false.

As a key component of strong POI, mechanism requires an accurate understanding. One concise explanation of mechanism comes from Todd Buras: “To give a mechanistic explanation of some phenomena (e.g. change in location) is to cite a property of an object (e.g., the mass of a body) together with a natural laws (e.g., Newton’s inverse -square law) describing how things with that property regularly behave...Mechanistic explanations thus tell us what we can expect to happen automatically and, as it were, of its own accord.”<sup>5</sup> Buras also notes that these mechanistic explanations, which stand as the primary explanations of science, should tell one what will happen given a specific set of conditions and the laws that correlate with these conditions. According to his model, mechanism can be boiled down to this formula:

$$\text{Phenomena} = \text{Object Property} + \text{Natural Law}$$

For the purposes of this paper, phenomena are the events (e.g., retracting one’s hand from a hot stove) that result from the objects’ properties (e.g., the heated stove and sensitivity of human skin) combined with a natural law (e.g., the transfer of heat via

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<sup>5</sup> Buras, Todd. “On the Failures of Naturalism.” *Review & Expositor*, vol. 111, no. 3, 2014, pp. 259–273.

conduction). As it relates to strong POI, mechanism provides a complete and physical explanation for events that occur. These complete explanations, in a way, close off the causality of the physical realm to solely physical objects and laws.

Flowing from mechanism's causally closing the physical, strong POI argues that a proper understanding of physical and nonphysical substances leads to the conclusion that it is impossible for them to interact. Strong POI makes this argument in two ways. First, as defined by Descartes himself, physical substances have a specific set of characteristics that explain how they exist in the physical world.<sup>6</sup> These characteristics include: extension, which is the property of taking up space across multiple dimensions; spatial location, which is the solid and singular location of the object at one place at one time; and divisibility, which is the ability to be divided up into fragments or smaller pieces. Even though physical substances have many additional characteristics, these three are the most important to strong POI because they describe the properties that prevent physical substance from interacting with the nonphysical.

In contrast, nonphysical substances do not have extension. They do not have a specific spatial location. They are indivisible. By the very nature of physical substances, with their extension, location, and divisibility, events occur. Nonphysical substances do not have these properties, so they do not have what it takes to cause events to occur. Following this line of reasoning, strong POI states that things in the physical realm cannot interact with things in the nonphysical realm. Therefore, more than simply stating that there is no need for the nonphysical substances to act on the physical, strong POI

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<sup>6</sup> Descartes, Rene. *Discourse on Method and Meditations on First Philosophy*. Translated by Donald A. Cress, 4th ed., Hackett Publ, 1998, pp. 92-96.

states that it is impossible for the two to interact. This impossibility forms the first attempt at a direct refutation of Cartesian Dualism.

### *Initial Rebuttal*

As part of any sound argument, Cartesian Dualism must be allowed room to reply to this criticism. This initial rebuttal (on the part of the dualist) begins with a short recap of POI. To review, weak POI is the philosophical argument attempting to detract from Cartesian Dualism and provide a basis for materialist position. Strong POI is the direct attack on Cartesian Dualism that states the impossibility of physical and nonphysical substance interaction. Both arguments attempt to derail and end Cartesian Dualism, and they do this by picking on one of the key parts of the idea. Descartes' theory went beyond stating that two different substances are systematically correlated in the human. In fact, one of the boldest and most important parts of his theory was that these two substances interact and cause some event (whether that event occur in the physical or nonphysical realm). Plainly stated, Cartesian Dualism is implausible without the interaction of the two substances. So, by attacking interaction, POI attacks the very core of Descartes' argument. Although POI argues against Cartesian Dualism in somewhat of a roundabout manner, either by questioning interaction or using the characteristics of each substance to state that interaction is impossible, it does eventually attempt to bring down Descartes idea.

With this understanding established, both the weak and the strong forms of POI do not seem to do justice to this large problem surrounding Cartesian Dualism. Many commonsense intuitions (which can be translated into strong philosophical arguments)

seem to detract from both the weak and the strong forms of POI. The following is a short outline of what may be called initial rebuttal to POI.

Beginning with the weak POI argument, there are two ways to rebut the premises. First, without the large assumption that causality can be reduced to physical mechanisms, there is no reason to fear the “how” question behind the POI argument. In fact, one of the only reasons the question of “how do two different substances interact” poses a problem to Cartesian Dualism relies upon an assumption that there indeed are two different substances. The issue for weak POI is that assumptions about the finality of causality like this typically end up being wrong. One example to support this claim is the introduction of electromagnetic forces to the body of physical science. Breaking the mold of the widely accepted “billiard-ball interaction,” whereby an event only takes place if one item strikes another, electromagnetic forces introduced a non-contact, causally significant type of interaction to the physical realm. This is an example of a new type of force breaking the mold of previous assumptions on physical interaction.<sup>7</sup>

The second way to rebut the premises of weak POI is to claim that asking “how” does not pose a significant issue to the Cartesian Dualism theory itself. It seems possible that one can both admit the importance of the “how” question to a philosophical understanding and also gravitate toward a theory that does not fully answer this question. Typical replies to this type of problem might include: “philosophy has not progressed enough to understand the how behind this theory,” “many other widely accepted physical

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<sup>7</sup> Using Newton’s gravitational force may provide a better example of a force breaking the traditional model of forces. Indeed, gravity is still mainly understood in terms of relationships. However, the understanding behind electromagnetism is more established in scientific literature, so I utilized this example.

theories do not answer the how question,” and “a sketchy how question is not strong enough to be a serious detractor from Cartesian Dualism.” Moreover, many beliefs existed long before the “how” underlying the belief was answered (e.g., people understood that the sun burned long before they understood the “how” behind the mechanism).

However, even with these contrary arguments, strong POI stands firm. This may not be the case, though, after the consideration of how science has progressed. The strong POI argument, as previously related, relies on a mechanistic view of causality. More specifically, under this theory, physical contact and the imparting of energy via interaction cause events. This was a foundational theory of science for some time. Returning to the previous example of electromagnetic forces, one will quickly understand that this form of mechanism is not what stands today.

If mechanism were the ruling theory of causality, there would be no room for an electromagnetic force, because this type of force does not imbue change via physical contact. While it does not seem impossible that physicists could discover some particle that does, in fact, travel between opposite magnetic poles (thereby obeying a mechanistic understanding of causality), science does not seem to be moving in this direction. Regardless, electromagnetic forces break the traditional, mechanistic mold of “physical causality” upon which I crafted the first iteration of strong POI. Therefore, even though electromagnetic forces are not a formal philosophical argument against strong POI, they do bring to light an interesting development: science no longer follows mechanism. Gone are the days of solely “billiard-ball interaction.” If mechanism no longer leads the

scientific community's theory of causality, the strong POI argument holds little weight against Cartesian Dualism.

### *Reply to Rebuttal*

In order to continue this philosophical dialogue and salvage POI, a materialist may reply that this rebuttal does serious damage to both weak and strong POI. There may be no way to save weak POI. While serious strides have been made to detract from Cartesian Dualism by formulating the "how" question in a specific way, the Cartesian Dualist should always be able to reply in a similar fashion to the mentioned rebuttal. Lycan considered this problem and reached a similar conclusion, rationalizing that the lack of a concrete theory of causality for many events makes it difficult to attack dualism from this angle.<sup>8</sup> This pathway seems closed for the current project.

Similarly, the materialist could note that it is difficult to bolster the strong POI argument in light of the fall of mechanism. The physical theory of mechanism was more than a crutch to strong POI - without it, this iteration fails. The one sliver of hope that remains for this form of strong POI might be the unity of science hypothesis, purported by Paul Oppenheim and Hilary Putnam. As this duo argues, if all scientific theories and laws reduced to one single discipline or understanding, this would, in a sense, reduce the understanding of interaction to some elementary causal relation. Working from a physicalist understanding of matter, a reduction of this type would render the nonphysical

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<sup>8</sup> Lycan, William G. "Giving Dualism Its Due." *Australasian Journal of Philosophy*, vol. 87, no. 4, 2009, pp. 551–563.

matter of Cartesian Dualism useless, or, at least, causally inconsequential.<sup>9</sup> However, as with weak POI, this argumentative path seems closed for the moment, as no unity of science has been reached by philosophical or scientific disciplines.

