



# Lightweight and heavyweight anti-physicalism

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## Abstract

I define two metaphysical positions that anti-physicalists can take in response to Jonathan Schaffer's ground functionalism. Ground functionalism is a version of physicalism where explanatory gaps are everywhere. If ground functionalism is true, arguments against physicalism based on the explanatory gap between the physical and experiential facts fail. In response, first, I argue that some anti-physicalists are already safe from Schaffer's challenge. These anti-physicalists reject an underlying assumption of ground functionalism: the assumption that macrophysical entities are something over and above the fundamental entities. I call their position "lightweight anti-physicalism." Second, I go on to argue that even if anti-physicalists accept Schaffer's underlying assumption, they can still argue that the consciousness explanatory gap is especially mysterious and thus requires a special explanation. I call the resulting position "heavyweight anti-physicalism." In both cases, the consciousness explanatory gap is a good way to argue against physicalism.

## 1 Introduction

The thesis that the knowledge of the cosmos' fundamental facts would allow a powerful intellect to deduce all other facts is intuitively plausible. The success of physics indicates that the fundamental facts are physical. If so, a powerful intellect should, in principle, be able to deduce the facts of chemistry, biology, society, and even consciousness, from the fundamental physical facts.

The above thesis presupposes an *intelligible connection* between fundamental reality and the rest of reality. In recent philosophical debates, Chalmers (2012) has

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influentially characterized such theses as *scrutability theses*. In scrutability theses, the intuitive notion of “intelligible connection” is rigorously defined as *a priori entailment*. I define the above thesis as a scrutability thesis, as follows:

*Cosmic Scrutability*: The microphysical truths a priori entail all other truths.

In this usage, *P* a priori entails *Q* iff the material conditional “if *P* then *Q*” is a priori knowable.<sup>1</sup> Chalmers argues that a priori entailment, so construed, is apt to provide “transparent bottom-up explanation,” meaning that “once one has spelled out the lower-level facts [...] there is no residual mystery about what the high-level facts are or about how the low-level facts give rise to them.” (2012, p. 305).

The *microphysical truths* form the scrutability base of *Cosmic Scrutability*.<sup>2</sup> The microphysical truths, as defined by Chalmers, are “truths about fundamental physical entities in the language of a completed fundamental physics” (2012, p. 110).

Chalmers rejects *Cosmic Scrutability*. Chalmers (1996, 2010) and Jackson (1998) have argued that the paradigmatic case of the putative failure of *Cosmic Scrutability* is consciousness.<sup>3</sup> Consciousness is understood in terms of *experience*. The *phenomenal truths* are truths about experiences. The phenomenal truths involve *phenomenal concepts*, concepts that refer to experiences in terms of how they feel. Following Levine (1983), the putative failure of *Cosmic Scrutability* due to consciousness is standardly characterized as an *explanatory gap*. I refer to this explanatory gap as follows:

*Consciousness Gap*: The physical truths do not a priori entail the phenomenal truths.

Chalmers and Jackson have used *Consciousness Gap* to pose an epistemic challenge against *physicalism*. Physicalism, roughly defined, is the metaphysical thesis that all fundamental entities are physical. The main targets of the *Consciousness Gap* challenge are physicalists who believe in *Cosmic Scrutability*. Influential 20th century physicalists, such as Lewis and Armstrong, have defended versions of physicalism (so-called “analytic functionalism”) that require *Cosmic Scrutability*. These are the *type-A physicalists*, in Chalmers’ (1996) terminology. Unless type-A physicalists can find a way to make *Cosmic Scrutability* work, their version of physicalism must be false. In light of this, Levine has described *Consciousness Gap* as “the main obstacle to acceptance of materialism” (2001, p. 76).

In response, many contemporary physicalists reject *Cosmic Scrutability* and accept *Consciousness Gap*. These are the *type-B physicalists* in Chalmers’ (1996)

<sup>1</sup> The role of “a priori” here is simply that, given the information in *P* and *Q* (even if these are obtained empirically) a sufficiently good reasoner needs *no further information* to know whether “if *P* then *Q*” is true.

<sup>2</sup> All scrutability theses posit a compact class of truths—a scrutability base—that a priori entails all the other truths.

<sup>3</sup> Chalmers and Jackson’s (2001) view is that the most likely candidate for a scrutability base is the conjunction of the microphysical truths (*P*), the phenomenal truths (*Q*), a totality “that’s all” premise (*T*), and the indexical truths (*I*): all together abbreviated as “PQTI.”

terminology. In terms of metaphysics, like all physicalists, type-B physicalists think the fundamental entities are exclusively physical. However, in terms of explanation, type-B physicalists do not think the microphysical truths must a priori entail phenomenal truths. Type-B physicalists typically embrace the *phenomenal concepts strategy* (PCS).<sup>4</sup> According to PCS physicalists, *Consciousness Gap* obtains due to the *special nature* of phenomenal concepts. Thus, according to many PCS physicalists, although *Cosmic Scrutability* could be true in general, the special nature of phenomenal concepts explains why it fails in the case of consciousness.

Schaffer (2017b, 2021) defends *ground functionalism*, a version of type-B physicalism where explanatory gaps are everywhere, in all instances of metaphysical dependence. Like other type-B physicalists, Schaffer accepts *Consciousness Gap* and rejects *Cosmic Scrutability*. However, unlike PCS physicalists, Schaffer is not concerned with the nature of phenomenal concepts. This is because he does not see *Consciousness Gap* as a special case. On the ground functionalism picture, there are explanatory gaps even in assumed paradigmatic cases of a priori entailment involving only physical truths; for example, between the truths of H+H+O atoms and H<sub>2</sub>O molecules. If so, *Consciousness Gap* is not special since no explanatory gap is special. Thus, if ground functionalism is true, *Consciousness Gap* based arguments against physicalism fail.

Against Schaffer, in this paper, I defend the anti-physicalist use of *Consciousness Gap*. In Sect. 2, I contrast the commonly held thesis that explanatory gaps are sparse and special with Schaffer's thesis that explanatory gaps are everywhere. In Sect. 3, I argue that some anti-physicalists are already safe from Schaffer's challenge. These anti-physicalists reject Schaffer's assumption that macrophysical entities are something over and above the fundamental entities. Finally, in Sect. 4, I argue that one can accept Schaffer's view of the macrophysical and still argue against physicalism based on *Consciousness Gap*. This is because *Consciousness Gap* is special, even if explanatory gaps are everywhere.

## 2 Explanatory gaps: sparse or everywhere?

### 2.1 Explanatory gaps and grounding

*Consciousness Gap* is naturally read as involving *grounding*. Grounding, as I understand it, is a relation of metaphysical dependence between the more and the less fundamental entities or facts. All instances of grounding obtain between *grounds*: corresponding to the more fundamental facts, and *groundees*: corresponding to the less fundamental facts. The groundees metaphysically depend on the grounds. The *fundamental facts* are the ultimate grounds; they ground everything else yet are themselves *ungrounded*. The *derivative facts* are the non-fundamental facts; they are the facts that are *grounded* (either in other derivative facts or in the fundamental facts).<sup>5</sup> If physicalism is true, the physical facts ground the phenomenal facts.

