

ABSTRACT

Is It Reasonable to Be an Interactive Substance Dualist in Light of Arguments From Neuroscience and Philosophy?

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Physics, biology, and neuroscience have grown to describe the world with astounding success. As philosopher John Searle notes, this leaves us with a question: where do *we* fit into this picture? Beginning with Descartes and running up to now, questions about the nature of the human mind have morphed to include modern scientific discoveries, namely those from the fields I just mentioned. In this thesis, I look at recent neuroscientific arguments against dualism and personal causation, weighing them to decide whether interactive substance dualism is still a reasonable position to hold. I conclude that the relevant neuroscientific studies are ridden with unreasonable data interpretations and generalizations, and that they do not even slightly diminish the rationality in holding interactive substance dualism. I then introduce and look at the more general scientific consensus-style argument for the causal closure of the physical world. I argue that based on the current state of physics, we have little reason to believe the physical world is causally closed. Lastly, I argue that the most common alternative to dualism, materialism, is possibly epistemologically disastrous. This thesis ultimately shows that the strongest arguments against interactive substance dualism fail to go through, and that we in fact have good reason to be dualists of this kind today.

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IS IT REASONABLE TO BE AN INTERACTIVE SUBSTANCE DUALIST IN LIGHT
OF ARGUMENTS FROM NEUROSCIENCE AND PHILOSOPHY?

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For Dr. Buras

INTRODUCTION

At our core, what are we? What differentiates us from the rocks we step on, the trees we pass, and the animals we interact with as we walk from place to place? And what does all this mean for the way we live our lives, thinking and conversing with others? These questions are central to our identity as humans and how we view others, as well as how we think about neuroscience, medicine, and our experience in general. Questions like this collectively fall under what's called the "mind-body problem," as they posit different interpretations of the existence and nature of minds and bodies.

Four years ago, I had not thought about the nature of the human mind. I was constantly studying biology and chemistry, assuming the detailed molecule movements I learned about explained the inner workings of the human mind. The more I learned, the more I took this connection for granted. I knew there was some gap, though, when studying neurotransmitters and thinking on my own life experience. I found it difficult to reconcile the picture of myself that I was being taught through science courses and the picture of myself that I had when I thought about my life and who I am. Soon after I began college, I encountered two arguments that significantly changed the way I thought about this gap. The first of these is often referred to as the Knowledge argument, and it was originally presented by Frank Jackson in a short paper entitled "Epiphenomenal *Qualia*."

In this paper, Jackson invites his readers into a thought experiment, drawing out two different kinds of knowledge humans have – knowledge of physical facts and

experiential knowledge, or *qualia*. To this day, this paper remains one of the purest arguments against materialism – the philosophical position that human beings can entirely be reduced to physical ongoingings. Here is Jackson’s argument, summarized by David Chalmers:

- (1) There are truths about consciousness that are not deducible from physical truths
- (2) If there are truths about consciousness that are not deducible from physical truths, then materialism is false
- (C) Materialism is false (Chalmers 7).

The basic idea of the thought experiment is as follows: “Mary is a neuroscientist who knows everything there is to know about the physical processes relevant to color vision. But Mary has been brought up in a black-and-white room (on an alternative version, she is colorblind) and has never experienced red. Despite all her knowledge, it seems that there is something very important about color vision that Mary does not know: she does not know what it is like to see red. Even complete physical knowledge and unrestricted powers of deduction do not enable her to know this. Later, if she comes to experience red for the first time, she will learn a new fact of which she was previously ignorant: she will learn what it is like to see red” (Chalmers 7).

The second argument I encountered is called the argument from the Unity of Consciousness. This argument asks the question: how do we experience things as unified, when the neuroscientific explanation of experience is fragmented? In other words, how

do we experience the view from a mountaintop as a unified experience, instead of separate perceptions of color and sound? There is no clear answer from neuroscience, i.e., there is no mechanism (that we have observed) responsible for clustering our perceptions into aggregate experiences. So, either we will find such a mechanism, or we will not. If we do not, then either our methods and tools of physical discovery never met the match of whatever mechanism is there, or the mechanism is not physical. At the very least, it is possible that this unifying mechanism is not physical. Pushing slightly harder, we can say that since our physical discovery seems adequate to unravel such a mechanism, it is reasonable to believe that the mechanism is nonphysical.

Myself included, many people first encounter the mind-body problem through one of these arguments. We often think about who we are in terms of our social identities, i.e. what we do for work or our about our ancestry. Fundamentally, though, do we know what kinds of things we are? Clearly, we are human, and we have several shared physical characteristics to prove this to ourselves. We all have brains and hearts, along with other organ systems required for us to survive. On a deeper level, though, we have sets of shared experiences. We are able to empathize with others when they are sad about things we have experienced and, often, things we have not experienced. We all must have similar enough experiencing capabilities for this to be the case, but why? Is it because the arrangements of physical particles in us are similar enough to create similar machines, or is there something else going on?

The main historical contender for the belief that “there’s something else going on” is substance dualism. Simply put, the substance dualist posits that humans are not entirely physical – we are, as Evans and Rickabaugh put it, *bodily souls* (Evans et al. 2015). This

means that we are not entirely physical, but that we are also not just ghosts in machines.

Dualism's main philosophical opponent is some form of materialism – the belief that everything is physical, and thus all phenomena, including human experience, can be reduced to physical ongoing. The central question this thesis addresses is this:

Considering recent arguments from science and philosophy, is there good reason to be a substance dualist instead of a materialist? My goal in addressing this question is to further reconcile the pictures we have of ourselves through science and through experience by understanding the philosophical and scientific arguments that exists on both sides of this dilemma.

Why does it matter to think about our fundamental nature as humans, and the way in which our minds relate to our bodies? As I mentioned above, it matters for our understanding of identity. Just as it is crucial to know who I am when I apply and interview for jobs or engage in conversations with my friends, it is important to know who I am as a fundamental thinker and how this relates to my behaviors. As humans, we take for granted the way we think and move our bodies no matter what mind-body theory you believe, and we ought to think about these things to understand ourselves better as a part of our world. If I do not understand myself, I have a hard time knowing what I want or even thinking about these things in the first place. The way I move forward in life depends on my ability to trust my thoughts, desires, and beliefs toward things in my life, and this fact hinges on the way my mind relates to my body (and how my body relates to my environment).

Secondly, we have good reason to think about the mind-body relationship as our world advances scientifically and informationally. John Searle, in his book *Freedom and*

Neurobiology, raises the central mind-body question: “how do we fit in?” (Searle pp. 22). In a world where modern physics and scientific thought govern every meaningful comment, what are we to make of ourselves? Do we simply lump ourselves into the rest of physics and write laws to describe our neurobiological makeup, leaving the questions of will and mind behind? Do we try and explain our experiences using the mostly solid pieces of science we have? Or are we something very different in the order of nature? All these questions hinge upon and relate directly to what we think about ourselves and how we think or experience things at all.

Third, we have good reason to explore the mind-body relationship because it deeply relates to the question of life after death. This question has been debated in the context of mind-body theories since before Socrates was around, and it is closely related to modern religious beliefs. Most, if not all, religious belief systems use this question to propose a particular mind-body theory along with any relevant metaphysical claims about humans and non-human entities. This is a subject of much debate in Christianity right now, where most Christians are dualists of some sort, but there are a rising number of Christian materialists.¹ Each mind-body theory says something different about what it takes to survive death, and therefore they each align differently with the various religious beliefs concerning this question.

Alongside these general reasons, I find this question important because of my own journey with the mind-body problem. First, arguments like the Knowledge argument and arguments from the Unity of Consciousness have left me in awe and convinced that there is something else going on in us. I first encountered these three years ago, and I

¹ A host of arguments for and against this position can be found in *Christian Physicalism?* (Loftin et al. 2017)

have continually referred to them as convincing pointers to the parts of our experience we have not (and maybe cannot be) quantified or explained.

Second, I have spent considerable time in college studying biochemistry, neuroscience, and other medical subjects, and I have not found anything satisfying on this front. I find the presence of numerous neurotransmitters and the complexity of the brain to be fascinating but underwhelming when I compare it to my own life experience. An objection often brought against me in this area is that I simply do not know enough information or enough about organizational superstructure to see how neuroscience could explain human experience. To this I say: I find the probability of substance dualism's truth at least as large as the probability of these reasons' truth. Until the latter probability overtakes the former, I do not plan on giving up my search.

In a related sense, I find it important to hash out my beliefs about the mind-body relationship because of its relevance to the field of work I am entering – medicine. A great physician knows that prescriptions will only go so far in the battle against illness. One of the most important roles a physician fulfills, then, is that of a counselor. I know the gravity of my decisions will only increase as I pursue a career in medicine, so the way I apply my beliefs about the mind-body problem is deeply important to me. I want to treat my patients holistically, and to do this I need to know what their nature is. This will help me know how and why to balance medication with counseling, and it will help me understand my role as a physician-counselor. I often find myself at the intersection of science and the mind-body problem now, as I have spent the past four years studying biochemistry and philosophy. Biochemistry tacitly presents the central conclusion of materialism – that all our experiences can be reduced to chemical processes. Considering

the complexity of human experience, however, this reasoning has little explanatory power compared to reasoning regarding *what it's like* to have a particular experience. In the following pages, I will address the question of whether it is reasonable to be a substance dualist in the context of arguments from neuroscience and science in general (the causal closure of the physical world)

In chapter I, I describe dualism in more detail through its history and through outlining many of its versions. I then show that interactive substance dualism is more philosophically sound and explanatory as an answer to the mind-body problem than the two most popular dualistic alternatives: property dualism and epiphenomenalism. I follow this by presenting materialism in its various historical forms. I recite (from David Chalmers) that the strongest form of materialism, functionalism, is incapable of explaining *qualia*, the metaphysical possibility of zombies, and the unity of consciousness. This chapter ultimately shows that interactive substance dualism is the most philosophically sound and explanatory answer to the mind-body problem.

In chapter II I focus on the objections to interactive substance dualism from neuroscience. I classify these objections as ones that use scientifically measurable evidence from the human brain to argue against dualism and personal causation. I find these objections salient because the human brain produces consciousness, and our ability to explain the workings of the brain in physical terms has a direct bearing on the possibility of dualism. I start this chapter by presenting what neuroscience has to say about the mind-body problem. I begin by outlining the famous neuroscience experiment from Benjamin Libet. I then summarize one of the most famous responses to these experiments in philosophy from Richard Swinburne. I then explain why Swinburne's

replies are not satisfying, bolstering them with some of my own reasoning and some reasoning from Alfred Mele. I finish by summarizing Mele's work surrounding these experiments and other similar experiments in neuroscience. Ultimately, this chapter shows that nothing from neuroscience disproves interactive substance dualism.

In chapter III, I look at a different form of scientific argument against substance dualism, the causal closure of the physical (CCP). I summarize David Papineau's history of this argument, eventually splitting it into the track record (inductive) argument and the argument from the uniformity of nature. I then tackle the track record argument, highlighting the seeming indeterminism already present in physics and an open door left for dualism on this front. I follow this by presenting and undermining the argument from the uniformity of nature on the grounds of the unity of consciousness and our ability to control our own thoughts. Ultimately, this chapter shows that we have good reason to believe our world is not physically causally closed, and therefore good reason to believe in the possibility of interactive substance dualism in the context of modern physics.

In the conclusion, I recount what I have shown in the thesis, and state what this means for interactive substance dualism. I conclude by highlighting an avenue for further research (the epistemologically disastrous results of believing that our world is physically deterministic) and giving two final arguments surrounding the control of our thoughts.

CHAPTER ONE

Interactive Substance Dualism and the Mind-Body Problem

The mind-body problem is simply a question of how the body relates to the mind. There have been innumerable views about how this problem can be solved, but a few have remained throughout time: materialism, dualism, idealism, numerous forms of these, and a couple of others. Idealism denies that there are mind-independent bodies at all. Materialism denies that minds are different from functions of the body (body-independent minds). Dualism tries to argue that the mind and the body are related and that they are two categorically different kinds of things.