Despite this rebuttal, the ending of these two formulations does not mean the end of POI in general. Just as the advent of modern physical theories meant the demise of mechanism, this same progression of physical theory proved to be a tool for the precision of POI. David Papineau brings light to this development in the appendix of his work *Thinking about Consciousness*. Here, Papineau points out that, despite modern-day assumptions, the closure of the physical realm via the conservation of energy has not always been a “settled theory.”<sup>10</sup> In fact, up until the latter half of the 19th century, scientists left substantial room for non-conservative forces (i.e., those that appeared to destroy or create energy) in physical theory. However, two key scientific discoveries changed this view.

First, physicists analyzing motion and the interaction of particles began noticing a trend - the sum of kinetic and potential energies of interacting particles remained relatively constant. Specifically, according to Papineau, “Jean d'Alembert (1717–83), Joseph Louis Lagrange (1736–1813), the Marquis de Laplace (1749–1827), and William Hamilton (1805–65), developed a series of mathematical frameworks...that, under certain conditions, [implied] the sum of kinetic energy and potential energy remains

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<sup>9</sup> Putnam, Hilary, and Paul Oppenheim. “Unity of Science as a Working Hypothesis.” *Minnesota Studies in the Philosophy of Science*, vol. 2, Oxford University Press, 1958, pp. 3–35.

<sup>10</sup> Quotation marks included because some do not consider this case closed, cf. Collins, Robin. “Modern Physics and the Energy-Conservation Objection to Mind-Body Dualism.” *American Philosophical Quarterly*, vol. 45, 2008, pp. 31–42.

constant”.<sup>11</sup> In other words, no other theory up until this point had limited the scope of energy expenditure in such a way as to imply that all energy is conserved. However, this estimation did not complete the formulation, because certain physical forces, such as friction, seemed to disobey the conservative rules required by these physicists.

The second key scientific discovery was the union of heat and mechanical energy. Until the early 17th century, there had been no explanation for why forces like friction seemed to destroyed energy (i.e., slow a moving body), while other forces, such as momentum, seemed to transfer energy seamlessly between moving bodies. However, scientists such as James Joule began noticing that a proportional amount of heat was produced in each one of these seemingly “non-conservative” interactions. This discovery, that eventually translated to the interpretation of heat as the missing energy, was one of the final steps in developing a universal principle of the conservation of energy.

Returning to the POI argument, this universal conservation principle created the environment for two premises for the stronger POI argument. Via the universal conservation principle, there simply is no room for a “special force” (e.g., a non-physical mind or substance) to introduce energy to a physical system. This understanding led to a general conception that energy, both micro- and macroscopically, is a constant - it is neither created nor destroyed. Furthermore, it is all “discoverable” in the physical realm. This conception, when furthered by philosophy, led to the creation of two premises. Outlined by Buras, they are: “...the *causal closure of the physical*: every physical effect has a complete physical cause...[and] a *causal exclusion principle*: if physical effects

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<sup>11</sup> Papineau, David. “The Conservation of Energy.” *Thinking about Consciousness*, Oxford University Press, 2002, p. 244.

have complete physical causes, they have no other causes”.<sup>12</sup> Working from these two premises, philosophers such as Papineau created the strongest form of POI available today.

This “stronger” strong POI argument, which seems to create the biggest stumbling block for Cartesian dualism, progresses from this history of scientific discovery and works through the two premises to argue that Cartesian Dualism is fatally doomed. In one sense, it is the culmination of all scientific understanding to this point in time. So, I will call it culmination POI, or cPOI for short. The argument follows this line:

1. Via the causal closure of the physical, every physical event has a completely physical cause.
2. Via the causal exclusion principle, if an event has a complete cause, it has no other cause.
3. Therefore, it is impossible for the mind to cause a physical effect, and Cartesian Dualism is false.

*Conclusion: Culmination POI*

As outlined, cPOI creates a weighty challenge for Cartesian Dualism to answer. It stands as perhaps the biggest challenge to Descartes’ idea, for while many have proposed various iterations of POI, most have failed in creating a serious, philosophical issue. This weight is due to the progression of scientific knowledge, especially in the 17th, 18th, and 19th centuries. This progression gave birth to two premises that led to the conclusion that his theory must be false. The causal closure of the physical, when paired with a causal

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<sup>12</sup> Buras, Todd. “On the Failures of Naturalism.” *Review & Expositor*, vol. 111, no. 3, 2014, p. 263.

exclusion principle, eliminates the possibility of there being a second, causally-significant non-physical substance (i.e., the mind). In this pointed, indubitably challenging POI argument, it seems that there is no way for Cartesian Dualism to survive unless some development of the physical sciences allowed for its reconsideration.

However, unquestionable philosophical arguments are rare, and, even if this argument seems strong and durable, there may be some snag in its fibers. While Papineau would readily admit that his argument is open to critique, the act of doing so reveals that there are serious contenders on both sides of his argument. Of course, a well-rounded philosophical approach must include considerations against the point of argument, and these considerations are what will make up the core of the next chapters.

## CHAPTER THREE

### Epiphenomenalism

In the remaining chapters, I will outline two replies to Papineau's cPOI. This chapter will both analyze the extent of cPOI and provide the first reply. By analyzing the extent of cPOI, I will show that accepting the two principles, i.e., causal closure and causal exclusion, entails the initial problem for this argument. This first problem with cPOI is that accepting it necessitates accepting a position called epiphenomenalism. Soon I will explain exactly what this term implies. As a precursor, epiphenomenalism is the uncomfortable position that the cPOI materialist inevitably must accept. What follows is the explanation of why this position is not a good place to be.

#### *Accepting culmination POI*

First, one must understand what it means to accept the two principles: causal closure of the physical and causal exclusion. Interestingly, Papineau admits that one could reject the principles, though he eventually argues that one should accept them. However, he does not fully show the reader what accepting the two principles requires. Carrying the principles to their logical conclusions prepares the first major rebuttal to cPOI.

To review, I outlined cPOI's key argument, namely that the causal interaction involved in Cartesian Dualism is impossible because of the causal closure of the physical and the causal exclusion principle. With these two premises firmly established, Papineau argues that it is impossible to accept the claims of Cartesian Dualism. He makes this

argument in appendix notes on the historical development of the conservation of energy principle. Of course, the argument does more than just counter Cartesian Dualism.<sup>1</sup> In fact, much like weak POI, which utilized a physicalist assumption to argue for materialism, Papineau's argument established a basis for an argument for a materialist theory. So, in the same act of attempting to prove Cartesian Dualism false, Papineau readies for the prompt entry of a materialist theory.

Interestingly, with this shift to a materialist theory, Papineau recognizes that his two premises may be rejected. In fact, he provides one good reason to reject them. This is an intrinsic part of his argument in a small section, titled "A Possible Cure for Epiphobia," of chapter one of *Thinking about Consciousness*. In the previous section, he had outlined a serious objection to his POI formulation - by his two premises, it seems like certain mental states, viz. pain, would play no role in the behavioral outcome of a subject. He uses the example of a headache's pain causing one to take aspirin. He admits in the previous section that it would be rational to deny his two premises as, intuitively, people take aspirin because of the pain from the headache. Because pain is not fully identified as a physical state (even octopuses, which are very dissimilar from humans physiologically, seem to feel pain and seem to respond to this pain in similar manners) it would appear that something non-physical is causing a physical event. Therefore, the causal closure of the physical seems impossible. However, in technical analysis, he explains that one should still accept the premises by granting general causal powers to the pain and identifying the pain as a token of a physical state. Though Papineau believes this

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<sup>1</sup> Papineau, David, *Thinking about Consciousness*, Oxford University Press, 2002, pp. 232-250.

explanation saves the cPOI argument, it in fact begins opening a hole for the first rebuttal.

### *Identity Theses*

In order to explain how this hole in the argument is a problem for cPOI, I must do three things. First, I will explain how accepting cPOI leads to a token identity thesis. Second, I will explain different types of identity theses, eventually reaching the type used by Papineau's cPOI. Third, I will show how token identity leads to supervenience and epiphenomenalism. Because the end goal is reaching the troubles of cPOI, the end of this section will work as a transition to establishing the first objection to cPOI.

To see how cPOI runs into this first problem, one must realize that the argument Papineau developed works strongly as an argument for a type of identity thesis. The prominent link between these two ideas (cPOI and identity thesis) falls on the crucial premise of Papineau's argument, the causal closure of the physical. In a preliminary step, this premise was used to argue that no event in the physical world could causally result from a non-physical property or substance. However, this principle does more than take away the causal power of non-physical substances.