<sup>4</sup> PCS physicalists include Loar (1990), Balog (1999), and Papineau (2002), among others.

<sup>5</sup> I base my characterization of grounding on the work of Fine (2001), Schaffer (2009), and Rosen (2010).

There are ongoing debates in the literature about the properties (and even the salience) of grounding. What matters for my purposes here are only two relatively uncontroversial features of grounding understood in a coarse-grain way. First, grounding is a relation of *directed* dependence; it orders the metaphysical hierarchy from the fundamental grounds up. Second, grounding is *synchronic*. The dependence in cases of grounding happens at the same time (synchronically), unlike in cases of causation, where it might also happen across time (diachronically).

Since all the relevant cases I intend to discuss involve grounding, in what follows, I restrict the notion of “explanatory gap” to grounding.

*Explanatory Gap*: an explanatory gap obtains iff there is *no* a priori entailment between a ground and a groundee in a putative case of grounding.

Conceivability is a perfect tool for locating explanatory gaps.<sup>6</sup> A scenario is conceivable iff it is *rationally coherent* upon ideal rational reflection.<sup>7</sup> For any ground  $P$  and groundee  $Q$ , if it is conceivable that  $P$  obtains while  $Q$  fails to obtain, then there is an explanatory gap between  $P$  and  $Q$ . Moreover, vice versa, if there is an explanatory gap between  $P$  and  $Q$ , then it must be conceivable that  $P$  obtains while  $Q$  fails to obtain.

## 2.2 Macrophysical scrutability

Even if *Cosmic Scrutability* fails,<sup>8</sup> many philosophers are willing to accept a weaker, restricted scrutability thesis.<sup>9</sup> The following such thesis is of particular importance to the philosophy of mind:

*Macrophysical Scrutability*: the microphysical truths a priori entail all macrophysical truths.

The most thorough defense of *Macrophysical Scrutability* in the recent literature comes from Chalmers and Jackson (2001) and Chalmers (1996, 2012). Chalmers defines the *macrophysical truths* as the “truths about any entities, including macroscopic entities, in the language of classical physics” (2012, p. 110). They involve “the structure and dynamics of the world at the macroscopic level, at least insofar as this structure and dynamics can be captured in terms of spatiotemporal structure (position, velocity, shape, etc.) and mass distribution” (Chalmers & Jackson, 2001, p. 330).

<sup>6</sup> Both Chalmers (1996, 2010, 2012) and Schaffer (2017b, pp. 3–4) agree on this.

<sup>7</sup> Chalmers (2010) calls this notion of conceivability “ideal negative conceivability.”

<sup>8</sup> Presumably due to *Consciousness Gap* or another counter-example. For example, Block and Stalnaker (1999) have famously argued that *Cosmic Scrutability* fails since there seems to be no a priori entailment between the microphysical truths and pre-theoretical macroscopic truths.

<sup>9</sup> In Chalmers’ (2012, p. 39) terminology, a scrutability thesis is restricted iff its base a priori entail a limited class of other truths.

*Macrophysical Scrutability* is far more plausible than *Cosmic Scrutability*. *Macrophysical Scrutability* involves “only a change of scale” (Chalmers & Jackson, 2001, p. 331) between physical truths. It entails that the physical structure and dynamics of the cosmos are intelligible at *all scales* in virtue of its fundamental physical building blocks.

*Macrophysical Scrutability* is widely accepted (explicitly or implicitly) by both anti-physicalists and physicalists. Chalmers (1996, 2012), Chalmers and Jackson (2001), and Goff (2017) defend *Macrophysical Scrutability*, while Balog (1999), Levine (2001), McLaughlin (2019), McQueen (2015), and Papineau (2002), amongst others, are sympathetic towards it. For example, McQueen argues that the truth of mass additivity is a priori entailed by the principles of Newtonian microphysics, while arguably by the principles of special relativity, “with enough relativistic information one could deduce that something has non-additive mass.” (2015, p. 1388) Moreover, McLaughlin (2019) argues that there is a priori entailment from the truths of quantum mechanics to the truths of chemistry. Finally, according to Balog (1999, p. 523), the “A Priori Entailment Thesis” (which roughly translates to *Cosmic Scrutability*), “might be correct about all truths except phenomenal truths.”

My view is that *Macrophysical Scrutability* is indispensable for the success of arguments against physicalism based on *Consciousness Gap*. Here, I have in mind the three “epistemic arguments” against physicalism: the explanatory argument, the knowledge argument, and the conceivability argument. *Consciousness Gap* (expressed either in terms of explanation, knowledge, or conceivability) features as an *epistemic premise* in all three of these arguments.<sup>10</sup> I argue that, although it is not explicitly stated, *Macrophysical Scrutability* likewise features in the background of these arguments as an *implicit assumption*.

*Consciousness Gap* alone—as an epistemic premise—is impotent against physicalism as a metaphysical thesis. This is why all three of the above epistemic arguments contain a further premise that *links epistemology to metaphysics*. I refer to this premise as “*Link*.”

*Link*: explanatory gaps entail metaphysical possibilities.

All proponents of the epistemic arguments against physicalism accept some form of *Link*. Typically, they defend more nuanced or restricted forms of *Link* instead of the above baseline form.<sup>11</sup> What matters for my purposes is that *Consciousness Gap*, via some form of *Link*, is taken to entail that physicalism is false. The above baseline form of *Link* is the foundation for all the other more nuanced forms, and thus, I focus on it here.

I argue that *Macrophysical Scrutability* justifies *Link*. *Macrophysical Scrutability* applies ubiquitously throughout the cosmos. It provides a clear example of a ubiquitous class of grounding connections without explanatory gaps. Thus, *Macrophysical Scrutability* proves that explanatory gaps are not everywhere. Instead, it appears that

<sup>10</sup> See Chalmers (2003, pp. 107–108).

<sup>11</sup> See Chalmers (2010) and Goff (2017, p. 100) for two recent versions of *Link*.

as a general rule, for true grounding claims, grounds a priori entail groundees throughout the cosmos. If so, *Macrophysical Scrutability* justifies the following thesis:

*No Gaps*: as a general rule, there are no explanatory gaps between the grounds and groundees referenced in true grounding claims.

*No Gaps* entails that explanatory gaps are a good guide to locating false grounding claims. *No Gaps* entails that, as a general rule, for any explanatory gap involving a ground *P* and a groundee *Q*, the corresponding grounding claim might be false. Thus, it is *metaphysically possible* that *P* does not ground *Q*. If so, some form of *Link* must be true.

Putting the chain of inference together: *Macrophysical Scrutability* justifies *No Gaps*, while *No Gaps* justifies *Link*. Thus, via *No Gaps*, *Macrophysical Scrutability* justifies *Link*. Although roughly stated, this chain of inference demonstrates a clear connection between *Macrophysical Scrutability* and *Link*. I believe that something analogous to this is implicitly assumed when *Link* is posited in the epistemic arguments against physicalism.

In summary: the orthodox view in the philosophy of mind is that explanatory gaps are *sparse and special*. They are standardly seen as an *odd exception* to an otherwise intelligible universe, and as such, need to be addressed. As I have argued, this stance is expressed in *Link* and is based on the implicit acceptance of *Macrophysical Scrutability*. *Consciousness Gap* entails the falsity of physicalism only via *Link*. However, without *Macrophysical Scrutability*, *Link* is ad hoc and implausible. If this is correct, *Macrophysical Scrutability* is indispensable for the success of the epistemic arguments against physicalism.