This thesis will be dealing primarily with the arguments for and against interactive substance dualism. In this first chapter, I will set the scene for looking at these arguments and answer the questions of what dualism is and why it should be taken seriously, even by scientifically minded thinkers. To give a sufficient answer to what dualism is, I will need to go through the history of the mind-body problem and some answers given to it over time. Before I dive into the history of the mind-body problem, I should make one clarification: the terms “mind” and “soul” are often used interchangeably in philosophy. As far as this thesis is concerned, they are referring to slightly different ideas: the mind is the broad seat of consciousness. The soul is a more particular instantiation of mind, where the seat of consciousness at hand is a nonphysical entity.

Short History of Dualism

Pre-Platonic

Concepts of the soul can be seen as far back as the Bible, ancient Greek plays, and Greek philosophy. Biblically, this is demonstrated most clearly through the concept of Sheol. Post-death, the Bible refers to people entering a spiritual realm called Sheol (Isaiah 14:9 ESV). Many examples of the soul and mind can be found in Greek plays, including those by Sophocles. Upon first hearing Jocasta speak of Laius' death in detail, Oedipus notes "what wandering in my soul now comes upon me – what turbulence of mind" in Sophocles' Oedipus the King (Sophocles 725-726). Though Sophocles does not present a detailed view on the mind-body problem or even the soul, we can see that he had some concept of it. Likely, he believed something like a popular belief today: that the soul corresponds to the part of people that houses deep feelings and that people "have" souls.

Plato

The first time we get a detailed view of the soul is in Plato. Plato presents a positive view of the soul in his Republic, but in his Phaedo he covers the relation of the soul to the body. In a rather lengthy monologue about 1/3 of the way through the Phaedo, Socrates presents two key tenets of his beliefs regarding the soul and the body. First, we are souls. He clearly says, "while we are in the body," then continues talking about souls generally as if to link the two.

Second, bodies are a sort of temporary prison for souls to Plato. In this way, bodies hold souls back in what they are meant to do and could possibly do. He says that the soul desires truth and cannot attain such truth until death, when it parts from the body

and remains. This view is furthered by those presented in the Republic, where Socrates argues Glaucon into the conclusion that the soul is immortal and has always existed (Plato 608d-611d). Further, this view points to another important point in Plato: separability of the body and soul. Plato believes that the body and soul can be separated – they were separate before life and become separate again after life.

Though Plato's account gives us little regarding how the soul and body interact, he clearly presents views pertaining to the mind-body problem. Plato is thinking about some of the same issues that are foundational to the problem today, and he is giving a relatively common answer to these issues (apart from the pre-existence of the soul).

Aristotle

The next major account of body and soul can be found in Aristotle. Aristotle believed that souls are forms, and that all living things have souls. Humans have rational souls, which govern human behavior through animating and organizing the matter of their respective bodies (Aristotle's *De Anima*, 412a, 17-21). This view can be hard to define, but the main important difference at this point in history is Aristotle's thoughts on separability. He believed that it would not make sense for the soul and body to exist apart from each other, but his beliefs on separability were also rather complex. This is consistent, considering he defines the soul in relation to the body.

Aquinas

Aquinas attempted to formulate an Aristotelian-Christian view on the soul – this basically took the form of Aristotle's view with a stronger separability clause. He asserted that the soul does not need a body to think. On Aquinas' view, then, our souls

can perform their central functions without our bodies. From this, he says that through death, the soul separates from the body and retains its thinking capacity. However, the soul exists in a diminished form without the body – it cannot exercise all its functions, as a body is required for some functions of the soul (Van Dyke 190).

Descartes

Descartes proposed the next major view of substance dualism. He argues that we are souls based on our infallible knowledge that we are thinking things. Since we do not have this kind of knowledge about our sense-perceptions, we are something separate from the seat of our sense-perceptions (the body).

Richard Swinburne argues that this argument does not work by analogy (infallible knowledge about one thing and not about another does not imply their separateness) and proposes a “fixed version.” Here is his argument:

- (1) I exist as a thinking thing now
- (2) It is logically possible that I go on thinking and so existing, even if my body is suddenly destroyed (and this remains logically possible, whatever else might be the case now inside or outside my body compatible with my existing now as a thinking thing).
- (3) It is not logically possible that anything continue to exist unless some part of it continue to exist.
- (C) Hence I must already have another part beside my body, namely my soul (Swinburne).

Descartes argued for the distinctness of soul and body on the basis of separability. His argument here is that we can clearly and distinctly perceive attributes in both the body and the mind (extension and thought) that do not exist in their counterparts. Because of this, he says, we can clearly and distinctly perceive the body apart from the mind. If this is the case, we can assert that the body can exist apart from the mind, and so the body is really distinct from the mind (Descartes 64a).

Something worth noting here is that these views assert that human beings are part body and part soul. Therefore, I am not just a soul animating my body like a tiny man inside a big machine. I am a soul and a body, on these views, I can survive death in a diminished form (because I will not have the same manner of existence that I do now, viz. through my body).

Apart from his famous argument for dualism, Descartes brought something to the table that was not yet considered in arguments about the soul. Partly due to him, science had deeply advanced by the time he was writing, and our understanding of the body took on a form quite like our current understanding. The body was thought of mechanistically – as a bunch of parts interacting materially with other parts. The question for Descartes, then, was: how do we fit in? As thinking things, do we only consist of a bunch of mechanistically interacting parts?

Descartes answers this question quite like Plato: we are essentially souls, interacting with but separable from our bodies. These are often referred to as “Cartesian substances,” which form the basis of Descartes’s view (Cartesian Dualism). Descartes’ view is also referred to as interactive substance dualism, as it proposes three key elements in its answer to the mind-body problem.

Interactive Substance Dualism

First, Descartes proposes that we are substances. Descartes outlines two sorts of substances in his *Meditations* – we will call them mental substances and bodies. These substances each have unique identifying factors: bodies are extended, and mental substances are thinking things (Descartes 51a). Substance in general, for Descartes, seems to take on a similar definition to that proposed by Aristotle in *Categories*: substances are things that cannot be predicable or attributable to anything else (Howard 2.2.1). For the remainder of this thesis, I will use the term “nonphysical substance,” “mind,” or “mental substance” to refer to Descartes’ idea of mental substance plus a few other characteristics. A mental substance, then, is a persistent and simple center of conscious experience and rational agency that can exist independent of other things (except God). By “conscious experience” I am referring to the quality of having what David Chalmers outlines as conscious states. Some examples Chalmers gives of these are “states of perceptual experience, bodily sensation, mental imagery, emotional experience, and occurrent thought” (Chalmers 2). By “rational agency” I mean the ability to generate thoughts, or at least play a necessary part in the chain of thought generation.

Second, Descartes proposes dualism as an answer to the mind-body problem. This simply means that humans on his view are of dual nature – body and mental substance. I am not just a body and I am not just a mind. Stephen Evans and Brandon Rickabaugh propose a definition that deals well with this nature – they say that we are bodily souls (Evans 324). By this, they mean that we are “souls that exist in a bodily form or manner” (Evans 324). This definition is particularly helpful because it closely relates us as souls to the body (Evans 324). A common objection to interactive substance dualism is that we

seem more tied to our bodies than ghosts in machines, and this definition clarifies this relationship. We are not just ghosts in machines – we exist through our bodies, not just in them. However, taken from Aquinas, we can exist apart from our bodies in a diminished form (Van Dyke 190).

The last key piece of Descartes' view is interaction. This is both a positive, necessary aspect of dualism as well as grounds for an objection to the view, so I will cover in in both regards. Interaction refers to the necessary consequence from dualism that nonphysical substances and physical things (namely, souls and bodies) can interact. This is first noted as a problem by Princess Elisabeth in her letter to Descartes about his *Meditations*. She asks Descartes how a soul could possibly produce motion in a body, considering contact and extension are required for things to produce motion in bodies, and Descartes excludes these qualities from the soul (Elisabeth 94a). In other words, it seems likely that only physical things produce motion in other physical things. They likely have this ability because of their particularly physical qualities. Souls do not have these particularly physical qualities, so we have good reason to believe they cannot produce motion in physical things. This question is still around today and is the subject of much current literature on interactive substance dualism.

Many philosophers, including Swinburne and Chalmers, sideswipe this issue, saying that we deal with the same causal issue in physics alone. Chalmers states that one of the central claims of objections to interaction is that there is no described causal nexus between mental substances and bodies. He points out, though, that from Hume and modern quantum mechanics, we deal with the same issues in physical-physical causation (Chalmers 30). In physics, we see patterns occur time and time again that we describe by

physical laws. However, none of these laws describe the essences of what is occurring – they are simply descriptive and taken as fundamental. The only difference between these causal nexuses, then, is that physical-physical interaction is something we can see, and so it seems a bit less mysterious to us. Chalmers folds the problem of interaction into the bigger problem of causation, and therefore shows that it is not a significantly bigger problem for dualism than for materialism.

As Chalmers points out, there is one kind of objection to interaction that is worth talking about: arguments for the causal closure of the physical. Chapter IV is dedicated to these arguments, so I will not spend time on them here.

Hylomorphic Dualism

Interactive substance dualism has not changed much since its inception. Many philosophers have tried to water dualism down into different versions that I will mention soon, but some have come up with interesting propositions consistent with Cartesian interactive substance dualism. One of these views worth talking about is hylomorphic dualism.

Hylomorphic dualism is, quite simply, a version of interactive substance dualism where the interaction involved is closely related to Aristotle's view of matter and form. St. Thomas Aquinas, as with much of his other philosophy work, adapted Aristotle's view to the Christian belief system to propose Thomistic dualism – this system, added to the foundation of dualist reasoning that Descartes provided, is perhaps the cornerstone of hylomorphic dualism.

The basic tenet of hylomorphic dualism is that the soul is the substantial form of the body. The soul provides life to the body and is the principle of organization of the

body, and so these two entities are closely tied. In general, hylomorphic dualism provides a more detailed positive account of interaction (through Aristotelian matter-form relations) and defines the soul differently (as a form instead of a substance). As far as the arguments in this thesis go, however, hylomorphic dualism is consistent with Cartesian interactive substance dualism – I will defend both views equally in this thesis.

Emergent Dualism

Another addition to interactive substance dualism worth mentioning is William Hasker's emergent dualism. Hasker presents this view in his book *The Emergent Self*, where he defends a strongly emergent view of the soul. Emergent dualists believe that the mind emerges from the brain when certain conditions are met. Some common conditions include that the beings in question are living and that their neural systems are arranged in a certain manner. These lines of when, why, and how this emergence occurs quickly become difficult to draw, which is the main problem for emergent dualists.

Common explanations of emergent dualism go like this: water molecules have an emergent property of liquidity. When they interact, the property of liquidity (a property that no single H₂O molecule has) emerges. This property can be deduced, however, by understanding the relevant chemistry. The way that hydrogen bonds work alongside London dispersion forces or dipole bonds (relative chemical attraction measures based on atom sizes and charges in molecules) taken with the formula of H₂O, for example, sufficiently explains why water exhibits liquidity at room temperature. Liquidity, then, can be dubbed a weakly emergent property relative to water.

Now let's say that some neuroscientists have modeled a map of human neuron interactions onto some 3-D software that we can visualize. Could anyone ever look at this

and guess that consciousness emerges? Further, at what level of complexity would a system like this become conscious? What are the key players in the system leading to agency? These questions lead emergent dualists to call consciousness strongly emergent, meaning that it is not nearly a property of neuron interactions combined with any other condition thrown in the mix. It is its own categorically different substance, which emerges based on the conditions and natural laws at play.

There are two strains of emergent dualism, broadly speaking, and here I am referring to the substance dualism strain. This view proposes that the soul is a mental substance that emerges from material beings. The other strain is called property dualism, which is a significantly different view from interactive substance dualism (talked about below).