As Papineau argues later in his work, this theory means that anything that plays a causal role in the events of the physical world must have a physical grounding (i.e., a physical substance to obey physical laws). In other words, whatever makes up the causal properties of an event must be *identified* with physical substances. This is the basic idea behind identity theses, of which I will analyze the main types that relate to this argument; however, it is important to realize that identity theses arose nearly three decades before Papineau published his argument. With these theses in mind, Papineau clearly meant his

cPOI argument (sometimes called the causal argument) to be both an objection to Cartesian Dualism and an argument for materialism.

The “pro-materialism” portion of Papineau’s cPOI results from his laying the groundwork for a strong materialist ontology (i.e., the part of materialist theory that explains “the nature of things”). Thomas Hofweber cleanly defines the purpose of ontology: “first, [to] say what there is, what exists, what the stuff of reality is made out of, secondly, [to] say what the most general features and relations of these things are”.<sup>2</sup> Hofweber’s definition sums up what the identity theses do, as each individual thesis in this field attempts to explain what types of substances and properties exist (in reality), and, secondly, how these substances and properties interact.

For how elegant materialism theorists purport their position to be, identity theses can be quite technical and nuanced. The purpose of this project is not to explore every identity thesis, but understanding the one that relates to the cPOI argument sets the stage for a proper objection to this argument. The identity thesis of interest is the token-identity thesis<sup>3</sup> (hereafter referred to as the TI thesis). Buras summarizes the TI thesis as “the claim that everything that instantiates any property at all instantiates physical

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<sup>2</sup> Hofweber, Thomas. “Logic and Ontology.” *The Stanford Encyclopedia of Philosophy*, 2017, plato.stanford.edu/archives/win2017/entries/logic-ontology/.

<sup>3</sup> The precedent and previously prominent thesis was the type-identity thesis. Cf. Smart, J.J.C. “The Mind/Brain Identity Theory.” *The Stanford Encyclopedia of Philosophy*, 2017, plato.stanford.edu/archives/spr2017/entries/mind-identity/, for a detailed delineation between the two; cf. Buras, Todd. “On the Failures of Naturalism.” *Review & Expositor*, vol. 111, no. 3, 2014, p. 269, for a straightforward explanation of why token- replaced type-identity thesis.

properties”.<sup>4</sup> For the materialist, this idea means that all properties (whether physical or non-physical) must be identified by some *physical* state. Specifically, token identity allows the physical state to be different across different times, places, and things. For the token-identifier, the pain I experience when I stub my toe is the same pain you or an artificially-intelligent robot experiences when you or the robot stub your toes, even though each physical state is most likely somewhat different. Pain, the non-physical property, is consistent across the differing physical states because of the token-identification of pain with a certain physical state.

A common part of the token-identity thesis is a dependency claim, which makes its way into the materialist ontology partly because of the causal closure of the physical. According to Buras, “the dependence claim adds that the non-physical properties of things are dependent upon or fixed by the physical properties”.<sup>5</sup> This claim may be self-evident to the materialist position, as my exposition has worked from the causal closure of the physical to identity theses; however, without this fundamental premise, there would be no reason to believe that identification could not work in the opposite direction, i.e., from the non-physical property to the physical state.

For clarification, consider the pain example. The TI thesis identified pain as the non-physical property that was directly determined by a certain token physical state. Thus, the physical state bore the causal load. Without the dependency claim, we could have envisioned an example of a non-physical property bearing the causal load in

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<sup>4</sup> Buras, Todd. “On the Failures of Naturalism.” *Review & Expositor*, vol. 111, no. 3, 2014, p. 268.

<sup>5</sup> *Ibid.*, p. 268.

identifying a physical state. Obviously, this would contradict the materialist premise (because non-physical properties would have causal powers), so the materialist must add the dependency claim when working with identity thesis. Of course, materialists have a term for this part of their theory.

The idea that non-physical properties are always dependent upon physical substances is referred to as supervenience. As an abbreviated explanation of this idea, consider a one-way road. At one end of the road is the token physical state, and at the other is the non-physical property (for simplicity, consider pain). The non-physical property of pain is completely dependent upon the physical state, which is at the other end of the one-way road. There are no side paths or detours that allow the pain to contribute anything back to the physical state. Thus, pain is completely dependent upon the causal driver, i.e., the physical state. Another thought experiment is to consider two different worlds that are exactly alike in all their physical states and compositions. Supervenience says that these different worlds would also be exactly alike in respect to every other (non-physical) property. The seemingly beneficial aspect of supervenience is that it allows non-physical properties/states to exist while still maintaining the strong materialist theory that the physical is both ontologically prior and causally closed. In addition, with the dependency claim, the materialist can avoid becoming a full property dualists. Instead, they go by a different name: epiphenomenalists.

### *Epiphenomenalism*

The purpose of this short section is to elucidate the epiphenomenal theory as it pertains to the cPOI argument, beginning the transition to the first objection to cPOI, viz. the “hard problem of consciousness” and the “explanatory gap.”

Epiphenomenalism, the theory that non-physical states and properties exist without causal powers, is one of the primary ways materialists acknowledge the existence of non-physical states (such as pain) while maintaining the causal closure of the physical. The purpose of this project is not to focus on epiphenomenalism,<sup>6</sup> but its implications begin an initial objection to cPOI. The key to this theory is that it purports that all physical states and events are entirely explained by the physical. In other words, per the TI thesis, any time a mental property occurs, there is also a physical property or substance which instantiates that non-physical property. Any experience of pain (or other non-physical states, such a happiness, sadness, fear) is an experiential “dangler” resulting from the physical state one embodies. The epiphenomenalist states that though we would like to believe our experience of pain leads us to avoid some action, we are, in fact, avoiding an action only because of the physical effect and state. One way to argue this point is to show how certain non-conscious actions work.

Consider the reflex argument:<sup>7</sup> our actions are, in some sense, causally dependent upon the actions of the central and peripheral nervous systems. Some of our actions, such as the patellar reflex, are reflexive, i.e., they are non-conscious actions that occur without our preconception. Furthermore, some configuration of our body’s inner-physical state allows these actions to occur. Mechanistic explanations work to explain how the inner structure of our bodies fully account for the jerking of my knee at the doctor’s office (the

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<sup>6</sup> For a fuller outline of the this theory, read Robinson, William. “Epiphenomenalism.” *The Stanford Encyclopedia of Philosophy*, 2015, plato.stanford.edu/archives/fall2015/entries/epiphenomenalism/, which outlines the basic thesis, objections, and replies of this idea.

<sup>7</sup> Derived from Buras, Todd. “On the Failures of Naturalism.” *Review & Expositor*, vol. 111, no. 3, 2014, p. 266.

patellar reflex). Therefore, mechanism entirely explains reflexes - this certain class of actions. With this complete description for certain actions that indubitably occur without mental, phenomenological dangling states, what is to keep one from exhaustively describing every action in terms of the physical states that surround it? It would certainly be a harder task, one that required a greater understanding of the higher-level brain and different physical states, but it seems very possible. In other words, it seems like the advance of scientific understandings of physical states and properties would allow one to explain the causation of consciousness (and actions that seem to derive from conscious thought) in purely physical terms.

In a way, epiphenomenalists can already provide these explanations (even if they lack scientific backing) by relying on functionalist understandings of consciousness. In short, a functionalist definition of a mental state (i.e., conscious state) would be: mental state Y is whatever derives as a *function* of physical state X. For example, “a functionalist theory might characterize pain as a state that tends to be caused by bodily injury, to produce the belief that something is wrong with the body...”<sup>8</sup> In this example, one would be able to provide a mechanistic-like explanation (which would eventually replace the functional definition of pain) to describe the conscious state of being in pain, similar to providing a mechanistic explanation for the patellar reflex. All that is required for this exhaustively-physical explanation is the progression of scientific understanding of the physical.

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<sup>8</sup> Levine, Janet. “Functionalism.” *The Stanford Encyclopedia of Philosophy*, 2016, plato.stanford.edu/archives/win2016/entries/functionalism/, pp. 2-3.

Thus, epiphenomenalism is the theory that conscious states are not causally efficacious. With this understanding of consciousness comes the first major objection to cPOI. Here, it takes the form of the question, “can one entirely define consciousness by these physical inputs and outputs?”