### 2.3 Schaffer's mereological gap

Schaffer (2017b, 2021) argues for *ground functionalism*, a version of physicalism where explanatory gaps are everywhere. If ground functionalism is true, there are explanatory gaps between *all* concrete grounds and groundees (2017b, p. 10). Schaffer accepts *Consciousness Gap* but rejects both *Cosmic Scrutability* and *Macrophysical Scrutability*. If ground functionalism is true, for all concrete grounds and groundees, explanatory gaps are *always the rule, and there are no exceptions*.

Schaffer offers his most elaborate defense of ground functionalism in “The Ground Between the Gaps” (2017b). There, he argues that explanatory gaps are everywhere because it is “conceivable, logically possible, and not a priori knowable otherwise that there are no *derivative entities*” [emphasis mine] (2017b, p. 14). Following Bennett (2011), Schaffer illustrates this with the conceivability of a *flat-world*.

To conceive of a flat-world, we need to conceive a scenario in which the fundamental physical facts obtain, yet no concrete groundees obtain. The flat-world is a world where only fundamental entities exist, and there are no concrete derivative entities. Thus, in the flat-world, there would be fundamental physical entities, but there would be no atoms, molecules, living organisms, societies, and so on—grounded in them.

Our world is conceivably a flat-world. The flat-world is a perfect microphysical copy of our world. Thus, it is *observationally indistinguishable* from our world

(2017b, p. 9). Thus, the flat-world is not a world where the cosmos is empty, nor where there is some sort of quantum mush everywhere. Rather, the key difference between the flat-world and worlds with derivative entities is the number of entities. To use a metaphor, if God is running an inventory of what exists, the inventory would have fewer items in the flat-world than in worlds with derivative entities.

Schaffer's flagship example involves *mereological composition*. Following van Inwagen (1990), there is an ongoing debate in the metaphysics literature regarding when, and if at all, parts compose a further entity. Roughly, that is van Inwagen's "*special composition question*." Mereological nihilism, i.e., the thesis that parts never compose anything, is true in the flat-world. The flat-world's conceivability demonstrates that the special composition question cannot be answered a priori in virtue of conceptual information about the natures of microphysical and macrophysical entities alone. In Schaffer's own words:

I am saying that an ideal mind, given the empirical information that there are H, H, and O atoms in a given arrangement, and given the conceptual information that an H<sub>2</sub>O molecule is an individual composed in a given way and with a given nature, still needs more information to determine whether an H<sub>2</sub>O molecule is present. [...] She needs substantive metaphysical information about the principles of composition. (2017b, p. 10)

Before proceeding, it is important to note that, in the example above, "H, H, and O" must stand for two hydrogen atoms and one oxygen atom *after* they have formed molecular bonds, and not for individual "free-floating" atoms without molecular bonds. Moreover, the H, H, and O atoms and the H<sub>2</sub>O molecule must exist at the *same time and place*. All this is entailed by grounding being a synchronic relation. Analogous considerations apply to all other composites and their grounds. Thus, for clarity, in contrast to Schaffer, instead of "H, H, and O," henceforth, I use the label "H+H+O" as a placeholder term for the microphysical ground of H<sub>2</sub>O.<sup>12</sup>

Schaffer argues that the non-trivial nature of the special composition question results in a ubiquitous explanatory gap. I formulate this explanatory gap as follows:<sup>13</sup>

*Mereological Gap*: the microphysical truths do not a priori entail the existence truths of macrophysical entities.

*Mereological Gap* entails that: "explanatory gaps are everywhere in nature, lurking in every concrete transition from more to less fundamental" (2017b, p. 14). Schaffer's solution for closing these abundant explanatory gaps is that "grounding bridges gaps." (2017b, p. 2) The idea behind this slogan is that there is a need for "substantive grounding principles" (2017b, p. 14) connecting grounds and groundees. The

<sup>12</sup> Atoms are not fundamental entities; nevertheless, I speak of them as such for convenience.

<sup>13</sup> Schaffer (2017b, pp. 13–14) also posits the conceivability of a *ghost-world* where all derivative entities are *epiphenomenal*. This is expected to show that the *natures* of composites are not a priori scrutable from the microphysical truths. Everything I say here about existence—mutatis mutandis—applies to the case of nature.

grounding principles are posited abductively, “by inference to the best explanation, in a holistic and fallible manner” (2021, p. 183). They explain how a specific ground determines a specific groundee.

*Mereological Gap* seems to contradict *Macrophysical Scrutability*. Schaffer uses *Mereological Gap* to argue that all forms of *Link* are false, that explanatory gaps alone never entail metaphysical possibilities. Schaffer’s ground functionalism posits that possibility is always determined by the grounding principles in conjunction with the grounds. If ground functionalism is true, conceivability never entails possibility without the inclusion of the grounding principles. Thus, if ground functionalism is true, all scrutability theses whose bases consist solely of truths about the fundamental entities are false. If so, both *Cosmic Scrutability* and *Macrophysical Scrutability* are false. The only scrutability thesis that Schaffer accepts includes the grounding principles in the scrutability base alongside the microphysical truths.<sup>14</sup>

### 3 Lightweight anti-physicalism

#### 3.1 Opposing worldviews

We have reached an impasse between opposing worldviews at this point in the discussion. On the one hand, in the philosophy of mind debates, *Macrophysical Scrutability* appears to be broadly accepted by both anti-physicalists and physicalists. According to friends of *Macrophysical Scrutability*, the H+H+O truths a priori entail the H<sub>2</sub>O truths. On the other hand, metaphysicians who have dealt with the special composition question and think mereological nihilism is conceivable might agree with Schaffer that *Mereological Gap* is true. In their view, the H+H+O truths do not a priori entail the H<sub>2</sub>O truths.

*Macrophysical Scrutability* and *Mereological Gap* seem to contradict each other. The clash over *Macrophysical Scrutability* and *Mereological Gap* is of crucial importance to the philosophy of mind. *Macrophysical Scrutability* and *Mereological Gap* both involve truths about macrophysical entities. Yet, *Macrophysical Scrutability* justifies *Link*, while *Mereological Gap* seems to undermine *Link*.

In the rest of this section, I offer a diagnosis of the dispute. Before proceeding, consider the following two epistemic theses as generalizations of the positions in the dispute:<sup>15</sup>

*Lightweightism*: For some true grounding claims referencing concrete entities as grounds and groundees, the grounds a priori entail their groundees.

<sup>14</sup> Schaffer’s (2017b, pp. 18–19) view is that the most likely candidate is a “PTIG” scrutability base, namely the conjunction of the microphysical truths (P), a totality “that’s all” premise (T), the indexical truths (I), and the grounding principles (G).

<sup>15</sup> These two epistemic theses are roughly based on Chalmers’ (2012, pp. 267–271) classification of ontological views.



*Heavyweightism*: For all true grounding claims referencing concrete entities as grounds and groundees, the grounds do not a priori entail their groundees.