To clarify: neither hylomorphic dualism nor emergent dualism (referring to emergent substances) conflict with Cartesian interactive substance dualism. Hylomorphic dualism defines the soul slightly differently to further explain the nature of interaction. Emergent dualism simply adds conditions of the possibility of conscious experience through the element of emergence based on material properties. In doing this, it attempts to address the “start” of mental substances in humans.

Varieties of dualism

There are, however, dualisms that differ significantly from interactive substance dualism. I will describe the two most common views in this category here, along with how exactly they are different from interactive substance dualism. These versions of dualism deal differently with the phenomena of consciousness, and they each have their own set of philosophical advantages and challenges. In describing how these views are

different from interactive substance dualism, I will show that interactive substance dualism is the most philosophically solid version of dualism.

Property Dualism

There are two significant ways of splitting dualism up: ontological splits and interaction-based splits. The first of the ontological splits we will cover is property dualism. Property dualists claim that “some of our mental states have immaterial properties” (Lycan 533). They further claim that consciousness (and any other functions attributed by dualists to the soul) is a property of our physical manifestation, rather than a substance of its own. This view is roughly a way of maintaining a materialist core while granting that there is something immaterial.

In his paper “Is property dualism better off than substance dualism,” William G. Lycan runs a tally of the most prominent arguments against both property and substance dualism. He rightly concludes that property dualism is no more tenable than substance dualism, and in fact substance dualism has two advantages over property dualism (Lycan 1). This runs against the general movement of modern-day philosophers of mind and scientists, who are significantly quicker to commit themselves to property dualism than substance dualism, based on some belief that it’s more tenable.

Lycan makes three central points in his paper. First, he says that the four major objections to substance dualism have little force, if any at all. The first objection is that Cartesian [mental substances] are not needed to explain any publicly known fact (Lycan 534). This is, at best, possibly true in the future. As I have shown in the introduction, and as Chalmers notes, we cannot sufficiently explain *qualia* on a purely physical framework. So, at the very least, this is false and weightless on our current physical knowledge.

The second objection refers to neural dependence, which is the dependence of the soul on the body (Lycan 535). This is simply not an objection to interactive substance dualism, as on this view the interaction involved runs both ways. Hitting one's own thumb does indeed cause mental states on interactive substance dualism, namely pain (at the very least).

The third objection points out the lack of explanation dualism gives for the pairing of one particular mind with one particular body (Lycan 537). Lycan notes that Bennett deals with this similar to the way Chalmers deals with the causal nexus objection: there are similar issues for purely physical frameworks, so this problem is not unique to dualism (Lycan 537).

The fourth objection is the only one that also arises for property dualism as well, and it deals with evolution. It basically asks two questions: why would mental substances come to be on evolution, and how could immaterial substances or properties be adaptive (Lycan 537)? I see no reason to believe mental substances are even subject to evolution (or any inherent problem with this), as evolution deals with physical things, so the first question holds little weight. The second question holds even less weight, as there is even less reason to believe mental substances could not be adaptive through life.

Lycan's second central point is that there are two objections to property dualism that substance dualism is immune to. The first of these deals with the oddness of strong emergence. I talked about strong emergence above in the section on emergent dualism, and in fact emergent dualism deals with this same objection (this is the one case where substance dualism does fall prey to this objection). The objection goes like this: how and why might immaterial properties emerge from a body? Lycan notes that sense can be

made of strong emergence, but it is a serious liability to any view that is committed to it (Lycan 540).

The second (and more salient) objection against property dualism that substance dualism does not face points out an epistemological issue with property dualism. If the subject of experience is a material body, but experiential facts lie in immaterial properties of the physical (brain) states of the subject, then how can a subject obtain knowledge of these experiential facts (Lycan 541)? On substance dualism, the subject of experience is a mental substance, so obtaining knowledge of experiential facts follows because these facts all lie within the same framework as the subject. On property dualism, this is not true. In other words, “a brute physical brain seems the wrong sort of thing to be acquainted with immaterial properties, even if the property-instances have spatial location” (Lycan 541).

The strongest formulation of this argument, I think, is to say that first, we have *qualia* unexplainable on materialism. These *qualia* are entirely subjective; they relate to the depths of our experience. If we posit properties of mental states as immaterial, our access to these *qualia* as material subjects becomes more questionable than if we posit ourselves as immaterial substances. Therefore, property dualism is philosophically worse off than substance dualism.

Lycan’s third central point in his paper is that the two objections to property dualism that are not faced by substance dualism hold more philosophical weight than the four objections that substance dualism faces, so substance dualism is philosophically better off in the end (Lycan 541).

Epiphenomenalism

The second major version of dualism that is significantly different from interactive substance dualism is epiphenomenalism. Epiphenomenalism claims that while consciousness and the soul are categorically different from the material world, they have no effect on the material world. Cartesian dualists, in contrast, claim that the soul effects the body and vice versa. Epiphenomenalism, then, does not have to explain the problem of interaction at all – the theory simply implies no interaction between body and soul.

This puts the dualist in an odd position, though, as epiphenomenalism lacks any of the drive that interactive substance dualism has. First, there is little reason to believe in contingent things that have no causal power to affect the world we live in – they do not matter. To explain this point, we can look to something like numbers. Numbers are not causal difference makers in the world, yet they are necessary truths, so they are useful for us to believe in. On epiphenomenalism, mental states are neither causal difference makers nor necessary truths – they are entirely contingent. This would be an odd thing to believe in generally and becomes much more so when we consider the presence and role of mental states (desires, beliefs, pains) in our everyday life. On epiphenomenalism, we would be forced to say things like “nobody ever winces because of pain.” We would also be left in the dark regarding who we are, because if we are at least in part made up of our mental states, then this part of us becomes questionable due to its lack of causal power and its contingency.

Secondly, causal power seems to be baked into the idea of mental states. When we feel scared, for example, our bodies undergo various changes in response to this mental state. If CCP is true and overdetermination does not occur, then only material

things could cause and be mental states. This leads to an odd disconnect on epiphenomenalism, where a full physical account of mental states plus a causally useless mental state is required to explain physical effects of the body. In short, epiphenomenalism commits us to weird beliefs that are, at the very least, far from the things that seem true about our experience.

These are the most relevant varieties of dualism today. Thus far, we have seen that interactive substance dualism stands in a better position than these other versions of dualism philosophically. Next, we will look at the two other central answers to the mind-body problem. These answers, instead of trying to posit and reconcile the material with the immaterial, swing fully in one of these directions. They both have their own method of rejecting dualism, and they are both simpler views than interactive substance dualism (they each posit only one kind of substance). This gives them each a slight edge over interactive substance dualism, but this edge is not enough to make up the lack of explanatory power they both have compared to interactive substance dualism.

Idealism

The first of these is idealism. Idealism proposes that nothing is ultimately physical. This means that everything around us is dependent on us as minds, and that there is no mind-independent reality. All of reality on idealism is a sort of projection from us as souls. This is a matrix-like view, except we are not brain-in-vats because we are not physical at all.

As I noted above, idealism is simpler than dualism. There are two major problems with idealism, however. First, idealism is not capable of being evidentially supported. We

can never confirm or deny that a mind-independent reality exists if we are minds perceiving what we believe to be reality.

The second major problem with idealism is that it is far from natural human intuition. Humans naturally come to believe in a mind-independent reality, whether this belief comes through common sense or some other innate faculty of humans. If idealism is true, then we are innately built for deception in this way, and we have good reason to question any of our other beliefs.

Materialism

The remaining answer to the mind-body problem (and method of rejecting dualism) is the most common mind-body view: materialism. Materialism, in short, is the belief that all of reality can be sufficiently explained in terms of physics, and that there is nothing nonphysical about humans or anything else in existence. Materialists endeavor to show that there is no “other substance” – all the observations we attribute to the mind can be sufficiently explained by science (most prominently, physics and neuroscience). Materialism has many versions and is at least as complex as dualism, so I will recount the two main versions here.

Behaviorism

The different versions of materialism, as you will see, make up different ways of attempting to explain mental states in terms of physical states (i.e. reduce the mental down to the physical). Behaviorism is the first of these. There are both radical and analytical versions of behaviorism, and B.F. Skinner was the main proponent of simple behaviorism (Graham). Simple behaviorism claims one simple equality: mental states are

behavioral states normally taken to be expressing internal states (Graham). For example, my mental state of pain on behaviorism is my behavior when I am in pain. If one is behaving a certain way, then, an observer keen on understanding the way they are behaving can directly and logically deduce their mental state (e.g. if one is crying, then they are sad).

There are clear problems here. Humans often have mental states completely different from their behavior at the time of observation. If behaviorism is true, then deception about one's inner states is not possible. This is simply not the case, so behaviorism is false. For example, it is possible that someone is crying and that they are not sad. On behaviorism, this is not possible.

Behaviorists (namely Gilbert Ryle) responded to this objection by introducing the notion of disposition. Ryle argues that while one may feel angry but not throw their fist, they are still disposed to do so, and mental states are dispositions of this sort (Tanney). In the end, this still does not work out. As David Armstrong says in his essay "The Nature of Mind," our thoughts-without-actions still constitute something on their own, apart from dispositions (Armstrong). Armstrong's criticism of Ryle is that dispositions are not occurrent states (states that currently occur in the mind). The inner states of persons that dispose them to behaviors, however, are occurrent states. It is not just a tendency to cry, but an occurrent inner state that causes the crying.

Functionalism

As behaviorism was losing traction, materialism took on a new form under the contributions of David Armstrong and David Lewis: functionalism. Functionalism, as a mind-body theory, claims that mental states are functional states. The mental state of

pain, therefore, would be functional in reference to certain ranges of inputs and outputs, like a fist hitting one's face and a subsequent set of movements to throw a right hook. As Armstrong explains the view, these functional states are somewhat like the dispositions of behaviorism, but they are occurrent states – they are occurring inside the subject.

Functionalism posits that mental states are “inner causes” that, under certain circumstances, cause some external behavior or set of behaviors. Functionalism, unlike behaviorism, is consistent with the identification of mental states as material. The most common way of going about this connection today is through neural firing. Neural firing, on functionalism, is an inner state of a person apt to cause behavior. Since this is also the definition of mental state, then neural firing is identical with mental states on functionalism.

Lewis' abstract to his paper *An Argument for the Identity Theory* sums this up rather well: “The definitive characteristic of any (sort of) experience as such is its causal role, its syndrome of most typical causes and effects. But we materialists believe causal roles which belong by analytic necessity to experiences belong in fact to certain physical states. Since those physical states possess the definitive characteristics of experience, they must be the experiences” (Lewis 1).

Functionalism solves the biggest problem that behaviorism had: identity between mental states and behaviors. However, it holds up the logical tie between these two entities, which maintains the deeper mission of behaviorism. Functionalism is, to date, the strongest theoretical argument materialists use to answer the mind-body problem.

The Hard Problem of Consciousness

While functionalism solved some of the problems that plagued behaviorism, it maintains the central problem of materialism. David Chalmers highlights this by describing the “hard problem of consciousness” (Chalmers 2). He does this by distinguishing the psychological notion (easy problems) of consciousness from the phenomenal notion (hard problem) of consciousness. The “easy problems”, he says, are problems related to inputs and outputs of neural systems (or systems in general). These include things like the “ability to discriminate stimuli, report information, monitor internal states, or to control behavior.” The hard problem, on the other hand, concerns “what it is like” to be in a given state/situation. While functionalism helps to explain the easy problems of consciousness, it does nothing in the way of explaining the phenomenal hard problem.

This distinction allows Chalmers to reinvigorate the old Cartesian-style modal argument, which he does through the possibility of zombies. Here is his “conceivability argument:”

- (1) It is conceivable that there be zombies
- (2) If it is conceivable that there be zombies, it is metaphysically possible that there be zombies.
- (3) If it is metaphysically possible that there be zombies, then consciousness is nonphysical.
- (4) Consciousness is nonphysical. (Chalmers 6)

His reasoning here is that one's zombie twin might have all of the same inputs and outputs that they do (they are functionally equivalent), but lack some of their conscious states (Chalmers 5). In this sense, the zombie would be physically identical to their human twin in every respect, but they would lack consciousness. If this is metaphysically possible, then consciousness is not physical.