### *The Qualia Argument*

Up until this point, this chapter has analyzed what the cPOI argument entails, concluding an epiphenomenalist understanding of human consciousness. Now, we will return to consciousness to see if epiphenomenalism fully explains this phenomenon. One way to consider epiphenomenalist theory is to compare it to how a computer works. Computers provide output depending on specific inputs. Epiphenomenalism considers consciousness a type of output (like the output of a computer) from a specific physical input. For example, physical state X leads to physical state and property Y with the potential for a non-interfering, non-physical, conscious phenomenon Z. Z is the output. This is the basic understanding of the epiphenomenalist position - that a type of materialist mechanism must completely describe consciousness in physical terms. Thus, one returns to the “causal closure of the physical premise” and the “causal exclusion principle” of cPOI. However, this does not seem to explain consciousness in its entirety - some aspect of consciousness exists outside this mechanism-like explanation.

Instead of jumping straight to what that missing piece is, one must first understand the philosophical idea of qualia. Consider these examples: when viewing the color blue, you have a certain experience; when tasting a homemade cookie, you have a certain experience; when hearing Beethoven’s 5th Symphony, you have a certain experience. These acts, and nearly any act we make, is accompanied by some type of

experience. Put another way, there is “something it is like” to see blue, taste a cookie, and listen to Beethoven. That “something” that these experiences “are like” is what philosophers call qualia. Qualia are “the introspectively accessible, phenomenal aspects of our mental lives”.<sup>9</sup> In other words, the qualia blue is what people experience when they look at something blue. People do not see a blue object and consciously recognize 470 nanometer wavelengths of light. When people see blue, they “experience” seeing blue.

Qualia are the crux of the first objection to cPOI. As previously examined, cPOI inevitably leads to an epiphenomenalist position - people have conscious experiences, yet these conscious experiences play no causal role. The only way to allow these supervening conscious experiences is to identify them (via the token identity thesis and dependency claim) with some physical state or property, presumably setting the stage for a physically-exhaustive, mechanistic-like explanation for consciousness. The problem with this line of reasoning is that physical, mechanistic-like explanations, which are purported to be exhaustive, do not explain qualia. Qualia are the missing piece of conscious experience. Put another way, there is at least one aspect of consciousness, viz. the intrinsic phenomenal character of experience, that these physicalist theories cannot explain.

While the underlying objection this raises to cPOI is generally the same across most works, this problem has taken two iterations in philosophical literature, outlined here as a summary of the initial objection to cPOI. The first iteration (in the progression of ideas, but not chronologically) of this problem is the “hard problem of consciousness,”

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<sup>9</sup> Tye, Michael. “Qualia.” *The Stanford Encyclopedia of Philosophy*, 2017, plato.stanford.edu/archives/win2017/entries/qualia/, p. 1.

coined by philosopher David Chalmers. Chalmers creates a dichotomy of easy and hard problems surrounding consciousness. To him, the “easy problems” are those that could be explained by some type of psychological or neurobiological science. These include “the ability to discriminate, categorize and react to environmental stimuli; the integration of information by a cognitive system; [and] the repeatability of mental states.”<sup>10</sup> In other words, to Chalmers, these are the types of problems that could eventually be explained physically. However, he recognizes that there is at least one problem of consciousness, viz. the qualia problem, that resists a scientific, physical explanation. He forthrightly states, “the moral of all this is that *you can’t explain conscious experience on the cheap,*” meaning that regardless of what science you use,<sup>11</sup> you will still end up running into an issue.

The issue you run into is the problem of describing the uniqueness of consciousness. This simply cannot be done by strictly scientific means. Eventually, Chalmers relies on non-reductive explanations (i.e., those that do not purport to explain everything with a basic, physical explanation that is seemingly required by cPOI), but these explanations have problems themselves.<sup>12</sup> The main takeaway from this work is that some aspects of consciousness cannot be explained adequately in the traditional

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<sup>10</sup> Chalmers, David, *The Character of Consciousness*, Oxford University Press, 2010, p. 4.

<sup>11</sup> Ibid., p. 15. Previous to this statement, Chalmers quotes methods such as neurobiology, nonlinear and chaotic dynamics, and quantum mechanics.

<sup>12</sup> Jaegwon Kim creates a strong argument against non-reductive materialism in Kim, Jaegwon. “The Myth of Nonreductive Materialism.” *American Philosophical Association*, 1989.

materialist manner. These types of explanations fail because the materialist way of defining consciousness does not account for *differing* (i.e., intrinsic) experiences of the conscious in physically identical situations. To reach this conclusion, Chalmers invokes a thought experiment in which zombie versions of people, exactly like those people in every physical aspect, lack the conscious experience of those people. In this case, though the physical states are identical, the non-physical states differ.

Chalmers' formulation of qualia is one starting point, but there is more to add to the argument. Though previous to Chalmers' work chronologically, the next iteration<sup>13</sup> derives from Thomas Nagel's hallmark article on qualia, "What is it Like to be a Bat."<sup>14</sup> While it appears to assert the same point as Chalmers' case, his argument takes a slight intellectual step. Nagel's argument goes like this: with the advance of current zoological anatomy and veterinary medicine, humans can, in a sense, understand everything there is to know physically about a bat. They can understand the specific hormones that dictate bat hunger, understand the somatic neurons that control flight, and understand all the synapses that fire as a bat flies to find food. However, no understanding of the physical facts about a bat will lead one to understand the subjective experience of the bat, primarily because the bat relies on sensory experiences that humans do not utilize, such

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<sup>13</sup> Without having read these authors' two separate arguments, it may confuse the reader as to why I listed them in this order of iteration: Chalmers seems to leave something out of the qualia argument that Nagel's argument includes, viz. the *subjective* character of qualia. By leaving out this small piece of the qualia argument, Chalmers is able to argue to a non-reductive materialism, thereby maintaining the two premises of cPOI. His is the first iteration because Nagel's appears to build on it and complete it by including this missing piece (a piece that ultimately prevents non-reductive materialism).

<sup>14</sup> Nagel, Thomas. "What Is It like to Be a Bat." *Philosophical Review*, vol. 83, 1974.

as echolocation. Thus, a physically exhaustive description of the bat will not capture the whole essence of the bat's consciousness - it will miss the subjective qualia, if there are any at all. Therefore, physicalist explanations are not complete.

For the purposes of this project, Nagel's conclusion means that since the physical explanation does not exhaust the current understanding of consciousness (its intrinsic, *subjective* states), physicalism must be false. To borrow another philosopher's term, this falsehood results from an explanatory gap, i.e., there are facts that are not entailed by physical facts, so there is no way to explain these facts by means of physical facts.<sup>15</sup> Though these non-physical facts are significant, they do not directly rule out the causal closure of the physical. However, using the materialist's primary rebuttal to the qualia argument, I will show how the qualia argument makes causal closure (and, therefore, cPOI), at best, counterintuitive.

### *Materialist Rebuttal and Reply*

This section outlines the best available materialist defense of cPOI to the qualia argument. Following this materialist rebuttal, I will provide a reply that is common to the qualia argument defenders.

One item that has lacked thus far from the qualia argument is talk of causality. This is the primary place materialists may rebuke the qualia argument. Their strongest rebuttal may go something like this: yes, materialists struggle with explaining qualia. This is the fault of a strongly materialist position. However, the qualia argument does nothing to counter the cPOI argument, primarily because the qualia argument does

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<sup>15</sup> Cf. Levine, Joseph. "Materialism and Qualia: The Explanatory Gap." *Pacific Philosophical Quarterly*, vol. 64, no. 4, 1983, pp. 354–361.

nothing to give qualia causal powers. As reasoned in the last chapter, the two principles of the cPOI argument were the *causal* closure of the physical and the *causal* exclusion principle. Both premises rely almost totally on a proper understanding of causality. Therefore, qualia do nothing to damage the cPOI argument. Furthermore, if one is forced to explain qualia, there is always the retreat to epiphenomenalism. In fact, that was the original purpose of the epiphenomenalist theory - to allow non-physical mental states (call these qualia for now) while stripping them of their causal power. Indeed, since the qualia argument made no substantial point of giving qualia causal powers, there is no reason to believe that qualia and cPOI cannot co-exist.<sup>16</sup>

This line of reasoning is the strongest rebuttal readily available to the materialist. This position, biting the “intellectual bullet” and stripping qualia of their causal powers, does seem better than the two other rebuttal options available: either denying the existence of an explanatory gap<sup>17</sup> or denying the existence of qualia at all.<sup>18</sup> While this project does not set forth to describe every rebuttal to the qualia argument, it seems as though most materialists, when pushed for a position, lean toward the epiphenomenalist position, thereby avoiding the major pitfalls of non-reductive materialism and qualia

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<sup>16</sup> In *Thinking about Consciousness*, Papineau explains that these two components may co-exist. He does this by showing that there must be some “higher” properties (i.e., a higher conscious cause) of the mental state that “are realized by the physical causes of their physical effects.” He calls this group of “higher” properties “functional higher-order properties.”