Ground functionalism is a version of *Heavyweightism*. In contrast, anti-physicalists like Chalmers and Goff (henceforth, I restrict the label “friends of *Macrophysical Scrutability*” to their views) embrace a form of *Lightweightism*.

### 3.2 Strong and weak groundees

Why do friends of *Macrophysical Scrutability* say they cannot conceive of H+H+O without H<sub>2</sub>O, while Schaffer says he can? I argue that this epistemic disagreement has a likely *metaphysical explanation*. My proposed diagnosis is that the disagreement arises because the two sides conceive of *two different kinds* of macrophysical entities. As I will show, Schaffer, on the one hand, conceives of macrophysical entities that are *something over and above* their grounds. Friends of *Macrophysical Scrutability*, on the other hand, conceive of macrophysical entities that are *nothing over and above* their grounds.

First, throughout his career, Schaffer has consistently defended a “robust realism for the non-fundamental” (2017a, p. 2459). He takes “entities like tables to be full-blown ‘heavyweight’ entities on the roster of entities” (2009, p. 360). In his view, both the fundamental and the derivative entities exist “equally, in the one and only sense of ‘exist’” (2017a, p. 2458).<sup>16</sup> This is why, Schaffer argues, his framework does not ontologically privilege the fundamental over the derivative (2017a, pp. 2457–2458). His reference to H<sub>2</sub>O as a “further individual” (2017b, p. 23) is a testament to this.

Derivative entities, as conceived by Schaffer, contain genuinely new information about reality. As Schaffer puts it: “I agree [with the anti-physicalist] that the phenomenal information is extra information. My point is that the same holds for all other higher-level information” (2017b, p. 18). I take the presence of such “extra information” together with Schaffer’s views on existence to indicate that, for Schaffer, the derivative entities are *something over and above* their grounds. I refer to derivative entities conceived as such as “strong-groundees.”

*Strong-groundees*: An entity *E* is a strong-groundee iff (i) *E* is derivative, and (ii) *E* is something over and above its ground.

Although somewhat rough, “something over and above” is, I believe, sufficient to give an intuitive grasp of strong-groundees.<sup>17</sup> It indicates a sense in which the existence of strong-groundees is not fully contained in the existence of their grounds.

My attribution of strong-groundees to Schaffer might seem in tension with his further claim that derivative entities are an ontological “free lunch” (2009, p. 353). I believe this tension is only apparent. Schaffer clearly states that all he means by “free lunch” is that the derivative entities are not fundamental (2009, p. 353). His “free lunch” characterization is about ontological economy. As he puts it: “derivative enti-

<sup>16</sup> Also see Schaffer (2009, p. 360).

<sup>17</sup> A rigorous definition of “something over and above” is beyond the scope of this paper.

ties [...] are genuinely new and distinct entities but they cost nothing by the measure of economy” (2015, p. 647).<sup>18</sup> The “measure of economy” Schaffer has in mind is that the fundamental entities *explain* the derivative entities but not vice versa.

Second, Chalmers (1996), in contrast to Schaffer, argues that the derivative facts *logically supervene* on the fundamental facts.<sup>19</sup> In cases of logical supervenience, given some more fundamental A-facts and some less fundamental B-facts: “*all there is to the B-facts being as they are is that the A-facts are as they are*” (1996, p. 36). Chalmers argues that the derivative facts are *redescriptions* of the fundamental facts. It seems that, in Chalmers’ view, insofar as the derivative entities exist, they exist only in a nominal way.<sup>20</sup> Using the biological facts as an example, he says:

Once God (hypothetically) made sure that all the physical facts in our world held, the biological facts came along for free. The B-facts merely redescribe what is described by the A-facts. They may be *different* facts (a fact about elephants is not a microphysical fact), but they are not *further* facts. (1996, p. 41)

Finally, Goff (2017 Ch. 2.2), similarly to Chalmers, argues that the macrophysical entities are *grounded by analysis* in the microphysical entities. In cases of grounding by analysis: “the grounding fact provides all that is essentially required for the entities contained in the grounded fact to be part of reality” (2017, p. 45). An entity grounded by analysis is “*nothing over and above its ground*” (2017, p. 42). Using “party” as an illustrative example, Goff says:

It’s not as though there are the people dancing, drinking, and so on, and then there’s this extra thing—the party—that floats above their heads. There’s a very intuitive sense in which the fact that there is a party is *nothing more* than the fact that there are people revelling; a world in which there are people revelling is *already thereby* a world in which there is a party. (2017, pp. 42–43)

Chalmers and Goff, despite their differences, seem to *reject* the strong-groundee conception for macrophysical entities. Both Chalmers and Goff seem to agree that macrophysical entities contain no new information about reality. Thus, contra Schaffer, in both Chalmers’ and Goff’s views, there is a sense in which H<sub>2</sub>O and, in general, macrophysical entities are *nothing over and above* their grounds. I refer to derivative entities conceived in this way as “weak-groundees.”

*Weak-groundees:* An entity *E* is a weak-groundee iff (i) *E* is derivative, and (ii) *E* is nothing over and above its ground.

<sup>18</sup> Schaffer (2015, p. 647) defends an ontological principle he calls the “Laser” (as opposed to Ockham’s “Razor”). The Laser states: “Do not multiply fundamental entities without necessity!”

<sup>19</sup> Note, this was before the grounding revolution in metaphysics. Nevertheless, there are clear parallels to be drawn between Chalmers’ (1996) logical supervenience and grounding.

<sup>20</sup> Also see Chalmers (2009, p. 120).

Again, “nothing over and above” talk is somewhat rough. Still, I find it is sufficient to give an intuitive grasp of weak-groundees.<sup>21</sup> It indicates a sense in which the existence of weak-groundees is fully contained in the existence of their grounds.

My analysis suggests the following. Schaffer thinks all groundees are strong-groundees. Chalmers and Goff think all macrophysical groundees are weak-groundees. Neither side offers an explicit argument for their preferred groundee theory. Regardless of who is right, this indicates two kinds of macrophysical entities at play in the dispute: strong-groundees and weak-groundees. If so, “H<sub>2</sub>O” can refer to either Strong-H<sub>2</sub>O (a strong-groundee) or Weak-H<sub>2</sub>O (a weak-groundee) (see Table 1).

The results in Table 1 make sense, given how I defined strong-groundees and weak-groundees.

Strong-groundees are something over and above their grounds. Thus, plausibly, knowing whether they exist (and what their essential natures are) involves new information, beyond the information in their grounds. If so, it is reasonable to assume that—even given full information about ground and groundee—the existence of strong-groundees might not be a priori scrutable from their grounds.

Weak-groundees are nothing over and above their grounds. Thus, plausibly, knowing whether they exist (and what their essential natures are) only involves learning the information in their grounds. If so, it is reasonable to assume that—at least when given full information about ground and groundee—the existence of weak-groundees might be a priori scrutable from their grounds.

The above suggests a plausible explanation of the dispute: *Mereological Gap* presupposes strong-groundees, while *Macrophysical Scrutability* presupposes weak-groundees. If so, *Mereological Gap* and *Macrophysical Scrutability* do not contradict each other; instead, they involve *different kinds of entities* in the roles of groundees. *Mereological Gap*, if true, shows that the existence of Strong-H<sub>2</sub>O (as a groundee) does not analytically follow from the existence of H+H+O (as a ground). In contrast, if true, *Macrophysical Scrutability* shows that the existence of Weak-H<sub>2</sub>O (as a groundee) analytically follows from the existence of H+H+O (as a ground).