Chalmers uses this reasoning in tandem with the Knowledge argument, which I personally find to be much stronger (I recount this argument in the introduction). The central conclusion of the knowledge argument is that physics (and therefore materialism) is not sufficient to explain what it is like to be a human being. *Qualia* is a parameter of variation in our life that is not about function. We can hold the inputs and outputs of our lives constant and our experience can entirely differ situation to situation. Chalmers also provides a “two-dimensional argument against Type-B materialists” attacking behaviorism and functionalism (Chalmers 17). I won't spend time on this argument here, as it is rather complex and long.

These arguments constitute massive blows to the materialist picture, as they point out good reasons to believe that consciousness is nonphysical. This is the central problem for functionalism, as functionalists identify brain states with mental states in an effort to reduce mental states down to physical events. As I stated in the introduction, the Unity of Consciousness argument is another argument in this vein – it points to a fact about human experience that remains unexplained on a physical framework. These three arguments are more than enough to say that interactive substance dualism is philosophically better off than materialism, because it provides a framework for explaining the phenomena of *qualia*, the unity of consciousness, and the metaphysical possibility of zombies.¹

¹ For more detailed argumentation on why functionalism does not sufficiently explain *qualia*, see *The Conscious Mind* (Chalmers 1996)

Conclusion

We have now seen that interactive substance dualism is the best answer to the mind-body problem philosophically. It is more philosophically sound and explanatory (particularly toward *qualia*) than other dualist answers to the mind-body problem, idealism, and materialism. Other dualist answers to the mind-body problem either leave us with questions of access to our own experiences (property dualism) or they leave us believing in contingent, unnecessary truths and commit us to odd beliefs because of mental states' lack of causal power (epiphenomenalism). Idealism is deeply far from human intuition about reality. Materialism does not provide any framework for describing *qualia*, the unity of consciousness, or the metaphysical possibility of zombies. As Chalmers notes, the major burden on dualism at this point is from science (Chalmers 30). The central question in this vein is: does anything in science disprove interactive substance dualism? In the following chapter, I will look at neuroscientific evidence against conscious agency, which is a central tenet of interactive substance dualism (and in fact, the one addressed by neuroscience). After this, I will pit interactive substance dualism against arguments for the causal closure of the physical based on historical physical evidence. Through this, I will show that the objections to interactive substance dualism from these two major areas of science fail and that interactive substance dualism remains a viable option today.

CHAPTER TWO

Neuroscientific Evidence Against Personal Causation

In this chapter, I will look at arguments against interactive substance dualism from neuroscience.¹ The key experiment I will look at is the Libet experiment, as it best exemplifies the argumentative problems present in the other more recent neuroscience experiments attempting to form similar conclusions. The Libet experiments attempt to show that the human decision-making process hinges on physical brain activity – this process does not hinge on conscious agency (the immaterial process which interactive substance dualism holds as the causal difference maker in some decisions).

Before jumping into the Libet experiment, though, I will explain the idea of personal causation (or conscious agency or free will – for the purpose of this thesis, these all refer to the same phenomena) and why it relates to interactive substance dualism. Personal causation is the idea that mental states can be the cause of brain states. For example, if I decide to think about cheese for the next hour, my brain will reflect this decision with physical brain states. These brain states would not have occurred had I not decided to think about cheese, so I personally caused them to happen. In keeping with the goal of the last chapter, no mind-body theory besides interactive substance dualism leaves room for this sort of thing to occur.

If we are nonphysical mental substances that can think and decide to do things, then we have some power to generate thought and movement. This is a causal interaction

¹ There are arguments against interactive substance dualism from other branches of science, but I do not find these remotely as strong as those from neuroscience. For some of these, see chapter 5 of Alfred Mele's *Free*

between the mental and physical that begins in the mental, so it is personal causation. Therefore, if someone were to successfully show that personal causation never plays a part in decision making and one's following physical states, this would disprove interactive substance dualism. To clarify: interactive substance dualism does not need to claim that every instance of physical state in the body occurs this way. It simply needs to show that at least one mental state makes a causal difference in the physical state of the body.

What are the Libet Experiments?

In the early 1980s, a neuroscientist named Benjamin Libet set out to experimentally answer the mind-body problem. Primarily, he wanted to answer the question of what causes our intentional outward behaviors – intention (mental events) or neural activity (physical events)? His experimental design is as follows: A subject sits in a metal telephone-box-like apparatus with a showerhead of EEG (electroencephalogram) electrodes attached to their scalp (this tool measures general electrical conductance of the scalp – a value associated with general brain activity). A very fast clock (using a dot to represent the time, rather than a line) called a Libet clock sits on the wall in front of them. The subject is then asked to randomly flex their wrist or finger, to which some more electrodes are attached. Lastly, they are asked to document the time on the clock at which they decided to flex their wrist/finger.

After averaging the EEG potential readings and graphing out the timestamps given by the subjects, here's a graphical summary of what he found:

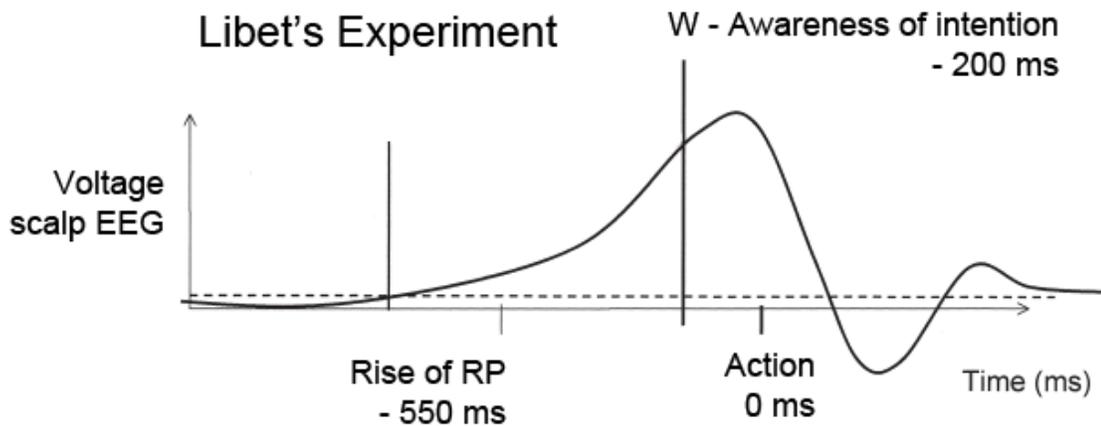


Fig. 1: Diagram of Libet's EEG Results

The curve here represents the average voltage readings of the scalp EEG around the time of decision making, which was intended to measure neural activity in the brain. "RP" on this chart is what Libet called "Readiness Potential," after his interpretation of the brain gearing up to make a decision. The line "W" is what Libet interpreted as the subject's "awareness of intention," which was the time they stated they had made the decision to flex their wrist or finger.

Without ever having seen these experiments, the interactive substance dualist would likely draw things up differently. They would guess that the subject's brain begins working during or after the subject is aware of their intention to raise their finger. This is, put simply, the shocking bit about the Libet experiments to interactive substance dualism. Libet concludes that human beings do not have free will from his experiment, and this conclusion is unreasonable for two main reasons: first, Libet simply has not shown that the subjects' mental state (their intention) did not play a necessary role in the causal chain

of events he recorded. Second, the raising of a single finger is not nearly a paradigm example of conscious agency as we normally take it.

Swinburne's Reply to the Libet Experiment

Perhaps the strongest response to the Libet experiment from philosophy is from Richard Swinburne (a dualist), who concisely presents an argument for the first of these two reasons in his book *Are We Bodies or Souls?* I find that his response is helpful in diagnosing the overarching problem with the experiments, but there is more to be done to show that interactive substance dualism is entirely compatible with the results of this experiment.

Before delving into the Libet experiments, Swinburne provides some general background on the interaction problem. The meat of this section comes in his explanation of pure mental events sometimes causing physical events. Some of his graphs are greatly helpful in understanding the problem, so I will use them as a launching point (Swinburne 128).



Fig. 2: Pure Mind-to-Brain Causation and Mental Causal Dangler

In these diagrams, each letter M represents a mental state (in this case, the intention to raise one's finger). Each letter B represents a brain state, or a particular arrangement of physical particles in the brain. The subscripts represent the order in which

each of these (separately) is occurring. Swinburne explains that there are really two ways of looking at personal causation: it either comes before its relevant brain events or after. For example, when one decides to raise their arm and so raises their arm, there is a mental event that occurs either before or after the physical events (neurons firing in the brain, then to the spinal cord, then to the arm, etc.) So, Swinburne poses, either we have something like this first picture of events, where the mental event is before any relevant physical events, or there's some physical event occurring first which causes the mental event and the rest of the relevant physical events (the second picture here).

As noted above, personal causation occurs when a pure mental event causes some physical event(s) in the body. This idea would align with the first picture of events above and is generally the way dualists think about mind-body interaction. For interactive substance dualism to be true, there has to be at least one case in which personal causation occurs.

According to Libet's findings, and with only these two pictures to choose from, we're likely left with the second one. Libet's "RP" seems to fulfill the role of B_1 , which causes the later mental event of "awareness of personal intent" and the subsequent brain events necessary to flex one's wrist/finger.

Now that we have these two pictures understood and in the frame of the Libet experiments, we can approach Swinburne's response to the experiments. Swinburne thinks that the Libet experiments provide no evidence against the dualistic picture of mind-body interaction even if they're scientifically sound.

To explain this, Swinburne diverges to some more graphs. He says that the common interpretation of the Libet experiments (shown as picture 2 above) misses out on

the possibility that M_1 is part of the causal chain. Worded another way: it's possible that B_1 causes M_1 , which then causes B_2 - B_4 :



Fig. 3: Mental Event as Necessary Part of Causal Chain

Instead of recognizing this possibility, scientists looking at Libet's experiment have concluded that M_1 must be some sort of causal dangler – simply the subject observing their own brain events as an intention. Therefore, M_1 could surely be a necessary part of the cause. We do not know what the curve would look like in the absence of a mental state (since the subjects intended to raise their fingers), so we cannot see whether the mental state made a difference.

As far as giving full benefit of the doubt to Libet goes, Swinburne's response is stellar. He is absolutely right in saying that this possibility of mind-brain interaction has been overlooked, and therefore that scientists have interpreted their data prejudicially. Swinburne then says that to show M_1 is not a necessary part of the causal chain here, an experiment would have to show that brain event B_1 causes B_4 and its physical action with M_1 just as well as it does without M_1 .

However, Swinburne is wrong that the Libet experiments, even if true, provide no evidence against the dualistic picture of mind-body interaction. They are far from what the dualist might expect given personal causation. Even after Swinburne's response (which assumes the scientific soundness of the Libet experiments), there is still some work to do before the dualistic picture is okay. Namely, we must describe how the rise of

the readiness potential before the subject is aware of their intention is consistent with interactive substance dualism. Swinburne's response assumes the scientific soundness of the Libet experiments and tries to argue that substance dualism is not disproven under these conditions. He is correct about this, but again, there is some additional explaining for the dualist to do. If the Libet experiments are scientifically sound, the causal picture explaining thought looks more-or-less materialistic: physical laws govern brain events which cause more brain events (plus maybe some mental causal danglers) and actions.

To clarify, the part of the Libet experiment findings that needs explanation is the early rise of "readiness potential." This correlates to B_1 from Swinburne's graphics, which represents the initial brain events observed. Either B_1 represents brain events proper (brought about by some unknown law of physics governing when and what thoughts arise), or it represents something else. If it represents brain events proper, then the Libet experiments favor materialism over dualism. If it represents something else, then dualism is not necessarily affected by Libet's findings.