<sup>17</sup> Although not a particularly strong argument, cf. Chalmers’ non-reductive materialism argument in Chalmers, David. “Facing up to the Problem of Consciousness.” *The Character of Consciousness*, Oxford University Press, 2010.

<sup>18</sup> Cf. Dennett, Daniel C. “Quining Qualia.” *Consciousness in Contemporary Science*, 1988, pp. 42–77.

oblivion. So, what can a defender of Cartesian Dualism say when faced with the materialist's rebuttal?

First, the Cartesian dualist must admit that the qualia argument is not an official refutation of materialism in general. Likewise, it is neither an official refutation of the causal closure of the physical nor the causal exclusion principle. In fact, all the qualia argument does is push the materialist closer to the brink of dualism, i.e., a supervenient, property dualist position that materialists like to call epiphenomenalism. The purpose of using the qualia argument as a prod to epiphenomenalism is twofold. First, it forces the materialist to admit that some sort of property dualism most accurately describes human nature (which, inevitably, is a weakening of the materialist position). Second, and more important to this project, the qualia argument points out the flaw of epiphenomenalism that detracts from the cPOI argument.

The flaw that develops from epiphenomenalism is simply the fact that under this theory, human beings do nothing because of or resulting from a mental state. For example, people do not take a drink of water because they have the mental state of being thirsty, but rather, they take a drink of water because of the physical state they are in, and their conscious, subjective experience of thirst is merely a dangler in the causally closed system. This line of reasoning is not a direct refutation of epiphenomenalism, as the rebuttal of this section pointed out; however, it serves to point out the counterintuitive nature of epiphenomenalism. Via epiphenomenalism, no action I take and no mental state I have results from a conscious, mental state.

What is more counterintuitive than that position? That means that I do not run from a bear because I am scared or get a drink of water because I am thirsty. Simply put,

my physical body is living without my conscious, reason-based input into the equation. Admittedly, the qualia argument does not contradict the epiphenomenalist position, which would thereby transitively counter the two premises of cPOI. What it does do is point out that, at best, the premises of the cPOI argument are counterintuitive (therefore, there is good reason to think one or the other is false). However, in a world where mental intuitions and reasoning mean nothing causally, there is no reason to accept either the qualia, or, for that matter, the materialist argument.

### *Concluding Remarks*

The third chapter of this project presented the first objection to the strongest, clearest outline of the problem of interaction, the cPOI argument. It began this objection by taking cPOI to its logical and necessary conclusion, an epiphenomenalist theory, by way of identity theses and functional definitions. As I outlined in the preliminary sections, accepting the two premises of cPOI set up an argument for materialism. However, this argument, following a path through token identity with dependency and functionalist definitions of conscious states, strongly supports epiphenomenalism. The assured outcome of epiphenomenalism set up the first objection to cPOI, the qualia argument.

It is important to note that the qualia argument is not an outright refutation of cPOI, but rather, an argument that accepting the two premises of cPOI make the materialist's position practically counterintuitive. It forms this argument primarily by harkening to commonsense intuitions. At some level, peoples' intrinsic and subjective experience of reality, (i.e. the qualia of their consciousness) seems to affect the actions

they choose to make. To deny this claim is possible, but when outlined fully in an argument, a denial appears highly counterintuitive.

The problem with cutting off the objections with the qualia argument is that we have not fully refuted the cPOI argument. It is possible that the two premises of cPOI still stand, however counterintuitively. A stronger objection must be made to refute the cPOI argument in a fuller sense. Ironically, this can be done without relying on factors outside the physical realm. It seems as though scientific discovery, once thought the harbinger of a physically-closed metaphysics, may herald a strong refutation of the cPOI argument.

## CHAPTER FOUR

### The Causal Closure of the Physical

Here, I outline my primary objection to cPOI, which acts as a direction refutation. As such, it claims that the causal closure of the physical is a false premise. I will begin by providing a short overview of how refutation works, then move on to a review of the causal closure of the physical, followed by reasons to reject this premise, the implications of refutation, and a final return to the primary thesis question.

#### *Philosophical Refutation*

The first step in refuting cPOI is delineating the essence of philosophical refutation. One easy way to do this is comparing how the two types of objection differ by referring to my initial objection. The first objection to cPOI was the counterintuitive nature of epiphenomenalism. Because of the way cPOI argues against Cartesian Dualism (by relying on the causal closure of the physical and the causal exclusion principle), there is only room in this argument for a materialist theory. The progression of materialism from cPOI relied on token-identity theses to argue for a causally-closed, materialist system. From this system emerged the necessary theory of epiphenomenalism. Materialists must recognize mental states, such as pain or joy, but they must also require that these mental states play no causal role in their universe. To do this, they rely on the theory of epiphenomenalism.

The problem with epiphenomenalism is not one of logic or impossibility, but one of the counterintuitive nature of this position. By this position, the experience of pain

plays no role in actions to avoid pain. Even though these positions do not directly refute any of the materialists' theory, they do seem counterintuitive. The purpose of including this type of objection first was to begin discussing cPOI's legitimacy. In other words, this objection broached the question of "is there truly a problem of interaction" by arguing that the best POI statement, cPOI, creates a highly counterintuitive universe. However, to formulate a strong objection to cPOI requires a direct refutation of the theory. The epiphenomenalism argument was not a direct refutation, but rather, it served the purpose of beginning discussion for a direct refutation.

In philosophy, there is a distinction between a general objection and a direct refutation. The first, general objection, is raising a point about an argument that makes that argument seem less likely. One way of creating a general objection is carrying an argument to its logical end and showing that this conclusion is either undesirable or counterintuitive. This type of objection upholds the entirety of the argument to prove a point against the argument. This is what the epiphenomenalist argument did. Second, direct refutation is pointing out how an argument is wrong or could not be true. There are two ways one can do this: either by showing that one of the premises of the argument is false, thereby showing that the conclusion does not have proper backing, or by showing that the premises do not properly add up to the conclusion. The difference between general objection and direct refutation is that one can prove an argument false by the latter, not by the former. Therefore, showing that cPOI is incorrect requires a direct refutation, i.e., something stronger than the general objection of epiphenomenalism.

Based on this understanding of direct refutation, there are three ways to refute cPOI directly. The first two are refuting either one of the premises that make up the

argument. This means refuting the causal closure of the physical or the causal exclusion principle. Another way to refute the argument would be to show that the premises do not entail the conclusion. This would include showing how the causal closure of the physical and the causal exclusion principle do not add up to the conclusion of cPOI. Since the premises do appear to add up, I will focus on the first method, i.e., refuting the causal closure of the physical.

### *The Causal Closure of the Physical*

As the main refutation of this project pertains to the first premise of cPOI, a review of the topic seems appropriate. For review, the causal closure of the physical is the statement that any effect or event results from a physical cause. There are no other causally significant factors in operation besides the physical. Noted philosophers have summarized this position similarly as “every physical effect has a complete physical cause.”<sup>1</sup> These causes can be thought of as agents in bringing about some event. For example, the “event” of moving my left arm is the direct result of physical agents (e.g., brain states, synaptic potentials, and muscular contraction) that operate within a causally-closed environment. All of the agents that brought about my arms movement are seemingly in the physical. Accordingly, will, consciousness, and the mind (viz., any term used to describe a nonphysical agent) play no role in this event. This significant position seems the bulwark of the cPOI argument.

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<sup>1</sup> Buras, Todd. “On the Failures of Naturalism.” *Review & Expositor*, vol. 111, no. 3, 2014, p. 263.

This cPOI argument relies on two premises. The first is the causal closure of the physical, and the second is the causal exclusion principle. Both are needed for there to be a cPOI argument, but the argument seems to rely heavily on the causal closure premise.<sup>2</sup> This is because the crux of the materialist position is that causes leading to the effects witnessed in the world are closed off to physical means. Furthermore, it is difficult to argue that there is a problem involving interaction for Cartesian Dualism if the physical is not causally closed. While various problems have been raised to Cartesian Dualism that do not rely on the causal closure of the physical,<sup>3</sup> it would seem that the theory's biggest problem, i.e., interaction, depends upon a causally closed physics. Therefore, the causal closure of the physical is crucial to cPOI.