Going back to the flat-world. My analysis indicates that what is missing from the flat-world are the strong-groundees but not the weak groundees. Remember, the flat-world is observationally indistinguishable from worlds with groundees. If so, it seems, although it might be conceivable that Strong-H<sub>2</sub>O fails to exist in the flat-world, it is inconceivable that Weak-H<sub>2</sub>O would fail to exist.

**Table 1** The explanatory gap between H+H+O and Strong-H<sub>2</sub>O

	Ground	Groundee	Explanatory Gap?
<b>Schaffer</b>	H+H+O	Strong-H <sub>2</sub> O	<b>Yes</b>
<b>Chalmers and Goff</b>	H+H+O	Weak-H <sub>2</sub> O	<b>No</b>

<sup>21</sup> Again, as with “something over and above,” a rigorous definition of “nothing over and above” is beyond the scope of this paper.

The difference between strong-groundees and weak-groundees suggests that strong-groundees are an underlying assumption of ground functionalism that friends of *Macrophysical Scrutability* reject (in the macrophysical domain). If so, it explains why explanatory gaps are everywhere in the ground functionalism picture while sparse in the *Macrophysical Scrutability* picture.

I do not take a hard stance in this dispute. What matters for my purpose is only that, as the above suggests: *Mereological Gap* requires strong-groundees, while *Macrophysical Scrutability* requires weak-groundees. I take this to entail that if all macrophysical groundees are weak-groundees—as Chalmers and Goff seem to think—neither *Mereological Gap* nor ground functionalism would get off the ground.

In summary: Chalmers and Goff assume that macrophysical entities are weak-groundees. This assumption protects their positions from Shaffer's *Mereological Gap* and allows them to use standard *Consciousness Gap* arguments against physicalism. Moreover, it makes their positions forms of *Lightweightism*. Thus, I classify their views as forms of "lightweight anti-physicalism," where I take the qualifier "lightweight" to refer to macrophysical weak-groundees. Formally, I define this position as follows.

*Lightweight Anti-Physicalism*: (i) All macrophysical entities are weak-groundees; (ii) For all true grounding claims referencing grounds and weak-groundees, given full and unambiguous information about ground and groundee, the grounds a priori entail their weak-groundees; (iii) The fundamental grounds are not entirely physical, or consciousness is a strong-groundee (or both).

### 3.3 Schaffer's response

Schaffer (2017b, pp. 21–24) anticipates his opponents might think that embracing *Lightweightism* would help them secure the specialness of *Consciousness Gap*. In response, Schaffer argues that this strategy cannot succeed. Roughly, he argues that if *Lightweightism* were true, it should apply equally to *all* instances of grounding. Thus, if friends of *Lightweightism* think *Macrophysical Scrutability* is true, they should also think that there is no gap between the microphysical and the phenomenal truths. In other words, Schaffer seems to be saying that a commitment to *Lightweightism* entails both that *Consciousness Gap* is false and that *Cosmic Scrutability* is true. In his own words:

For if it can be "just by meanings" that the H, H, and O atoms compose something miscible, it can equally be "just by meanings" that these neurons and synapses compose someone miserable. Or at least, no relevant difference between the chemical and the phenomenal has been identified that keeps the latter specially out of reach of this stretched out notion of the analytic. (2017b, p. 23)

He concludes, "It is hard to be a dualist if analytic connections are so easy!" (2017b, p. 23).

According to Schaffer, friends of *Lightweightism* cannot explain why there is an explanatory gap between the physical and the phenomenal (and nowhere else) without falling into *circular thinking*. As he puts it: “Why is this connection specially opaque? Because there is no analytic connection. Why is there no analytic connection? Because the connection is specially opaque.” (2017b, p. 24).

I think that Schaffer, in his argument above, is begging the question against *Lightweight Anti-Physicalism*. This is because *Lightweight Anti-Physicalism* does not entail that anything goes, that there are no explanatory gaps whatsoever. Schaffer fails to take notice of the *qualifications* that define *Lightweight Anti-Physicalism*.

Firstly, all friends of *Lightweight Anti-Physicalism* agree that for a grounding claim to be without an explanatory gap, the grounding claim *must be true*. No friend of *Lightweight Anti-Physicalism* would expect the truths of H+H+O atoms to a priori entail the truths of wombats. Why would they when this grounding claim is evidently false? Secondly, *Lightweight Anti-Physicalism* entails that, even for true grounding claims, the ground a priori entails the groundee iff the groundee is a *weak-groundee*. Schaffer, in his arguments above, takes none of these qualifications into consideration.

I suggest Schaffer begs the question by presupposing (a) that consciousness is grounded in the physical entities and (b) that consciousness is a weak-groundee. In other words, Schaffer (in this argument) appears to presuppose that some lightweight version of physicalism is true. If this were the case, then yes, Schaffer’s argument would be sound. However, this is precisely what friends of *Lightweight Anti-Physicalism* want to deny. Friends of *Lightweight Anti-Physicalism* agree that there are correlations between physical states and human consciousness. However, they do not start with the *further assumptions* that consciousness has a physical ground and that consciousness is a weak-groundee. Instead, they use *Consciousness Gap* and *Macrophysical Scrutability* to point out that physicalists are wrong to believe at least one of these claims. There is *no circularity* in thinking that *Consciousness Gap* obtains because consciousness is not grounded in the physical or because consciousness is not a weak-groundee.

In summary, both sides accept *Consciousness Gap*. Chalmers and Goff presuppose weak-groundees and defend *Lightweight Anti-Physicalism*. Schaffer presupposes strong-groundees and defends ground functionalism. This brings us to a stalemate. Schaffer aspires to resolve the stalemate with his argument above. Yet, as I have argued, he seems to be begging the question against *Lightweight Anti-Physicalism*. He offers no non-question begging reason to doubt *Consciousness Gap*, were *Lightweightism* true. Thus, to decisively refute *Lightweight Anti-Physicalism*, the onus is on Schaffer to give a *further argument* against the weak-groundee conception, as employed by Chalmers and Goff.

## 4 Heavyweight anti-physicalism

### 4.1 Beyond lightweightism

So far, I have argued that anti-physicalists could reasonably reject *Mereological Gap* by embracing *Lightweight Anti-Physicalism*. However, despite this, I still have not

fully defused Schaffer's challenge. So construed, being an anti-physicalist seems to hinge on the success of *Lightweight Anti-Physicalism*. Therefore, if Schaffer is right, explanatory gap arguments cannot work on a heavyweight view, such as ground functionalism.