Possible Explanations of B_1

There are at least four explanations of B_1 that are consistent with both interactive substance dualism and Libet's findings. Ultimately, I believe this shows that we simply do not know enough about the neuroscience to make decisive interpretations here. Regardless, these explanations may be helpful in deflating the power of B_1 coming before M_1 on the graph.

The first of these four explanations is that there could be a natural lag time in the mental life. Just like there is lag between neuron firing in the brain and a wrist flexion, subjects somehow have mental lag – they become aware or conscious of their intention

(and think they are making it) after they have mentally intended something. Therefore, M_1 as it is represented in the experiments is just the subjects' becoming aware (or registering already-present awareness) of decisions they have already made (which presumably occurred before B_1). As I will explain further later on, this would not be odd at all with regards to big or complex decisions – choosing which college to attend, for example. Maybe you have already made the decision, but you become conscious of having made said decision a bit later on.

The second explanation of B_1 I want to propose is the broad (temporally elongated) intentions explanation. Imagine being on the edge of a plane, about to jump into the atmosphere and skydive. How does it seem when you are making this decision and when you finally make it? It quite feels like your mind is going back and forth, ramping up, then eventually you just jump – you do not necessarily think to yourself “now is the time” at some given moment; the decision more temporally elongated than that (non-instantaneous). Therefore, it seems, our intentions in complex scenarios are broad – we have several factors playing into our decisions (with the skydiving example, simply heightened physiological activity). This elongated decision process could appear as something like an RP on a graph, just like Libet and Schurger found. And more than that, our intentions and thoughts could appear to be spontaneous on a graph, whereas they seem much less spontaneous to us.

Does this help with simple tasks such as wrist flexion? I believe so. In Libet's experiment, the subjects were told explicitly to make their decision on when to flex “unconsciously,” letting as little as possible influence them. But even this propagates its own set of thoughts and corresponding brain activity! If I were in Libet's experiment and

were given the same instructions, I would be thinking to myself “flex now” “oh wait, I am not supposed to think that” “but wait, was that not yet another thought?” “how do I do something without letting myself decide to do it?” and so on... then boom! You move your finger while still sorting out the thoughts. The rate of these thoughts would most certainly look spontaneous to an outside observer. Lastly, though one’s intention to flex their wrist is not nearly as complex as their intention to jump out of a plane, they still have a short “mental ramping-up” that occurs prior to their decision. To sum up on the elongated-intentions explanation of B_1 , there is no reason to believe that the RP found by Libet and Schurger represents anything other than the physical correlation to mental events occurring before and in a decision. B_1 simply reflects M_1 , and M_1 is not just a moment on the graph.

Alfred Mele presents a decision-making model in his short work *Free* that could be used to explain the role of B_1 . We will call this model the general intention explanation. This explanation proposes that decisions like those in the Libet experiment have two aspects: a general intention and a proximal intention. In the Libet experiments, the general intention would be the general intention to flex your wrist *randomly and unconsciously*.² The proximal intention, or cue, in these experiments would be self-provided – Mele uses the example of him saying “now” to himself. If you are reading this, stop, and try to raise your finger any number of times “randomly and unconsciously” over the course of a minute. You will likely find that you do something like what Mele explains – you may use a different word than “now” or not even a word at all, but you will

² Libet used the term ‘unconsciously’ because he wanted his subjects to avoid intentionally raising their fingers – a terrible, and likely impossible to follow, instruction to give if you are trying to measure whether consciousness makes a causal difference

likely be giving yourself cues of some sort. As an explanation of B_1 , the general intention would represent a fluctuating EEG signal (on Mele's model, this would be the way the brain reflects general intentions to randomly perform wrist flexions) and the proximal intention would be represented by the time a subject becomes aware of their intention. This picture is consistent with Libet's findings (in a general representative sense, not with the exact timing of things), showing again that the mental state of subjects could be playing a necessary role here. Further, this picture is significantly closer than Libet's interpretation to how things seem to us (namely, that our intentions make causal differences in our actions).

The last explanation of B_1 is also put forth by Mele, but in Ch. 3 of *Free* (Mele 28-32). When discussing more recent Libet-style experiments, Mele provides all sorts of explanations about what B_1 could be. His most powerful thought, I think, is that B_1 could be something like the physiological reflection of an urge to wiggle the finger or a slight bias to press one of two buttons. This is quite like the elongated intentions explanation, except the mental states involved are urges instead of simply streams of decision-related thought. On this view, M_1 is the conscious decision whether to act on said urge. M_1 here is obviously a necessary part of the causal chain, otherwise the chain would push through to B_4 whether or not the agent involved made a conscious decision to act on the urge B_1 . But clearly this is not the case – we have urges all the time and find ourselves in the position of choosing whether to act on them. We sometimes spend minutes of our lives deciding whether we should act on an urge to eat one more piece of dessert, for example. It is also very possible for us to have an urge to eat that extra piece and choose not to do so. Of course, there are cases where our physiological urges seemingly overpower our

conscious decisions, but this does not happen every time. These types of urges sure seem physiologically prompted, just as our decisions whether to act on them seem conscious. Often, the urges come before the conscious decisions whether to act on them, but this is clearly consistent with the interactive substance dualist's picture of mind-body interaction.

So, with all of these possible explanations of B_1 available, Swinburne's first reply to the Libet experiments becomes much more complete and satisfying. If we can reasonably apply these frameworks to the Libet experiments, there is no doubt that the relevant mental events of a subject could be a necessary part of the causal chain being experimented on. At this point, we can say that interactive substance dualism is at least as consistent with Libet's findings as materialism. Once we consider the way things naturally seem to humans (that their intentions do make causal differences in their thoughts and actions), interactive substance dualism takes a significant edge over materialism in providing the best account for decision-making.

Before moving on, it is worth noting that the Libet experiments are probably scientifically incorrect as well as philosophically unreasonable. In 2012, Aaron Schurger released a study entitled "An accumulator model for spontaneous neural activity prior to self-initiated movement" that discounted the Libet experiments on neuroscientific grounds. He repeated Libet's experiment but measured for the control – EEG signals of the subjects not being asked to move and not moving at all. He found that there were fluctuating EEG signals when subjects were simply sitting still, and he used artificial intelligence to compare these signals to the signals from subjects when they were asked to flex their wrists. His most significant finding was that the time subjects report

intentions of actions is much closer than Libet thought to the time when the neural chain of activity begins. Schurger and his team found that both the average beginning neural chain of activity and the average subjective intention time matched up at around -150ms of the action occurring. This result is also consistent with the interactive substance dualist's picture of mind-body interaction. The dualist would simply have to say that the time it takes for mental states to causally influence their first physical state is smaller than what they believed on Libet's evidence. Most of the lag time noted would have to be moved to the body – the time it takes for neurons to transfer their action potentials to other neurons and activate the relevant muscle groups for movement.

Self-Defeating Aspect of the Libet Experiment

Swinburne's second response to the Libet experiments depends on his framework of rational belief that he sets up in *Are We Bodies or Souls?* Because of this, and because it is rather far from being relevant to the consistency of interactive substance dualism with the Libet experiment, I will not discuss it here. There is perhaps a more powerful objection in the neighborhood of his response that we can make here, however. We can say for sure that the scientists performing Libet-style experiments are attempting to prove something opposite of how things seem to us. This avoids the overconfidence of Swinburne's second reply but points out a similar issue: if the Libet-style experiments are correct in their philosophical and scientific claims, and if materialism is true, then things are not how they seem to us.

If I were to raise my finger right now, it seems that I have decided to do this (that personal causation has occurred, i.e. a mental state has caused a brain state). As a mind (or mental substance or soul), I decide to raise the finger, and my decision causes my

body to follow through. If the Libet experiments (and their following philosophical assumptions) are correct, then I become aware of what is going on in this whole process well after it has started, and something besides my decision to move my finger causes the movement. This surely is not how things seem to me.

The problem lies in the fact that the Libet experiment relies on the way things seem to the subjects. If the experiments and their philosophical assumptions are correct, then Libet is attempting to prove that things are far from how they seem to us. If we can be wrong about the way things seem to us regarding what causes our actions, then we could surely be wrong about the way things seem to us with respect to smaller things, like the way a clock face appears to us. So, the goal of the Libet experiment, along with the nature of the experiment, makes the experiment self-defeating at its outset.

Libet's Unreasonable Generalization

In his short work *Free*, Alfred Mele covers an enormous amount of material surrounding the Libet experiments, similar recent neuroscience experiments, behavioral science experiments, social science objections, and more. His goal is quite similar to mine: show that none of these experiments rule out personal causation. At the end of his discussion on the Libet experiments, he points out Libet's major reasoning mistake.

When Libet interprets his results, he states that personal causation does not occur in general (that humans do not ever make conscious decisions to do things, or at the very least that these conscious decisions always lack causal power). This would be a fine conclusion to draw if the decision Libet's subjects made is a paradigm example of conscious decision-making. Mele brings up the contrast between the Libet experiments and the decisions we make every day, however: "randomly and unconsciously" wiggling

your finger or flexing your wrist is nothing like making decisions that we often think of as conscious decisions. These sorts of decisions could be like the skydiving example given earlier, professing one's love, or any number of other complex decisions that require you to mull over multiple options, make pro-con lists, etc. So, generalizing the assumedly proven unconscious results of wrist flexion to most decisions that humans make is unnecessary and fallacious.

I want to add in one example to Mele's reasoning here. Let's use Libet's original wrist flexion, but make it a consistent beat, like tapping along to your favorite tune. It seems that you decide to tap along to said tune by forming something like a general intention. Further, each individual tap has some sort of cue and proximal intention, likely caused by the upbeat, anticipation of the downbeat, etc. This example fits perfectly with Mele's general intention explanation of how the mind and body are interacting here, and it is significantly simpler than any of the complex decisions mentioned above. So if Libet's conclusions are not necessarily the best explanation of something as simple as tapping along to your favorite song, is there any reason they should generalize to all conscious decisions? Absolutely not.

At this point, Libet's conclusions simply remain unproved. We have seen that there is plenty of reason not to believe Libet's conclusions about something as simple as wrist flexion, and even if we take this to be true, there is no reason to generalize these conclusions to other, seemingly more conscious decisions that we make. Mele's work here provides a helpful guide to understanding why the Libet experiments are not defeaters for the dualistic picture of mind-body interaction. So far, it seems that alongside Swinburne's argumentation and the explanations of B₁ I have mentioned, Mele's

arguments drive (at the very least) this point home: materialism is no more probable than dualistic one given the Libet experiments.

To wrap up, I want to include a short summary of what Mele talks about in the 3rd chapter of his book. He asks the question: “Is free will/personal causation adrift in new-wave neuroscience?” There are two primary Libet-like experiments that he covers in this chapter. First, he looks at an experiment done by Soon et al. in 2008. This group claimed to be able to predict (using fMRI tech) with 60% accuracy which of two buttons a subject would press up to 10 seconds before it was pressed. There are a couple of major issues Mele brings up with this, and a couple that I see – one being the fact that 60% is only a little bit bigger than 50%, which would be pure chance. Therefore, these results do not seem very probabilistically useful or significant. Second, the brain signals being read on the fMRI could represent any form of B_1 as discussed above. Lastly, also as with the Libet experiments, these results do not say anything about significant conscious-seeming decisions that we make in our lives, like whether to accept a particular job offer or not.

The second study Mele brings up is a 2011 study, entitled “Internally generated preactivation of single neurons in human medial frontal cortex predicts volition” (Fried et al.). In this experiment, deep brain electrodes (instead of scalp EEG readings) were used to detect neural activity changes while subjects watched a Libet clock, pressed a key, and reported afterward when their intention initially arose to do so (basically the Libet experiment redone with better neural activity measurement technology). The results? “80% of the time, significant changes in neural activity were detected about 700ms before the W time the participant reported (the time they reported being aware of their intention), and the W time the scientists predicted was within a few hundred ms of the W

time the participant reported” (Mele pp. 31). What does this say? More or less: pretty specific brain activity seems to lead to conscious urges to press the key. But, this experiment falls prey to the same issues that the Libet experiment does. The brain signals detected could mean anything, and absolutely do not serve as proof against the dualistic mind-body picture. Lastly, Mele adds (and as talked about earlier), it is up to participants whether they act on urges. Therefore, in keeping with the thought that the deep brain neural activity is something like an urge, it is very possible that the scientists read out some activity on a graph and the subject’s behavior does not follow – simply because they chose not to act on their urge. And lastly, these processes are as inconsequential and ungeneralizable as wrist flexion. So, these experiments do little (if anything at all) more than Libet’s to make the naturalistic picture more probable than the dualistic one.