While materialists provide many reasons for the causal closure principle, there appears to be a gradient of philosophical adeptness to these arguments. As considered in Chapter Two, one way of arguing to POI is by questioning how the physical and non-physical interact. This “how” questions, via a strategic assumption, leads to a causally closed physics, but it is relatively weak in the grand plethora of POI arguments. Another way to argue for a causally closed physics is to bring out mechanistic theories of physics. This approach argues that mechanism (or a “billiard-ball” interaction between physical particles) rules out the possibility of a non-physical substance. Though this approach is a

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<sup>2</sup> The causal exclusion principle is important, but it is used to rule out the argument for a “supervenient” or “over-determining” yet causally-significant mental agent. The causal closure principle appears to be the heart of the materialist position. Cf. Papineau's opening remarks in the abstract of Chapter 1 of Papineau, David. “The Conservation of Energy.” *Thinking about Consciousness*, Oxford University Press, 2002.

<sup>3</sup> Cf. “The Queerness of the Mental” or “The Unity of the Mind” in Robinson, Howard. “Dualism.” *The Stanford Encyclopedia of Philosophy*, 2017, [plato.stanford.edu/archives/win2016/entries/dualism/](http://plato.stanford.edu/archives/win2016/entries/dualism/).

stronger method of causally closing the physical, it falls apart with the entrance of non-mechanistic forces to physical systems (e.g., gravity or electromagnetism). One final and perhaps strongest way of arguing for the causal closure of the physical is to point to the culmination of scientific discovery. Papineau traced this development, ultimately arguing that recent overviews of scientific knowledge allow us to see a “big picture” conservation of energy that causally closes physics. This argument is perhaps the strongest way to establish the causal closure principle as it uses empirical evidence and avoids mechanism.

While this project does not have room to outline every argument for the causal closure of the physical, it would seem, in a philosophical sense, that the culmination argument (or, loosely, the conservation of energy) provides the best basis for POI. In one sense, the culmination argument is enticing - it seems to combine the best theories of physical interaction, motion, and energy, into a neatly packaged picture of physics. However, in another sense, this argument is also open to serious critique, namely because it relies so heavily on the progression of scientific theories. There may always be room to question if Papineau’s culmination argument is the most recent scientific advance. Indeed, this question must be continually asked if the cPOI argument is to remain relevant. What follows is an outline of why the culmination argument is not tenable considering recent scientific theory and philosophical understanding.

### *Rejecting Causal Closure*

Questioning the culmination of scientific theory questions the primary premise of the cPOI argument. By refuting this premise, I will refute the cPOI argument directly, thereby showing that there is no cPOI for Cartesian dualism. To begin this argument, I will consider current evidence for causal closure. In his work *Mind, Brain, and Free Will*,

Richard Swinburne addresses multiple materialist objections to dualism in his chapter titled “Interactive Dualism.”<sup>4</sup> After addressing multiple *types* of objections to dualism, such as weak POI, he turns to a scientific, empirically-based set of objections. What these objections do is set up a causal closure of the physical principle, which, in turn, provides direct refutation to interactive dualism. When breaking down these objections, he notes that there tends to be two types of evidence that modern materialists claim support the causal closure of the physical.

The first type of evidence,  $\alpha$ -type evidence, is data taken from recent neuroscience experiments that show that there is no room for mind-caused events in the physical causal chain. More specifically, he claims that these arguments “depend on evidence about which conscious events (and, in particular, which intentions) people have how long before or after certain brain events.”<sup>5</sup> He points out that most who use these types of arguments tend to rely on the Libet experiments, in which subjects used a clock to measure the time of their intentions to act. After pressing a button (the physical event), the time of the event was recorded. Simultaneously, researchers monitored brain activity, measuring the build-up of electrical activity that led to the physical event.

The results from these experiments showed that the build-up of electrical activity in the brain, which represents a physical brain state preparing for the physical event, occurred approximately 400 milliseconds before the subject recorded possessing the intention to react. So, per Libet, this experiment showed that intentions play no role in the

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<sup>4</sup> Swinburne, Richard. “Interactive Dualism.” *Mind, Brain, and Free Will*, Oxford University Press, 2012, pp. 100-124.

<sup>5</sup> *Ibid.*, p. 105.

physical causal chain. This finding seems to support the causal closure of the physical. Despite these claims, Swinburne argues that experiments of this type do not rule out the causal influence of intention, but that they only show that intention is not the “first cause” in the chain of events.<sup>6</sup> To prove that the intention was not causally influential, scientists would have to carry out the same experiment with the same results while somehow preventing the conscious intention. Swinburne believes there would never be a way to rule out an intention in this way, so it would be impossible for  $\alpha$ -type evidence to prove the causal closure of the physical.<sup>7</sup>

The objection to  $\alpha$ -type evidence does not directly apply to cPOI, but it does create a juxtaposition for the type of evidence that supports the causal closure of cPOI. Swinburne calls this  $\beta$ -type evidence. Even though he never straightforwardly claims that his objection to  $\beta$ -type evidence is against Papineau’s cPOI, the way he describes  $\beta$ -type evidence could apply directly to Papineau’s cPOI. According to Swinburne,  $\beta$ -type evidence includes, “arguments from large-scale physical theory, suggesting that all physical events are caused by and only by other physical events, from which it follows that no conscious event can make any difference to them.”<sup>8</sup> In other words, physics has a complete and closed causal explanation for every event based on the structuring of its empirical laws and theories.

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<sup>6</sup> Swinburne, Richard. “Interactive Dualism.” *Mind, Brain, and Free Will*, Oxford University Press, 2012, p. 110.

<sup>7</sup> *Ibid.*, p. 111.

<sup>8</sup> *Ibid.*, p. 106.

Of course, Swinburne points out that evidence of this type typically regresses to quoting the principle of the conservation of energy (COE). Papineau used this principle as the trumping theory of his culmination argument. However, Swinburne carefully notes the distinct form of COE typically cited, which includes two principles: principle 1, which is a causal interaction principle (i.e., according to physics, interaction requires the exchange of energy) and principle 2, the Boundary Principle of Energy Conservation (BPEC), i.e., the change of energy in one space is directly proportional to the increases and decreases in the energy of neighboring spaces. This dual principle hypothesis is what Papineau attempted to establish with his culmination argument when he showed how the history of science eventually culminated in the full understanding of COE.

While Papineau purports this dual principle culmination argument, Swinburne argues that there is probably no reason to believe that either principle is completely true due to one final piece of science. Quantum physics, which Papineau seems to omit in his “culmination” argument, is the established science of determining the placement and energy (i.e., momentum) of subatomic particles. In other words, this discipline determines what interaction is occurring (principle 1) and where energy is going (principle 2). However, the development of quantum physics also led to a revealing principle. This principle, the Heisenberg indeterminacy principle, states that there is a limit to the accuracy of determining a particle’s position and momentum. As one increases the accuracy of a position measurement, the energy measurement proportionally decreases in accuracy. I will refer to this idea as principle 3, as it seems the next logical step in truly “culminating” science.

So, per principle 3, the measurements of energy that Papineau claims in his understanding of COE turn out to be *probability* estimates. This breakdown occurs because the smaller and more individual the particle one begins to observe, the less probable it is to have either an accurate location or energy measurement. This understanding is a direct result of principle 3. Swinburne explains it by explaining the quantum unpredictability of radioactive decay - that one can determine how long it will take half of a sample (e.g., carbon-14) to decay, but that this determination does not tell one exactly which atoms will decay. This idea leads him to state that “small-scale nature is not merely not totally predictable, but not totally determined.”<sup>9</sup> While some have attempted to create deterministic theories of individual atoms, most scientists have agreed that quantum physics supports an indeterministic formula.<sup>10</sup>

Drawing this back to the causal closure of the physical, principle 3 appears to allow small-scale, indeterminate increases and decreases of energy that do not result directly from a COE understanding of physics. While these small changes eventually even out in the long run (whether that be by considering large bodies or large amounts of time), principle 3 does allow one type fracture in the causal closure of the physical. This breaking of the causal closure becomes more significant with a forthcoming example, but for the moment, it appears one premise of cPOI, viz. the causal closure of the physical, has been directly refuted. This would seem to refute the argument of cPOI, considering

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<sup>9</sup> Swinburne, Richard. “Interactive Dualism.” *Mind, Brain, and Free Will*, Oxford University Press, 2012, p. 114.