The above is problematic since it entails that one can be an anti-physicalist iff *Lightweight Anti-Physicalism* is true. Although versions of *Lightweightism* seem to be often assumed in the philosophy of mind, many contemporary metaphysicians favor *Heavyweightism*. Ground functionalism seems like the best attempt yet at creating a heavyweight version of physicalism. Thus, suppose Schaffer is right, and we need to conceive of H<sub>2</sub>O and derivative entities in general as strong-groundees. As Schaffer (2017b, pp. 22–23) anticipates, the physicalist can simply embrace ground functionalism or another version of *Heavyweightism*.<sup>22</sup>

I think there is no reason to restrict anti-physicalism to *Lightweight Anti-Physicalism*. It is plausible that some anti-physicalists could be sympathetic towards *Heavyweightism* and think *Mereological Gap* is true, although they do not agree with Schaffer's physicalism. Such anti-physicalists would be happy to bite the bullet of *Mereological Gap* and embrace the following view:

*Heavyweight Anti-Physicalism*: (i) All concrete groundees are strong-groundees; (ii) For all true grounding claims referencing grounds and strong-groundees, the grounds never a priori entail their strong-groundees; (iii) The fundamental grounds are not entirely physical.

Friends of *Heavyweight Anti-Physicalism* can argue against physicalism either (a) without recourse to *Consciousness Gap*, or (b) with recourse to *Consciousness Gap*, by saying that *Consciousness Gap* is special in heavyweight views.

Arguing against physicalism without recourse to *Consciousness Gap* means giving up one of the primary motivations for being an anti-physicalist. At least since Descartes, anti-physicalism has been fueled by the puzzlement of how consciousness can be physical or can exist in virtue of something physical. Moreover, giving up on *Consciousness Gap* being true would mean giving up many argumentative advances made by anti-physicalists, especially in discussions of phenomenal concepts. Thus, although it might be possible to argue for *Heavyweight Anti-Physicalism* without recourse to *Consciousness Gap* being true, that is certainly undermotivated and disadvantageous.

Alternatively, friends of *Heavyweight Anti-Physicalism* can say that *Consciousness Gap* is special, even on heavyweight views. The mysteriousness of consciousness does not seem to diminish if *Mereological Gap* is true. *Consciousness Gap* based arguments against physicalism are the best articulation of this puzzlement. In what follows, I will show how to argue for *Heavyweight Anti-Physicalism*, based on *Consciousness Gap*.

<sup>22</sup> It is an additional problem, that is beyond the scope of this paper, whether physicalists would be motivated to embrace ground functionalism. Ground functionalism seems to be a close cousin (if not a version) of emergentism or naturalistic dualism. Thus, it might appear too dualistic for most physicalists.

## 4.2 The deep opacity argument

Schaffer argues that if ground functionalism is true, *Consciousness Gap* is not special. Against Schaffer, I argue that *Consciousness Gap* is significantly more mysterious than *Mereological Gap*, and thus, demands an explanation. I call this argument “*the deep opacity argument*”:

P-1. Deeply Opaque: *Consciousness Gap* is deeply opaque.

P-2. Explanation: Deeply opaque explanatory gaps require an explanation of their deep opacity.

C. *Consciousness Gap* requires an explanation of its deep opacity.

The deep opacity argument is valid and simple. Nevertheless, both P-1 and P-2 need further clarification and justification.

### 4.3 P-1: deeply opaque

First, P-1: Deeply Opaque. Against Schaffer, I argue that even if we accept *Heavy-weightism*, not all grounding connections are equally opaque. Even if explanatory gaps are everywhere, some explanatory gaps are more mysterious than others and thus *deeply opaque*.

*Deep Opacity*: For any ground  $P$  and strong-groundee  $Q$ , the claim that  $P$  grounds  $Q$  exhibits a deeply opaque explanatory gap iff (i)  $P$  and  $Q$  are conceived under transparent concepts, and (ii) a priori reflection on  $Q$  does not reveal  $P$ 's essence.

A few clarificatory remarks are in order.

First, *Deep Opacity* is *theory-specific*. Unless otherwise specified, I assume ground functionalism to be the metaphysical theory under consideration.

Second, *Deep Opacity* requires *transparent concepts*. I understand “transparent concepts” in the same way Goff (2017, p. 91) does, as concepts that reveal the *full essence* of their referents.<sup>23</sup> Like Goff, I assume that phenomenal and pure physical concepts are transparent.<sup>24</sup>

The requirement for transparent concepts might seem overly high. After all, most ordinary language concepts are not transparent. For example, it is plain that water, when conceived as the *watery stuff* that fills the oceans and quenches our thirst, does not a priori reveal anything about  $H_2O$ , its physical essence. The same seems true for most macroscopic phenomena. I agree with this observation. However, as Goff (2017, p. 99) acknowledges, the lack of transparency in ordinary language is plausibly due to *human ignorance*.

<sup>23</sup> Transparent concepts can also serve as a more rigorous characterization of the “full and unambiguous information” notion in *Lightweight Anti-Physicalism*.

<sup>24</sup> It is worth noting that Goff (2017, p. 141) does not think that “impure” physical concepts (e.g., the physical concepts used in a Russellian monist framework) are transparent.

*Deep Opacity* seeks to find deeply opaque connections between the entities themselves and not merely between the concepts we use. Only transparent concepts can provide the ontological clarity needed for this task. Luckily, it is reasonable to assume that, in principle, all concepts have a transparent version. If so, non-transparent propositions are, in principle, convertible to transparent propositions with the same meaning. Goff (2017, p. 130) dubs this process “*transparent rendering*.” Transparent rendering replaces every non-transparent concept in a given proposition with its transparent, co-referring counterpart. For example, in this process, the non-transparent concept “water” would be replaced with the transparent concept “H<sub>2</sub>O.”

The above allows *Deep Opacity* to, in principle, evaluate any grounding connection posited by a heavyweight metaphysical theory while avoiding false positives due to ignorance or ambiguity.

Third, *Deep Opacity* involves a *top-down analysis* of grounding connections. It starts with the groundee and moves to the ground. This approach is tailor-made for heavyweight views. Remember, if *Heavyweightism* is true, groundees are always something over and above their grounds. Thus, in this context, it is natural to analyze a grounding connection’s opacity by analyzing just how much of the ground’s essence is contained within the groundee’s essence.

Finally, *Deep Opacity* scans the groundee for *the essence of its ground*. Following the current orthodoxy, I take essences to be *real definitions*. *Deep Opacity* always considers the ground as a *kind*. This is because groundees are typically multiply realizable. Thus, in most cases, the ground (considered as a kind) is a possibly infinite collection of facts or entities. The items in this collection are the ground’s *instances*. As I will now explain, when discussing the essence of a ground, I always refer to the essence of the ground *itself*, as a kind, and not to the essences of its different instances.

I take the essence of a ground to be *a condition* that must be satisfied by *all instances of that ground*.<sup>25,26</sup> Quite plausibly, all instances of a ground have some properties in virtue of which they serve as that ground. These properties seem to be the ones that metaphysically explain the groundee. Whether an instance has other properties beyond these seems to make no difference to the groundee. For example, assume that the fact “there are animals” is grounded in the fact “there are humans, cats, and sparrows.” Only the properties that make humans, cats, and sparrows into animals seem to do explanatory work. Whether humans are moreover rational plays no role in metaphysically explaining “there are animals.” Thus, I take the essence of the ground to be a condition specifying the properties that something must have to metaphysically explain the groundee, and hence, count as an instance of that ground. This holds true even in cases where the ground has only one instance.