There are numerous other recent experiments like these (Matsushashi, 2008, for example), most of which contain similarly gross generalizations from actions like finger movements to the conclusion that conscious intention does not cause our actions. In 2009, Simone Kühn ran an experiment of this kind entitled “Retrospective construction of the judgement of free choice” and concluded that humans are not able to consciously “veto” their actions (Kühn 2009). In 2016, a study designed to test the same phenomena at a higher level of complexity was released, where subjects “played a game where they tried to press a button to earn points in a challenge with a brain–computer interface (BCI) that had been trained to detect their readiness potentials in real time and to emit stop signals” (Schultze-Kraft, et al, 2016). This study concluded that humans are indeed able to “veto” their initial action-decisions post-RP detection, but before a “point of no return” around 200ms prior to the onset of movement (Schultze-Kraft, et al, 2016).

The decisions involved in even Schultze-Kraft's experiment, of course, still are not the caliber of seemingly conscious decisions that we experience day-to-day. However, we see that conscious agency may have some role in even decisions of one further degree of complexity – i.e., canceling a prior decision.

To sum all of this up, scientific experiments claiming to disprove personal causation (and subsequently, interactive substance dualism) have not been effective. Interactive substance dualism is no worse off after consideration of the Libet, Soon, and Fried experiments. These experiments fail to show that personal mental causation is not necessary in the causal chain to action, and they further fail to show that this kind of causation is not the start of causal chains leading to action. Beyond neuroscientific failures in deducing the role of conscious agency, we see more recent experiments like Schultze-Kraft's that reasonably conclude the opposite.

At this point, we have seen that interactive substance dualism is the most philosophically sound and explanatory answer to the mind-body problem. In this chapter, I have shown that recent neuroscience has not disproven personal causation, though it claims to. I have also shown what this means for interactive substance dualism – that it is at least as capable as materialism in explaining the findings of these neuroscientific experiments. These two chapters together show that neither philosophy nor recent neuroscience has ruled out interactive substance dualism as the best explanation for *qualia*, the metaphysical possibility of zombies, and the unity of consciousness. In the next chapter, I will tackle the last major scientific objection to interactive substance dualism – the causal closure of the physical world.

CHAPTER THREE

Against the Causal Closure of the Physical World

Thus far, we have seen that interactive substance dualism is the most philosophically sound and explanatory answer to the mind-body problem. We have also looked at recent neuroscience experiments along with arguments against personal causation made on their behalf. None of these experiments have done the work they set out to do, or even close to it. They have been ridden with unreasonable generalizations and unjustified data interpretations, which has made for tough argumentation and insufficient evidence.

Now, we will look at a different kind of argument from science. Instead of looking at specific experiments, we will assess the “general scientific consensus” that has given rise to much of what we have looked at so far. This consensus is one of the heaviest and most cited points against interaction (and therefore interactive substance dualism). This view is called the causal closure of the physical (CCP), and (as formulated by David Papineau) is as follows:

(CCP) All physical effects are fully determined by law by a purely physical prior history (Papineau 4).

CCP is not only an assumption in science – it is a pivot point for the mind-body discussion. If CCP is true, and if every physical effect only has one complete cause (overdetermination does not occur), then interactive substance dualism is false (and the

possibility of personal causation becomes questionable, at the very least). On these views, there is no room for anything besides physical prior histories and relevant physical laws to cause physical effects. Of the types of dualism, only epiphenomenalism can be true in conjunction with CCP, because whatever nonphysical substance exists does not have any causal interaction with the physical world on this view. I talked about the problems of epiphenomenalism in chapter I, so I will not say any more here about them.

No one has proven CCP to be true. As we will soon see, there are gaps in physics that need to be closed before CCP can even be considered probable – and there are likely more gaps we do not know about. However, it is a central conclusion of science that CCP will be true in the future. The trajectory of science and the establishment of general conservation laws have pointed toward CCP and have set science up to claim it as a yet-to-be-proven truth. This chapter will focus on arguments for and against these claims.

David Papineau gives a concise history of the establishment of CCP in his essay “The Rise of Physicalism,” which I will summarize here. This history will help us understand exactly why science claims CCP is true. CCP is essentially a hard-won scientific consensus, which has been allegedly earned throughout time and experiments establishing general conservation laws. The catch is this: if we have perfectly general (and fully physical) conservation laws in science, then physics is closed. As I stated earlier: if physics is closed, and if overdetermination does not occur, then there is no room for interactive dualism to be true. There would be no room for mental causes causing physical effects because everything could be explained by prior physical histories and the laws of physics. Papineau’s history will help us see why we should question CCP and therefore where and why there is room for interactive substance dualism to be true.

History of CCP

Papineau starts off speaking directly in reference to the mind, talking of mental causes as the main players in question. He says, at least for the early history of CCP, that the key question is “whether there are any non-mental (physical) effects that cannot be accounted for without reference to *siu generis* mental causes” (Papineau 9). “*siu generis*” here simply means that the mental causes in question are wholly non-physical.

The history begins with Descartes, the first philosopher to work in a physical framework significantly different from physics in the time of Aristotle. Descartes asserted that the “quantity of motion” (mass times speed) of physical objects is constant (Papineau 9). Since this quantity leaves open vectoral direction change, there is technically room for mental causes to have physical effects. Mental causes could simply be changing the direction of sodium ions in the brain, for example, giving rise to certain thoughts at certain times. Descartes believed that the pineal gland (a tiny organ roughly at the center of the brain) was the seat of the soul, and that mental states changed the direction of particles there to cause the physical states of the body (like the raising of my arm when I have a question). This was a wildly incorrect and unrefined view, and Descartes received much blowback on it from science as time went on. Even without the pineal gland theory, there has been no evidence of mental causes changing the direction of particles in the brain, so this method of drawing things up has not worked out. Either way, Descartes’ “quantity of motion” was the beginning of a long train of conservation law creation. Next, Leibniz came along and posited the conservation of linear momentum and kinetic energy (Papineau 10). These conservation laws knock out what Descartes said about quantity of motion, because they account for directional change. According to Papineau,

the conservation of these quantities was enough to “ensure physical determinism” (Papineau 11).

So why did CCP not become a widely held belief from this point? Papineau attributes this to the next paradigm shift in physics, which re-opened the case for physical determinism. Up to this point, the only method of action in physics was believed to be contact (Papineau 12). Newtonian physics completely changed this picture to view forces as “impressed,” which means they “consist in action only and remain no longer in the [relevant] bodies when the action is over” (Papineau 12). The two kinds of impressed forces that Papineau speaks of here are field forces (gravity, e.g.) and other special forces. Since Newton dethroned impact as the only method of energy transfer in physics, the road to other force interpretations opened, and “special forces” became a possibility. Special forces are basically non-gravitational forces (chemical, magnetic, etc.) where contact is not the primary mode of energy transfer (Papineau 12).

This framework leaves room for mental causes in the category of special forces. Though Newton’s laws implied the conservation of momentum in closed systems, conservation of energy was not part of his framework, and there are no laws in Newtonian physics governing the origin of forces (Papineau 13). Therefore, there is room left here for mental causes to have physical effects as forces of their own.

Papineau follows this thought by outlining the two kinds of mental forces that Newtonian physics would allow for: indeterministic mental forces (spontaneous mental causes affecting the physical world) or mental forces governed by deterministic force laws (maintains determinism) (Papineau). Papineau notes that a world with deterministic mental force laws is scarcely different from a purely physical world, and therefore likely

not worth denoting. In this sense, the big question is whether there is any allowance for indeterministic mental forces. At this point in the history, Papineau is willing to say yes.

This answer changes, however, when he turns to discuss the conservation of energy. Conservation talk, according to Papineau, began with traditional rational mechanics. The story we have looked at above covers much of this, where conservation was present with Leibniz and then suspended with Newton. The key difference with where we are now is that we believe “all fundamental forces” to be conservative (Papineau 15). At this point, however, nonconservative forces like friction were left open, with energy disappearing into thin air.

Joule’s “equivalence of heat and mechanical energy” was the key to the lock of energy conservation (Papineau 16). Once it was understood that mechanical energy is the same sort of thing as heat, physicists could explain events like friction on a purely conservative basis. Nothing was disappearing – all energy was going somewhere, and “non-conservative forces like friction were merely macroscopic manifestations of more fundamental conservative forces” (Papineau 16).

To Papineau, this means there is no room for the first type of mental force allowed by Newtonian mechanics. The reason for this is that “the very idea of [energy conservation] commits us to a law which governs [the force in question]” (Papineau 18).¹ These are the sorts of laws that describe potential energy gains and losses, and energy

¹ Papineau’s formulation here is a bit weak. He says that the reason the conservation of energy rules out indeterministic mental forces is that these forces do not have laws showing how they cause accelerations and gains/losses in energy. A stronger way of putting his argument is as follows: the conservation of energy rules out indeterministic mental forces because nothing nonphysical can contribute to gains or losses in energy within the physical world. I show below that there are indeterministic aspects of current physics that give us good reason to question even this line of reasoning, however, and Papineau recognizes this in the 17th footnote to his work (pp. 26). A further reason for questioning this amended line of reasoning comes from James Pitts, who shows that energy conservation is, in fact, consistent with interactive substance dualism (Pitts 2019).

type transfers (Papineau 18). Indeterministic mental forces, by their nature, do not have these sorts of laws, and so they will not obey energy conservation. Therefore, the conservation of energy rules them out. Therefore, the conservation of energy is simply inconsistent with spontaneous mental forces ungoverned by deterministic force laws.

Lastly, Papineau recognizes that the conservation of energy allows for deterministic mental forces. This remains slightly problematic for him, because while these sorts of forces would satisfy the conservation of energy, they would break the completeness of physics.

Papineau gives two final lines of argument to drive the completeness of physics home. He says first that all “other forces” noted in history have been reduced to fundamental, conservative forces. So, even though we could name some force active in the brain a “mental force,” it will likely, like friction, reduce to conservative fundamental forces that have already been discovered. Second, there is no physiological evidence necessitating a special force. As scientists in general have furthered physiology and neuroscientists have furthered our understanding of the brain, we have seen nothing out of the ordinary given the physics we currently understand. According to these two arguments and the conservation of energy, Papineau says, the completeness of physics is overwhelmingly probable.

The Track Record Argument for CCP

Papineau’s first line of reasoning here is a “track-record” argument of sorts. He is simply saying that as we have encountered mysterious physical events in the past, our physical explanations have proved sufficient. We have been able to reduce friction and

other seemingly non-conservative physical events down to conservative fundamental forces. So, we will likely be able to do this with the brain.

An important facet of this argument is its inductive nature. So, we must take it as such moving forward. The track record argument is a bet on the way things will look in the future based on the way the world has run thus far. The argument basically goes like this:

- (1) At several points in history, we have believed events to be caused by nonphysical entities
- (2) At some time after every one of these points, we have empirically deduced that these events are, in fact, reducible to physical ongoingings
- (3) Given a large historical precedent for reduction, we can induce that the future will be like the past
- (4) 1 and 2 provide a large historical precedent for reduction
- (5) The future will be like the past, meaning every future event we encounter will be reducible to physical ongoingings

Indeed, in the recent past we have discovered that many events we look at can be explained in terms of the four fundamental forces we have found: electromagnetism, gravity, the strong force, and the weak force. However, before we made it to this point, we had to posit entirely new forces. At one point, however, gravity and electromagnetism seemed mysterious to us, quite like consciousness seems to us now. After this grey point, there was a physical revolution establishing these fundamental forces and their laws. The

track record argument goes to say that this will continue to happen for the things we do not currently understand through physics.