<sup>10</sup> Cf. Maleeh, Reza, and Parisa Amani. “Bohm's Theory of the Relationship of Mind and Matter Revisited.” *NeuroQuantology*, vol. 10, no. 2, June 2012, pp. 150–163, for an explanation of one failed deterministic theory.

the format I previously outlined for direct refutation of an argument. However, one could argue that this understanding of physics merely cripples causal closure. This foundational premise still applies to the human brain. The question then becomes: does the indeterministic theory of quantum physics apply to the brain?

### *Quantum Physics and the Brain*

There exist two primary tactics of rebuttal that materialists defending cPOI could offer to the quantum physics argument. The first is that even though small-scale systems have apparent indeterminacy, COE still exists on a large scale - systems still maintain a relatively stable and measurable input and output of energy. This rebuttal attempts to reaffirm the causal closure of the physical and cPOI as it pertains to the discussion at hand, i.e., physical systems of relatively large, measurable kinetics. I will reply to this rebuttal with an example from Swinburne. The second rebuttal is that even if quantum mechanics cripples causal closure, this does not necessarily apply to the brain. This rebuttal, though slightly weaker, attempts to allow the quantum physics argument and maintain cPOI by denying the quantum indeterminacy in the human brain. I will reply to this rebuttal with a physiologic understanding of the structure of the brain.

The first rebuttal, questioning the effects of indeterminacy on the large scale, operates under one legitimate understanding of quantum physics. This rebuttal argues from the coexisting facts of sub-atomic (i.e., small-scale) indeterminacy and larger-scale COE. In a sense, this is the stronger rebuttal for the materialist for two reasons. First, it directly refutes the quantum physics argument against causal closure. Second, it relies on a fully physical theory carried to its conclusion to refute a dualist's understanding of

science. Both of these reasons may appear attractive to the materialist, but the consideration of one example dispels this rebuttal.

Swinburne, in a manner, acknowledges this rebuttal. As reply, he provides a thought experiment: “one could, for example, construct an atomic bomb such that whether it exploded depended on whether some particular atom in a block of atoms decayed within an hour or not.”<sup>11</sup> This intriguing example is meant to show how the seemingly insignificant indeterminacy of a single atom could have a catastrophic, physical effect. This is a strong reply to the rebuttal because it acknowledges the initial “insignificance” of indeterminacy proposed by the materialist, but it also provides a case where this insignificant factor has a disproportionately large effect. In relation to quantum physics, by principle 3, it is physically unapparent whether one individual atom will be in a certain state at a certain time. This would typically be unnoticeable on the larger-scale measurement of energy, as this indeterminacy tends to average out; however, when the state of this one atom carries the weight of a nuclear explosion, it is evident indeterminacy would have played a causal role.

To continue this discussion, the materialist could reply with the second rebuttal. Indeed, quantum physics seems to cripple causal closure, but the brain is no nuclear warhead. Because the dualist has not argued for application to the brain, the quantum physics argument fails to rebut cPOI. This is an interesting line of rebuttal because it questions both the structure of the brain and the scale of brain effects.

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<sup>11</sup> Swinburne, Richard. “Interactive Dualism.” *Mind, Brain, and Free Will*, Oxford University Press, 2012, p. 114.

As to the first question, the rebuttal applying to the structure of the brain, Swinburne paints a beautiful picture of brain physiology. He argues that “it may well be that the brain is just the kind of system in which small-scale indeterminacies cause large-scale effects.”<sup>12</sup> This type of small-to-large scaling is evident with an explanation of the brain’s physiology. If one has not studied the brain in depth, it is astonishing to learn that conservative estimates put the total number of neurons in the brain as close to 86 billion. When considering the hundreds of connections each neuron contains, most estimates consider 100 trillion synapses as a minimum. Each of these neurons works by transmitting an electrical signal along its axon to a synaptic terminal, at which a chain of events will begin. This chain culminates in the potential release of some neurotransmitter (chemical) into the space (synapse) between two distinct neurons. This process happens both to carry sensory information to the brain and to supply motor innervation to the muscular system.

Adding to this intricacy, Swinburne draws attention to three dependencies which dictate whether these signals are transmitted from one neuron to the next. First is the amount of neurotransmitters released into the synaptic cleft. Second is the distance the neurotransmitter must diffuse to reach the next neuron. Third is the amount of neurotransmitter that physically binds to receptors on the post-synaptic neuron.<sup>13</sup> The sheer number of neurons and synapses along with these three dependencies create a strong case for the possibility of “indeterminacy” in the human brain. However, in

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<sup>12</sup> Swinburne, Richard. “Interactive Dualism.” *Mind, Brain, and Free Will*, Oxford University Press, 2012, p. 115.

<sup>13</sup> *Ibid.*, p. 115.

answer to the second question (about the scaling of small-to-large effects) Swinburne draws upon recent neuroscience studies. These studies show that the “dependencies” of neuron firing may be prime targets of quantum physics scaling (from small to large effects).

Without delving into these studies too deeply, it is sufficient to summarize their featured take-away: different aspects of neuronal physiology could act as the interaction point for quantum indeterminacy.<sup>14</sup> While it is not within the scope of this project to explore each of these studies, it is important to see how this relates to the proposed rebuttal. If neuron firing is under the influence of these quantum laws and “principle 3,” then relatively large-scale effects, such as moving an arm in a predetermined path, would have some aspect that fell outside the causal closure of the physical. The actions of the nervous system, in which innumerable synaptic events occur across more than 100 trillion synapses, do, in fact, seem like just the right system for quantum indeterminacy to be causally significant. Since this causally significant aspect falls outside the physical, the causal closure principle collapses, and cPOI appears directly refuted.

#### *Refutation Conclusion*

At this point, with the primary premise of cPOI seemingly defeated, the materialist has little left to uphold the argument. However, there may be one final materialist reply remaining. The materialist may reply in this way. Yes, your argument

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<sup>14</sup> Two fascinating studies include: Osaka, Naoyuki, et al. “Quantum Processes in the Brain, a Scientific Basis of Consciousness.” *Neural Basis of Consciousness*, John Benjamins Publishing Company, 2003; and Schwartz, Jeffrey M., et al. “Quantum Physics in Neuroscience and Psychology: a Neurophysical Model of Mind-Brain Interaction.” *Philosophical Transactions of The Royal Society*, vol. 360, 2005.

against the causal closure of the physical seems sound, but it appears as if my argument for the causal closure is just as sound. Both of us are making bets on the future of science: it may support causal closure, or it may support a causally open physics. Either way, I have the uniformity of nature to back my position.

This appeal to the uniformity of nature is the materialists' *final* option to respond to the causal closure rejection. This argument states that, based on the observation of chemicals and electricity (i.e., physical substances) elsewhere in nature, one would expect chemical and electricity to behave the same everywhere. This "everywhere" includes the human brain. So, even if science has not shown that these physical substances behave *exactly* the same in all places, the materialist can place a bet on the future of science making these convenient findings.

However, this final rebuttal ignores the core of the causal closure refutation, viz., that the human brain is precisely the type of place where one would expect to find *variation* in nature. As a mysterious, elegant organ, "a brain is like no other type of physical object."<sup>15</sup> It has conscious, qualia-filled experiences that influence it to act and behave in amazing manners. So, it seems as if the uniformity of nature argument fails as well - the behavior of the natural universe and the brain would have to prove similar, but this is not the case.

At this point, the materialist has run out of options. The causal closure of the physical seems to be refuted, and, thus, cPOI defeated. To review, the direct refutation focused on the primary premise of cPOI - the causal closure of the physical. By pointing

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<sup>15</sup> Layman, Stephan. *Letters to Doubting Thomas: a Case for the Existence of God*. Oxford University Press, 2006, p. 153.

out the flaws in Papineau's classic "culmination" argument, I showed how the best version of the problem of interaction (i.e., cPOI) is untenable. The primary flaw Papineau made was ignoring the development of quantum physics in his culmination. By ignoring this development, he undermined the whole position of his argument, viz., that science culminates in such a way as to deny Cartesian Dualism. The defeat of this premise is a crucial step in answering the original thesis question.

### *Answering the Question*

Working from the collapse of the causal closure premise leads to a direct refutation of cPOI, but this is not the final step of the project. The final step is answering the thesis question: is there a problem of interaction for Cartesian Dualism? What follows is an abridged outline of the project which will provide a concise answer to this question.