All explanatory gaps involve a failure of a priori entailment. However, only some explanatory gaps involve grounds and groundees with vastly different essences.

<sup>25</sup> And likely a proviso that all the items in the ground are more fundamental than the groundee. This follows trivially from the nature of “ground.”

<sup>26</sup> Fine (2012, pp. 74–76) defends a very similar claim. Also see Dasgupta (2014) and Goff (2017, Chapter 2.2) for similar essence-based accounts of grounding.



These “deeply opaque” gaps are categorically more opaque than the other gaps. This will become clear as I put *Deep Opacity* to use.

I claim that *Consciousness Gap* is deeply opaque because, a priori, no experience (as a groundee) reveals the essence of its microphysical ground. A priori, experiences are essentially *what they feel like*. Their essences appear fully constituted by their phenomenal characters. For example, a priori, the essence of pain is that pain hurts. In contrast, the microphysical ground of any experience is likely a collection of microphysical states exhibiting some specific (and yet undiscovered) structure. Plausibly, the ground’s essence is a description of that structure. Experiences, I claim, fail to a priori reveal this structure. This difference in essences gives rise to *Consciousness Gap*’s deep opacity.

It could be objected that some experiences exhibit the same structures as their physical grounds. On a naïve reading, this claim is almost certainly false. Current neuroscience indicates that experiential structures are not direct copies of brain structures. Simply put: my experience of a triangle is almost certainly not grounded in an actual triangle in the brain.

A more promising reading of the above claim is that some experiences and their grounds instantiate the same *information structures*.<sup>27</sup> But, again, I am skeptical this can dispel *Consciousness Gap*’s deep opacity.

If we understand “information” in a broad sense,<sup>28</sup> information structures are too common to define the ground of consciousness. When broadly construed, information is *everywhere*: in all systems and at all scales. A doorknob might have the same information structure as many simple experiences. Yet, it is highly unlikely that doorknobs ground experiences.

If, on the other hand, we employ a more narrow sense of “information,” then almost certainly, such information structures are not a priori revealed by experiences. For example, in neuroscience, the Integrated Information Theory posits that experiences are identical to the system’s *maximal  $\Phi$* , i.e., the “maximally irreducible cause-effect structure associated with the system in that state” (Koch, 2019, p. 87). However, as things stand now, it seems impossible to discover such nuanced structures in the substratum purely based on introspection.

Relatedly, it might be objected that some experiences are essentially bodily. For example, it might be a priori that pain presents itself as something that hurts the body. Nevertheless, although pain might *represent* the body, this is insufficient to reveal the essence of pain’s physical ground. As far as a priori reflection of pain goes, the body might be made of ectoplasm or have any odd structure. Thus, again, I do not think this removes *Consciousness Gap*’s deep opacity.

In contrast, *Mereological Gap* is not deeply opaque because, a priori, each composite (as a groundee) seems to reveal the essence of its microphysical ground. Consider Strong-H<sub>2</sub>O and H+H+O once again. By definition, Strong-H<sub>2</sub>O is a molecule grounded in H+H+O. On the other hand, H+H+O’s essence is likely a description of the H, H, and O atoms and their bonds. If so, given that essences are real definitions, Strong-H<sub>2</sub>O’s essence clearly references its ground. It seems impossible to imagine

<sup>27</sup> See Chalmers (1996, Chapter 8).

<sup>28</sup> For example, “information” in Claude Shannon’s sense.

what else—if not H+H+O—could make Strong-H<sub>2</sub>O a molecule. This point is further backed by the fact that H+H+O and Strong-H<sub>2</sub>O are observably indistinguishable. Thus, fully describing either of them is impossible without describing the H, H, and O atoms and their bonds.

Putting this together: Strong-H<sub>2</sub>O is something over and above H+H+O; yet, its essence must reference H+H+O. This point holds even if Strong-H<sub>2</sub>O is epiphenomenal. Similar considerations seem to apply to all cases of macrophysical composition. Thus, *Mereological Gap* cannot be deeply opaque.

Based on the above, purely on a priori considerations, *Consciousness Gap* is deeply opaque, while insofar as *Mereological Gap* can be called opaque, it must be *regularly opaque*.

*Regular Opacity*: For any ground  $P$  and strong-groundee  $Q$ , the claim that  $P$  grounds  $Q$  exhibits a regularly opaque explanatory gap iff (i)  $P$  and  $Q$  are conceived under transparent concepts, and (ii) a priori reflection on  $Q$  reveals  $P$ 's essence.

*Regular Opacity* is the negation of *Deep Opacity*. All the specifications I stated above about *Deep Opacity*—mutatis mutandis—apply to *Regular Opacity*.

If *Heavyweightism* is true, explanatory gaps are everywhere. Thus, all grounding connections are opaque. However, as I argued, some explanatory gaps are categorically more opaque than others. These are the deeply opaque gaps. Here, the ground and the groundee have vastly different essences. The groundee does not contain the properties that define its ground. Thus, in deeply opaque gaps, there is *little or no intelligible connection* between ground and groundee. In contrast, other grounding connections are regularly opaque. Here, despite the failure of a priori entailment, the ground and groundee still have many significant aspects of essence in common. The groundee contains all the properties that define its ground. Thus, regularly opaque gaps maintain a *significant intelligible connection* between ground and groundee.

*Consciousness Gap*, as I have argued, is deeply opaque, while *Mereological Gap* is regularly opaque.

#### 4.4 P-2: explanation

By itself, the deep opacity of an explanatory gap does not translate into a difference of metaphysical significance. This brings us to P-2: Explanation. I will argue that if the ground functionalist cannot remove the mysteriousness of deep opacity, she must at least explain its presence.

The first reason in support of P-2 is that deep opacity is *more mysterious* than regular opacity. In regularly opaque gaps, the groundee contains the properties that define the ground. Thus, the ground seems to do substantial work in metaphysically explaining the groundee. There appears to be explanatory work done by *both* the ground and the grounding principles. This is why the grounding of composites in physical grounds is unsurprising and does not seem like a cosmic accident. In contrast, in cases of deep opacity, the groundee does not contain the properties that define the ground. Thus, the ground appears to be doing little or no work in metaphysically

explaining the groundee. Instead, most of the explanatory work appears to be done by the grounding principles *alone*. I believe this is why the grounding of consciousness in a physical ground is surprising and seems like a cosmic accident.

The second reason in support of P-2 is that mysteriousness, by itself, asks for an explanation. Ground functionalism promises to alleviate mysteriousness. In Schaffer's (2021, p. 181) own words: "a satisfying metaphysics should be *explanatory*." Thus, since deep opacity is mysterious and *Consciousness Gap* is deeply opaque, the ground functionalist should explain its deep opacity.

The third reason in support of P-2 is that, on the heavyweight view, regular opacity seems to be *the rule*, while deep opacity seems to be *the exception to the rule*. *Mereological Gap* is regularly opaque and obtains everywhere, in all potential instances of composition. In contrast, *Consciousness Gap* is deeply opaque and only obtains in cases where there is higher-level consciousness. Thus, *Consciousness Gap* is an exception, and exceptions, in general, deserve an explanation.