There are two main modes of arguing against the track record argument. The first is to point out the weakness of inductive arguments in general. The fact that physical revolutions and reductions of events have dominated in science in the past simply has no logical bearing on any given event being physically reducible in the future. At best, this argument could rely on probability based on prior experience, but this is even a flimsy premise.

The second mode of arguing against the track record argument is to point to one or more inconsistencies in the historical precedent for reduction used for the argument. As with Newton and the suspense of determinism from Leibniz, there have been moments of suspended reduction in physics. Recently, these moments have shown up in quantum physics.

As quantum mechanics was being formulated, physicists began examining the four fundamental forces under its postulates. They found that there were quantum “carriers” of three of the four fundamental forces, which explained them to greater detail (and in quite a different manner) than we had seen before. This has been done with the electromagnetic force, the weak force, and the strong force.² We are slowly discovering smaller particles and unexpected interactions among them, allowing us to describe old rules in a new way and sometimes formulate new ones altogether. These descriptions occasionally exist in physics as alternatives to traditional mechanical descriptions, not discovered truths underlying our prior general theories. For some phenomena (like light

² Short explanations of these theories can be found on the Hyperphysics website (referenced in the Bibliography)

being describable as a wave or particles), physicists have multiple ways of describing the same event. While this is extremely useful, it is far from deterministic. At best, we rely on probabilities of explanations or occurrences with quantum physics descriptions, and this leaves some doors open in the reductive history of physics.

David Chalmers makes quick work of explaining this sort of indeterminism and the gap it leaves open for interactive substance dualism. Chalmers notes that modern physics is “encouraging to the possibility [of interactionism]” (Chalmers 30). He notes that physical states can now be explained by wave functions, “according to which physical entities are often in a superposed state” (Chalmers 30). The earliest and most palatable encounter of an idea like this in physics is the observation of light as a particle and a wave. Light, by the famous double-slit experiments, has been shown to have properties of both a particle and a wave. Further, it can be usefully observed as either of these entities alone.

As Chalmers explains, there are two different ways these wave functions can resolve: through linear and nonlinear evolutions. Here’s the key point: “Schrödinger evolution is deterministic, but collapse is nondeterministic Schrödinger evolution is constantly ongoing, but on the standard formulation, collapses occur only occasionally, on measurement” (Chalmers 30). To try and explain this more simply, let’s use an atomic example. Electronic presence used to be explained by the Bohr model. This model is somewhat planetary, with concentric rings of electron valences around a nucleus. It is the first model chemistry students see in textbooks, as it remains the simplest explanation of atoms.

As chemistry progressed, we discovered that electron locations can be more accurately described by probability distributions, or clouds of probabilities. This picture looks more like a gradient of color most concentrated at different points (depending on the atom or molecule in question). The darkness of this gradient represents the height of probability that an electron will be in some place at some given moment in time. In other words, the darker the point on the gradient, the higher the probability you will find an electron there upon observation. Quantum mechanics poses that at any given moment, the electrons in atoms are not in any given place – they are in a superposed state.

Upon observation, these probability distributions sometimes collapse into physical states. When collapse occurs, the particles in question move from being in a superposed state represented by a wave function (describing probability distributions) to being in an actual location. Further, these physical states are not fully observable, due to the Heisenberg uncertainty principle. Two variables are at play with this principle (momentum and position), and Heisenberg showed that both cannot be observed at any collapse.

What does all of this mean for the track record argument? Well, two things. First, we can assert that the foundation of physics may be indeterministic. In other words, there is positive evidence that the physical world may not be causally closed given what we know about physics alone. If physics is causally closed, we expect physical determinism. Clearly, quantum mechanics with collapse has opened this door back up from where Papineau stopped the history. Therefore, CCP is compromised, at least for now. This is summed up quite well by the work of Heisenberg and Carl von Weizsäcker, who were constantly faced with indeterminacy when examining quantum phenomena. Holger Lyre

nicely summarizes the philosophical implications of von Weizsäcker's work, showing that under quantum mechanics, "physics is reduced to information or, more precisely, potential information" (Lyre 2).

In saying this, Lyre is harping on the indeterminacy present at even basic levels of physical information. The first level of this indeterminacy is with actual locations of particles. At the basis (and particularly on the atomic level), physics relies on information on these locations that is potential in nature – it is not determined, sure truth. The second level of indeterminacy Lyre is referring to is descriptive. We can describe the same phenomenon in multiple different physical ways, many of which resolve to different results. Again, this is useful, but it is only potential information. It is not sure, and it cannot be used as a single premise in any argument.

This idea is closely related to a popular paper written in 1990 by physicist John Bell, entitled "Against Measurement." In this paper, Bell questions the field of physics for its philosophical problems surrounding quantum physics. He has two main issues: first, at the time of writing, physicists conclusively knew very little about the way quantum physics relates to everyday physical events. He notes several inconsistencies and ambiguities arising from different quantum theories that existed at the time, showing that physicists were still confused about what might be the foundational mesh of our universe.

Second, he questions physicists who apply what we know about quantum mechanics only in experiments, and do not attempt to use it to understand the world around us. He states that this is against the larger function of science, which is to systematically understand ourselves and the things around us. Bell mentions this attitude

as part of the physics community in an earlier paper, saying “many came to hold not only that it is difficult to find a coherent picture but that it is wrong to look for one – if not actually immoral then certainly unprofessional” (Bell, BSNR, 5).

Due to my lack of knowledge in physics, I won't say much more than this: von Weizsäcker, Bell, and others like them have continually come along and pointed out deep inconsistencies and philosophical issues in physics with quantum mechanics. The skepticism of physicists like these and the continued existence of theories like collapse in quantum mechanics is enough to admit both that the physical world isn't completely explained yet and that there is little reason to believe in CCP on the knowledge base we have.

Chalmers makes one further move that I will lightly cover. He follows his short explanation of quantum indeterminacy by noting that “the collapse dynamics leave a door wide open for an interactionist interpretation” (Chalmers 31). Chalmers points out the fact that there is a causal variable in collapse quantum mechanics called “observation,” which leaves room for mental causes to be involved. Collapse on this interpretation is, in fact, “supposed to occur on observation” (Chalmers 31). He further points out the great disagreement in science about what exactly a measurement is, but that “there is one sort of event that everyone agrees is a measurement: observation by a conscious observer” (Chalmers 31). The main interpretation philosophers and some physicists have pondered in this vein is the idea that this could be the source of odd physics going on in consciousness. In other words, conscious observation could play a necessary role in our thoughts and ideas because of the way it causes quantum phenomena. Papineau mentions this as an odd, yet effective defeater for CCP in the 17th footnote to “The Rise of

Physicalism.” Referencing these arguments, he says “On these interpretations, the completeness of physics is indeed violated, since collapses do not follow from more basic physical laws, but depend on ‘emergent’ causes. It would seem an odd victory for non-physicalists, however, if the sole locus of sui generis mental action were quantum wave collapses” (Papineau 26).

Papineau is correct about the odd nature of this interpretation, but it remains possible, so further research is much needed in this area. Chalmers has written rather recently on this topic in his paper “Consciousness and the Collapse of the Wave Function,” where he coalesces mathematical theories describing consciousness and quantum collapse. He notes in the abstract that simple versions of this theory are incompatible with knowledge we currently have in physics, but that more complex versions remain possible. Simply enough, quantum physics has left room for dimensions to consciousness that we have not described, and further research is necessary here.

With Chalmers’ recent area of research remaining open and the general indeterminism that von Weizsäcker and Bell brought to light, Papineau’s track record argument becomes much less clear. If anything, we are finding out that the fabric of our physical universe is at least partially and naturally indeterminate. This fact shakes up the evidence that the track record argument relies on, and because of this we have little reason to currently believe CCP.

Argument for the Uniformity of Nature

At this point, we have seen that physics is not as determined as we often believe it to be. Do we have good reason to believe any of this indeterminacy is associated with the human brain and conscious agency? I have already mentioned that philosophers are

trying to work this possibility out in detail, but do we have any general reasons to believe that physics of consciousness looks different from the physics of the world?

I believe the answer to this question is an emphatic yes. Arguments that look at consciousness in this way are called arguments about the uniformity of nature. Where the track record argument looks to everything not-yet reduced to physical ongoings as the quantity needing to be clarified, arguments from the uniformity of nature look primarily to the brain. Consciousness is the key quality in question when it comes to CCP, and the human brain is held to be the seat of consciousness on most mind-body theories. Interactive substance dualists claim that it cannot be explained by solely physical ongoings, and materialists believe it can.

Colin McGinn presents the central question of these arguments in his book *The Mysterious Flame* when he says: “there is a yawning chasm between the natures of [brains and other organs], because brains produce consciousness and those other meaty organs do not” (McGinn 9). Based on this chasm, we either should not be conscious or there is truly something different going on in the brain to allow for conscious agency. These arguments follow this basic format:

- (1) The world outside of human brains is physically deterministic
- (2) The brain is no different from the world external to human beings
- (C) The brain is physically deterministic in nature

The pivotal premise of this argument is that the brain resembles the rest of nature – there’s nothing “special” happening in the brain that would lead us to posit some special force or other cause to explain what is going on.

In a purely physical sense, this argument has evidential weight. We don’t see odd particle movements when we view the brain under a microscope in the way that Descartes posited. This presumption on its own is also reasonable. With the basis of physical discovery we have, we should not take matter in one part of the universe to behave differently from matter in another without good reason. So the question, then, is whether we have good reason to believe things might run differently in the brain. We do indeed have good reason to believe this, because there is something deeply mysterious about the brain: it is correlated with our subjective self-conscious experience. There is nothing in the external world quite like our unified conscious experience. Our ability to realize the space we are in currently and wholly, recall memories, think on different problems and aspects our lives, and simply think flowing thoughts is naturally unique.

We do not seem to be under physical determinism like the rest of the material world (excluding the possibility of animal consciousness here for simplification). When I, for example, bring something to mind, we see that my brain lights up in certain areas relative to the thoughts I had. While nothing on the micro-level in the brain seems to be breaking the completeness of physics, the very fact that I brought the thing to mind that I did and that the brain lit up in the way it did is not explained by only physical laws and prior physical histories. It is explained simply by my conscious agency in thinking of the thing that I thought of. This personal explanation of our bringing up particular thoughts is

not only a good one – it is the only explanation we have of this phenomenon. As we will see soon, the only other explanation requires us to say that we are not bringing up thoughts at all.

If this connection could be explained purely by physical laws and prior physical histories, then we would expect to one day be able to predict people’s thoughts without them telling us what they are thinking. One key point here, however, is that there will never be any good reason for us to refute someone on their own thoughts, even upon our physical observation of their brain.³ If a neuroscientist looks at an fMRI of someone (uninstructed) thinking of something and concludes that due to past fMRI studies, they must be thinking of their grandmother, and they instead say they were thinking of their great aunt, the neuroscientist has no authority to deny their testimony. This is because all we know about the brain and our thoughts is reduced to correlation based on testimony, and not the relevant physical ongoings.

What Neuroscience Has and Has Not Taught Us

Another way of making this point is to look at the physical ongoings of the brain and deduce what exactly we can know from them. Neuroscience has taught us much about the way that cells relay action potentials in the brain. It has also taught us about correlations between brain states and mental states – when someone is in pain, their brain state looks like other brain states we have collected as evidence when people say they are in pain. What neuroscience hasn’t taught us, however, is how and why an action potential occurs in some particular neuron (or set of neurons) when I think of the cheddar cheese in my refrigerator or when I have any other particular thought/idea.

³ This idea comes directly from a conversation I had with Dr. Buras, my thesis director.