To begin, Chapter One considered the various ways academic disciplines consider the human being. Philosophy presented the best approach because of its dedication to truth and wisdom - a dedication that allows it to draw in truths and findings from a plethora of disciplines. The two ways I considered philosophy explaining the human were materialism and Cartesian Dualism. This dichotomy forms because materialism states that only physical factors play a causal role in the human, while Cartesian Dualism claims that the physical body and the nonphysical mind each causally interacted with the other.

Materialism argued against Cartesian Dualism via POI. In Chapter Two, I considered the various forms of POI (i.e., the strongest objection to Cartesian Dualism), creating a distinction between "weak," "strong," and "culmination" POI. The purpose of this chapter was to discover the best available "yes" answer to the thesis question - that

there *is* a problem of interaction for Cartesian Dualism. This chapter eventually showed that culmination POI (cPOI), provided the best available version of POI. This version depends on an understanding of scientific discovery as leading to or culminating in a general conservation of energy principle (COE). With COE in place, cPOI could argue against Cartesian Dualism via two premises: the causal closure of the physical and the causal exclusion principle.

Both premises created a strong *yes* answer to the initial thesis question by supporting cPOI. At this point, with the beginning of Chapter Three, I began considering rebuttal to cPOI. In that chapter, the main objection to cPOI was materialism's collapse to epiphenomenalism. This objection is not a direct refutation. Rather it serves as an argument that the materialist vision (purported through cPOI) is counterintuitive *at best*. In general, the purpose of Chapter Three was to point out that this collapse into epiphenomenalism makes materialism (and, therefore, cPOI) counterintuitive. However, the materialist still had the option of "biting the intellectual bullet," denying qualia any causal power, and maintaining cPOI. Up until this point, it appeared as if there was truly a problem of interaction for Cartesian Dualism, even if this problem was counterintuitive.

To deny POI for Cartesian Dualism, there would need to be some sort of direct refutation of cPOI. Chapter Four provided this direct refutation. To do this, I needed to refute one of the two premises of cPOI. The arguably more crucial premise for cPOI is the causal closure of the physical (for upon this principle hangs the crux of the materialist position), so I began outlining arguments against this premise. The main argument against this premise was that science did not actually culminate in the manner Papineau purported. He left out the key development of quantum physics.

This established field of science led to the discovery of an uncertainty principle, which I termed principle 3. This principle stated that measuring any body would lead to uncertainty in either the location or the energy measurement of that body. One of the hallmark descendants of this principle is that, on a microscopic level, particles tend to behave indeterministically. While small-scale indeterminacies tend to average out on the large-scale (e.g., a radioactively decaying sample of carbon-14), there are examples of these indeterminate nuances having large-scale effects. Working from Swinburne's explanation of this example, Chapter Four portrayed a clear image of how the physical is not causally closed. Because the physical is not causally closed, premise one of cPOI collapses, and cPOI fails.

Returning to the thesis question, the defeat of cPOI heralds an answer. Directly refuting the causal closure of the physical removed a primary premise, thereby bringing down cPOI. So, it would appear there is no problem of interaction for Cartesian Dualism. Admittedly, alternative versions of this problem exist; however, as I have argued, this is the philosophically strongest form, so it represents the best that POI arguments have to offer. Considering this fact, it seems like no POI argument can truly face Cartesian Dualism.

## BIBLIOGRAPHY

- Berkeley, George, and R. S. Woolhouse. *Principles of Human Knowledge ; and, Three Dialogues between Hylas and Philonous*. Penguin Books, 2004.
- Buras, Todd. "On the Failures of Naturalism." *Review & Expositor*, vol. 111, no. 3, 2014, pp. 259–273.
- Calef, Scott. "Dualism and Mind." *Internet Encyclopedia of Philosophy*, [www.iep.utm.edu/dualism/](http://www.iep.utm.edu/dualism/).
- Chalmers, David. "Facing up to the Problem of Consciousness." *The Character of Consciousness*, Oxford University Press, 2010.
- Collins, Robin. "Modern Physics and the Energy-Conservation Objection to Mind-Body Dualism." *American Philosophical Quarterly*, vol. 45, 2008, pp. 31–42.
- Dennett, Daniel C. "Quining Qualia." *Consciousness in Contemporary Science*, 1988, pp. 42–77.
- Descartes, Rene. *Discourse on Method and Meditations on First Philosophy*. Translated by Donald A. Cress, 4th ed., Hackett Publ, 1998.
- Descartes, Rene. *Meditations on First Philosophy: with Selections from the Objections and Replies*. Translated by John Cottingham, Cambridge University Press, 2011.
- Engelhardt, Jeff. "Property Reductive Emergent Dualism." *Philosophia*, vol. 43, no. 1, 2014, pp. 63–75.
- Hofweber, Thomas. "Logic and Ontology." *The Stanford Encyclopedia of Philosophy*, 2017, [plato.stanford.edu/archives/win2017/entries/logic-ontology/](http://plato.stanford.edu/archives/win2017/entries/logic-ontology/).
- Kim, Jaegwon. "The Myth of Nonreductive Materialism." *American Philosophical Association*, 1989.
- Layman, Stephan. *Letters to Doubting Thomas: a Case for the Existence of God*. Oxford University Press, 2006.
- Lee, Joseph. "Brain-Computer Interfaces and Dualism: a Problem of Brain, Mind, and Body." *Ai & Society*, vol. 31, no. 1, 2014, pp. 29–40.
- Levine, Janet. "Functionalism." *The Stanford Encyclopedia of Philosophy*, 2016, [plato.stanford.edu/archives/win2016/entries/functionalism/](http://plato.stanford.edu/archives/win2016/entries/functionalism/).

- Levine, Joseph. "Materialism and Qualia: The Explanatory Gap." *Pacific Philosophical Quarterly*, vol. 64, no. 4, 1983, pp. 354–361.
- Lycan, William G. "Giving Dualism Its Due." *Australasian Journal of Philosophy*, vol. 87, no. 4, 2009, pp. 551–563.
- Maleeh, Reza, and Parisa Amani. "Bohm's Theory of the Relationship of Mind and Matter Revisited." *NeuroQuantology*, vol. 10, no. 2, June 2012, pp. 150–163.
- Nagel, Thomas. "What Is It like to Be a Bat." *Philosophical Review*, vol. 83, 1974.
- Oppy, Graham. *The Best Argument against God*. Palgrave Pivot, 2014.
- Osaka, Naoyuki, et al. "Quantum Processes in the Brain, a Scientific Basis of Consciousness." *Neural Basis of Consciousness*, John Benjamins Publishing Company, 2003.
- Papineau, David. "The Conservation of Energy." *Thinking about Consciousness*, Oxford University Press, 2002.
- Putnam, Hilary, and Paul Oppenheim. "Unity of Science as a Working Hypothesis." *Minnesota Studies in the Philosophy of Science*, vol. 2, Oxford University Press, 1958, pp. 3–35.
- Robinson, Howard. "Dualism." *The Stanford Encyclopedia of Philosophy*, 2017, plato.stanford.edu/archives/win2016/entries/dualism/.
- Robinson, William. "Epiphenomenalism." *The Stanford Encyclopedia of Philosophy*, 2015, plato.stanford.edu/archives/fall2015/entries/epiphenomenalism/.
- Ryle, Gilbert. *The Concept of Mind*. Routledge, 2009.
- Schwartz, Jeffrey M., et al. "Quantum Physics in Neuroscience and Psychology: a Neurophysical Model of Mind-Brain Interaction." *Philosophical Transactions of The Royal Society*, vol. 360, 2005.
- Smart, J.J.C. "The Mind/Brain Identity Theory." *The Stanford Encyclopedia of Philosophy*, 2017, plato.stanford.edu/archives/spr2017/entries/mind-identity/.
- Stoljar, Daniel. "Physicalism." *The Stanford Encyclopedia of Philosophy*, 2016, plato.stanford.edu/archives/spr2016/entries/physicalism/.
- Swinburne, Richard. "Interactive Dualism." *Mind, Brain, and Free Will*, Oxford University Press, 2012.

Tye, Michael. "Qualia." *The Stanford Encyclopedia of Philosophy*, 2017,  
[plato.stanford.edu/archives/win2017/entries/qualia/](http://plato.stanford.edu/archives/win2017/entries/qualia/).

Uzan, Pierre. "Deciding the Mind-Body Problem Experimentally." *Axiomathes*, vol. 27,  
no. 4, 2016, pp. 333–354.