I anticipate that Schaffer might object to this third point. He might say that even if *Consciousness Gap* is deeply opaque, it is *not the only* deeply opaque explanatory gap. Schaffer (2021) mentions potential explanatory gaps involving sets, value, and particle locations. The *set gap* is a putative explanatory gap between the members of sets (as grounds) and sets (as groundees). The *value gap* is a putative explanatory gap between the physical grounds of value and the value facts (as groundees). Finally, the *particle gap* assumes Albert's (1996) reading of Bohmian quantum theory. This putative explanatory gap involves the one fundamental particle in 3 N-dimensional configuration space (the "world-particle," in Albert's terminology) as a ground. In the roles of groundees, this gap involves the locations of the many derivative particles in ordinary 3-dimensional space. I go over these cases one by one.

The set gap does not appear to be deeply opaque. {Socrates} (as a groundee), a priori, clearly reveals the essence of its ground Socrates. The same seems true for other sets and their members. By definition, sets are collections of such-and-such elements. If so, sets a priori reveal the conditions that set elements must fulfill to belong to the set. Thus, the set gap cannot be deeply opaque.

The value gap might be deeply opaque. The moral property goodness (as a groundee) does not seem to a priori reveal the essence of its physical ground. This might simply be because moral concepts are not transparent. Alternatively, it might be because the underlying grounding claim is false. The value gap posits that moral properties are strong-groundees. Historically, this has been the position of moral realists who oppose naturalism. If so, moral realists could argue against ground functionalism based on the deep opacity of the value gap in a way analogous to how I use *Consciousness Gap* to argue against it. If so, everything I say here about consciousness—*mutatis mutandis*—likewise applies to the case of value. Thus, it seems, recourse to the value gap does not decisively help the ground functionalist.

The particle gap does not appear to be deeply opaque. Derivative particles (as groundees) seem to a priori reveal the essence of their ground, the world-particle. After all, the world-particle and the many derivative particles *are both essentially particles*. They belong to the same kind and have all the same essential properties. They are both what Maudlin (2007) would call "*local beables*": physical entities that

exist somewhere, at some definite location in space-time. All of this indicates that the particle gap cannot be deeply opaque.

Proponents of Bohmian quantum theory such as Maudlin prefer this theory over other quantum theories precisely because it offers a sense of intelligibility between fundamental ontology and macroscopic reality. Quantum realists who are sympathetic towards *Heavyweightism* could argue against some quantum theories based on deep opacity worries.<sup>29</sup> Namely, if a quantum theory posits an ontology with deeply opaque explanatory gaps towards the macrophysical, this is to be taken as evidence against that theory. Thus, as in the case of value, resorting to quantum theory at best provides a shaky ground for the ground functionalist.<sup>30</sup>

#### 4.5 Once more unto the breach

This ends my defense of the deep opacity argument. I now turn to outline the consequences of the deep opacity argument for ground functionalism and anti-physicalism in general.

First, the deep opacity argument does not refute ground functionalism. It only puts *explanatory pressure* upon it. It demands that the ground functionalist explains the deep opacity of *Consciousness Gap*.

The ground functionalist could explain the deep opacity of *Consciousness Gap* by appealing to *the nature of phenomenal concepts*. Doing so amounts to taking the path of the phenomenal concepts strategy (PCS) physicalist. PCS physicalists typically think that *Consciousness Gap* obtains because phenomenal concepts are *not transparent*.<sup>31</sup> In their view, consciousness is physical, yet it appears mysterious due to phenomenal concepts' lack of transparency.

Rejecting the transparency of phenomenal concepts offers a way out for the ground functionalist. However, it also comes at a price. The price is a return to the old (pre-*Mereological Gap*) debate about phenomenal concepts. Whatever the solution to the phenomenal concepts debate may be, the deep opacity argument forces the ground functionalist to discuss the special features of phenomenal concepts. Thus, in effect, to resolve the problem, the ground functionalist must acknowledge that *Consciousness Gap is special*.

Second, the deep opacity argument opens an avenue for anti-physicalists to argue against ground functionalism based on *Consciousness Gap*. Anti-physicalists sympathetic towards *Heavyweightism* can use the deep opacity argument to argue for *Heavyweight Anti-Physicalism*. One such view is *heavyweight panpsychism* (the conjunction of panpsychism and *Heavyweight Anti-Physicalism*).

Panpsychism is roughly the thesis that all fundamental physical entities are intrinsically conscious. Goff (2017) defends panpsychism, while Chalmers (1996) is greatly sympathetic towards it. Panpsychism's major selling point is its compatibility

<sup>29</sup> For example, the proposal of some proponents of Everettian or GRW quantum theory that fundamental reality is a 3 N-dimensional quantum state.

<sup>30</sup> There is a lot more to be said about potential explanatory gaps between the quantum and the macro-physical scale. For a discussion, see Ney and Albert (2013).

<sup>31</sup> See Goff (2017, pp. 93–95).

with the causal closure of the physical and all the other scientific evidence that physicalism is compatible with. Thus, if panpsychists are right about this, both ground functionalism and panpsychism fit the empirical data equally well.

Heavyweight panpsychists could argue that every human experience (as a groundee) a priori reveals the essence of its experiential ground. Both human experiences and the putative fundamental experiences are *essentially experiences*. They belong to the same kind. From here, panpsychists could argue that each human experience contains the phenomenal properties that define its ground's essence. If so, heavyweight panpsychism could offer an intelligible connection between fundamental reality and human consciousness that ground functionalism lacks.<sup>32</sup>

I do not claim heavyweight panpsychism can definitely remove *Consciousness Gap's* deep opacity. I only claim it has a better chance at this than ground functionalism. Heavyweight panpsychism preserves *Mereological Gap's* regular opacity (and the regular opacity of ground functionalism's other regularly opaque explanatory gaps). Thus, if heavyweight panpsychism fits the empirical data equally well as ground functionalism yet explains more, it should be preferred over ground functionalism. If so, heavyweight panpsychism is one good way to endorse *Heavyweight Anti-Physicalism*, based on the specialness of *Consciousness Gap*.

In summary: I showed that even if explanatory gaps are everywhere, *Consciousness Gap* stands out as deeply opaque. The mysteriousness of *Consciousness Gap* demands an explanation. Whether we seek to defend ground functionalism or argue for *Heavyweight Anti-Physicalism*, *Consciousness Gap* regains its dialectical significance. There is a lot more to be said about the details. Nevertheless, whether the reader agrees with the physicalist or the anti-physicalist, the message of this section is clear: *Consciousness Gap* is special even if *Heavyweightism* is true.

## 5 Conclusion

I defined two metaphysical positions that anti-physicalists can take in response to Schaffer's *Mereological Gap* challenge. One, they can reject *Mereological Gap* and embrace *Lightweight Anti-Physicalism*. Two, they can accept *Mereological Gap* and embrace *Heavyweight Anti-Physicalism*. I argued that in either case, they could be anti-physicalists in virtue of *Consciousness Gap*. The consciousness explanatory gap remains special no matter the number of any other explanatory gaps.

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<sup>32</sup> Another advantage of heavyweight panpsychism is that it seems to avoid the *combination problem*, which is roughly the problem of how the fundamental consciousness gives rise to derivative consciousness. If heavyweight panpsychism is true, mental combination would be explained via the grounding principles.

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