Moving one step further, neuroscience does not explain the flow and control of our thoughts. I believe I am in control of my thoughts right now. I can either choose to call up a memory of eating breakfast this morning or I can think about the next thing I want to write in this paragraph, and so on. There is little explanation in neuroscience for why thoughts are linked together the way they are, and no account where we are in control of such thought linkages. What is left, then, is an account of thought processes where we are not in control. As I will explain in the conclusion, this leaves us, at best, in an epistemologically questionable position regarding our experience.

The Unity of Consciousness

There is one last notable aspect of our experience that has been the subject of much neuroscientific and philosophical debate in the past couple of decades. I think it drives the uniqueness of our experience home, and therefore is another point against the uniformity of nature. The point is this: when we look at the brain on a neuroscientific view, we see fragmented physical correlates of sensations. However, when we are experiencing something, nothing about our sensational experience is fragmented. We feel as though we are in time, experiencing things as they happen all at once. When I see my desk, for example, I do not see myself as experiencing each different color of wood reflected into my eyes by the light from my window – I simply see my desk. Similarly, when I talk to a loved one, I do not experience things in a fragmented manner – I experience it all at once as a single unified subject.

Materially, this unity of conscious experience is hard to define. However, when we invite something like a conscious substance into the picture, there are numerous interpretations available on how this substance might play a role in unifying the material

aspects of sensation and experience. The arguments for and against this view are numerous and complex, so I won't dive into them here. A notable argument²⁰ for the unity of consciousness in substance dualism has been presented by Brandon Rickabaugh, who creates a bridge between a particular theory of causation and modern neuroscience theory to explain the unity of consciousness and following substance dualism.

Overall, we have many reasons to reject that nature is physically uniform with respect to the brain (and more generally, consciousness). We seemingly have control of the flow of our thoughts, and there is no physical explanation for this fact – our best explanation involves conscious agency. Further, there is nothing else in nature like the human brain because the human brain produces consciousness. Lastly, our experiences are unified and we are unified, and on the materialist account of the brain none of this is true. To believe materialism about consciousness, in fact, would be epistemologically disastrous.

Chapter Conclusion

In this chapter, we have looked at some background on CCP and its history according to Papineau. We have divided Papineau's argumentation into the two most common philosophical and scientific arguments for CCP, namely the track record argument (scientific consensus) and the argument from the uniformity of nature. We have then looked at arguments against the track record argument, mainly hovering around the instability of modern physics. From this, we looked at an interesting avenue provided by said instability, namely the connection between modern quantum mechanics and interactive dualism. This instability and possible avenue show that CCP is unproven. Not

only can we question CCP because of its inductive nature, we have good reason to question it because of the indeterminacy in modern physics.

Lastly, I argued against the argument from the uniformity of nature, first stating the uniqueness of human experience as compared to the rest of nature in general, then touching on this uniqueness as it relates to our seeming control of our thoughts. In conclusion, there are many reasons to not believe that our universe is physically causally closed, and many reasons to believe interactive dualism is true.

CONCLUSION

In chapter I, I argued that interactive substance dualism is the most philosophically sound and explanatory answer to the mind-body problem. I showed that the other dualist answers to the mind-body problem are ridden with problems that interactive substance dualism does not face. I then showed that both idealism and materialism, the remaining major answers to the mind-body problem, are far from how things seem to us. Idealism is deeply far from human intuition – it endeavors to show that there is no mind-independent reality. Materialism is far from how things seem to us in that it does not explain *qualia*, the unity of consciousness, or the metaphysical possibility of zombies. Only interactive substance dualism provides a framework for understanding the phenomena of consciousness, so it is the most philosophically sound and explanatory answer the mind-body problem. The main problems left for this view come from science (specifically neuroscience and arguments for the causal closure of the physical).

In chapter II, I explain the tie between interactive substance dualism and personal causation. I then look at the Libet experiment, which attempts to disprove personal causation on neuroscientific grounds. I show that Libet has utterly failed in this endeavor, because there are at least four explanations of how personal causation is consistent with his results and because this effort requires a deeply unreasonable generalization from his experiment to the rest of human decisions. I finish this chapter by showing that for the most part, more recent neuroscience experiments face the same issues as Libet's experiment, and the ones that do not seem to successfully show evidence for personal causation in decision-making.

In chapter III, I historically discuss the hard-won scientific consensus that is the causal closure of the physical world. I show that there is indeterminacy in modern physics that is consistent with interactive substance dualism, and therefore there is good reason to believe our world is not physically causally closed. I also argue against the arguments for the uniformity of nature, on the account that the human brain, in its production and exercise of consciousness, is unique. I argue this on account of our ability to control our own thoughts and the unity of conscious experience. Overall, this chapter shows that there is little reason to believe that the causal closure of the physical world is true or will be true.

Chapter I shows that interactive substance dualism is philosophically the best explanation for our experience. Chapters II and III show that none of the strongest objections brought against interactive substance dualism from science successfully disprove dualism. On these two conclusions, we can say that interactive substance dualism is the best philosophical and scientifically consistent explanation for our experience. Therefore, it is reasonable to be an interactive substance dualist today.

Further Research on our Control over the Flow of Our Thoughts

There is one main avenue for further research that I would like to highlight: the epistemologically disastrous results of physical determinism based on the control we have over our thoughts. I allude to this idea at the end of chapter III, but I believe it deserves more attention philosophically, so I will restate it more clearly here.

It seems that we are in control of our thoughts. If I were to give you an open instruction, like “think of something right now,” you might think of a bicycle. But you also might think of a chair. Either way, you have good reason to believe that you thought of what you thought of because you decided to think of it – not because of the arrangement of physical particles in your brain prior to having the thought and the physical laws we have to describe how these particles might move from the before-thought snapshot. There are really three different views we can take with regard to the control and flow of our thoughts, which I will outline here.

First, we could say that we are fully in control of our thoughts and everything going on in our brains. This theory does not seem scientifically supported, as there are plenty of involuntary things going on in our brains all the time. There is neurobiological “noise,” so to speak, so when fMRIs or glucose PET studies are done, we do not see *only* clear-cut areas of the brain lighting up related to someone’s thoughts. Further, certain things pop into our thoughts without us doing any conscious work to bring them up – thinking of food when you are hungry, as an example. Either our physiological states or our environments can cause these, and they are common to all of us.

The second option is consistent with CCP. On this view, we are not in control of our thoughts at all. This is a physically closed *and* deterministic view that splits quickly into several camps, each with their own thought as to what sort of material thing we might be. These different views state that we are a specific set of neurons, the whole brain, or some other physical set of matter. These views get more scientifically reasonable as they gain complexity, quite like the interpretations of substance dualism that are currently being researched.

A notable effort in this view is to invite the illusion of choice into physical determinism. That is, to take the phenomena generally attributed to indeterminism on other views (free choice, e.g.) and attribute them instead to some unknown complexity in the material systems of brains. This makes determinism more nuanced, where it *feels* like we have free choice and control of our thoughts, but we really do not. On this picture, we are fully material beings who only seem to control some of our thoughts. We are some sort of material network in the brain that pushes the pins and levers necessary to think about cheese as we think about cheese, convincing ourselves that we made the choice all along. This convincing would also be a physical ongoing, so it would not occur in the way we seemingly convince ourselves to do things. We would further (and falsely) believe this to be a choice that we made.

The last main view is that we are nonphysical and in control of some of our thoughts. This is interactive substance dualism – an indeterministic view where CCP is false. On this picture, our brains go about many things involuntarily and without our conscious input. When we do choose to think of something, or choose to abstain from some thought, however, our brains reflect this physically. This picture is consistent with

neuroscientific observations, in that we see noise along with more powerful brain state appearances upon conscious thought.

These three models look very differently at the flow of thoughts and our control over our own thoughts. We can make short work of the first view, as I have done above – it is evidentially unsupported. All we need is for the third view (interactive dualism) to be at least as probable as the second (deterministic materialism) to show that we should not believe CCP based on our thought flow.

On a broad level, the third model *seems* significantly closer to human experience than the second. It *seems* that when I decide to eat a sandwich for lunch, I truly decided to eat a sandwich for lunch. This case seems markedly different from cases where the mental states involved do not seem under my control. Take the pain I feel when I stub my toe, for example. I did not choose to experience this pain, or even to put myself in a position where I might experience this pain. With my making a sandwich instead of a salad for lunch, I am deciding on something that makes a significant difference in my experience. My choice of making a sandwich does not at all feel like the pain I feel when stubbing my toe; it feels voluntary, and it feels like a different *type* of mental state. The second model, and more strictly CCP, simply does not allow room for this sort of choice to occur, or this sort of difference in mental states to exist.

But why should the way things *seem* matter? When we inevitably perceive something incorrectly (like that the solar system is organized geocentrically), we can eventually discover that things were not the way they seemed to us. The important in this case is that our perception of our own thinking is epistemologically pivotal. When we are wrong about an external fact, like the central point of our solar system, we just change

our beliefs. When we are wrong about the way we think and believe, we have good reason to question everything we know. If my own thoughts are not from me, and if I am completely out of control in my own mind, then I have no more reason to believe what is going on in my brain than I have to believe a piece of external information from someone else. I lose ownership of the things happening in my brain, and I can no longer take my thoughts about other things to be truthful. I am solely on the receiving end of other powers; a passive observer, if you will. This is far from the way we live and perceive ourselves, and it sets up a rather slippery slope toward skepticism.

Another way of stating this problem is that we have more than one mode of epistemic access to many external things. I can see and touch the TV remote. So if one of my faculties, like my sight, is in error, I can correct it through another mode of epistemic access like touch. In other cases, our epistemic access is limited to one faculty. This is the case with our awareness of our own mental states. Here, we have no way of correcting what we believe – we are just wrong. This is what materialistic determinism posits, and this is a problem because all our other beliefs rely on our ability to correctly believe things about our inner states.

So, at the very least, deterministic materialism puts us at odds with our human experience thus far. It makes us out to be passive observers, watching our thoughts flow by but not truly having control over them. At the most, it leaves us skeptical and deceived. Lastly, it is far from accurate at interpreting the flow of our thoughts. On these points alone, we have plenty of reason to say that CCP is unproven, and even some good reason to reject it because of impending epistemological disaster. We can at least say on

these grounds that interactive dualism is at least as probable as deterministic materialism, if not significantly more probable.

Two Final Arguments To Consider

I want to close by posing two last (related) arguments in this line of further research. The first of these describes the gap between what we see in the brain materially and what we might expect to see given materialism *and* the control we have over our thoughts:

We are either material, or we are not. If we are material, due to the way we can generate and control our thoughts, we would expect to see neuroscientific evidence reflecting this (i.e., something like Descartes' pineal gland model; some material system responsible for starting causal chains of material thought in the brain). We do not see this. So, either our detection tools and abilities are not strong enough to observe this sort of material system, or we are nonphysical. It seems more likely that we are nonphysical than that our detection tools and abilities are not strong enough to observe this sort of material system. Therefore, we are probably nonphysical.

This second argument is slightly different, but in the same realm. It points out that we would expect things to look more random than they do from a world that has indeterminism but remains physically causally closed. Since this is the case, the next best option is to believe the world is not physically causally closed (in something like interactive substance dualism):

There are three sorts of reasonable explanations we can give regarding determinism. Either our world is materially deterministic (i.e., CCP is true), our world is materially indeterministic (based on the sort of quantum mechanical interpretation I talked about in chapter III) or our world is not physically causally closed (and indeterministic, at least in cases of personal causation). The flow of our thoughts does not make sense on a deterministic account of the physical world. On pure materialistic indeterminism, we would the flow of our thoughts to seem less logical to us than they do. The flow of our thoughts seems logical to us, so the next best option is nonmaterial indeterminism.¹

¹ This argument derives much of its strength from the argument from reason (from C.S. Lewis' *Miracles: A Preliminary Study*). The similarity between Lewis' argument and mine was brought up to me by Dr. Alexander Pruss and Dr. Buras, who both sat on the defense committee for this thesis. Dr. Buras explicates a stronger version of the argument from reason in his paper entitled *On the Failures of Naturalism*, which I've cited in the bibliography below.

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