

From Indeterminacy in a Fundamental Theory to Fundamental Indeterminacy?

Chanwoo Lee

(The final version to appear in *Analytic Philosophy*)*

1 Introduction

Elizabeth Barnes defines ‘metaphysical indeterminacy’ as “indeterminacy in how things are” (Barnes 2014, 339).¹ Given the widely received distinction between the fundamental and the derivative in metaphysics,² we can locate metaphysical indeterminacy either in the fundamental or the derivative realm. Barnes (2014) proposes that fundamental indeterminacy (‘FI’ for short), which is metaphysical indeterminacy in the fundamental realm, needs more recognition in metaphysics.³

This paper does not argue that the notion of FI is unintelligible (cf. Evans 1978), but the notion’s intelligibility alone does not imply that it exists in the real world. I challenge Barnes’ case for accepting FI in metaphysics. First, I characterize the principle by which she infers FI, which I argue is unwarranted (Section 2). I consider three options for addressing her case: In the first two options, her case is either taken to discredit the prior metaphysical theory (Section 3) or lead to anti-realism (Section 4), leaving no room for FI. The third option, somehow insisting on FI, is not theoretically

* This is a **preprint version** of the paper, which significantly differs from the final version. Please only cite the final version of the paper; if you have trouble accessing it, please contact the author directly.

1 See Barnes and Williams (2011) and Wilson (2013) for some influential accounts of metaphysical indeterminacy. I submit that the disagreements between these accounts are largely orthogonal to the present paper.

2 See, e.g., Fine (2001), Schaffer (2009), Sider (2011).

3 Barnes (2014, sec. 1) offers an argument that all metaphysical indeterminacies imply some fundamental indeterminacy, which has been debatable (Eva 2018; Mariani forthcoming). This paper does not take a stand in this debate. In the same vein, this paper is not committed to the view that only the fundamental layer of the reality is *real* in a metaphysical sense.

worth it (Section 5). These arguments, I suggest, undermine Barnes' case for FI; there is little reason to believe in FI.

2 Barnes' case for fundamental indeterminacy

What does it take to accept FI in metaphysics? Barnes offers the following characterization:

A theory is committed to fundamental indeterminacy just in case according to that theory a sentence of Ontologese can be indeterminate. [...] All that needs to be the case is that descriptions of fundamental reality can be indeterminate (Barnes 2014, 347)

She adopts the notion of Ontologese, i.e., the “joint-carving” language that captures the fundamental structure, which I take for granted.⁴ By “theory”, she refers to a fundamental theory cast in Ontologese, which is expected to offer a “complete true description of how things are fundamentally” (Barnes 2014, 342); metaphorically, the theory should completely inform us of what God has done to create the world.⁵ Nevertheless, more explanation is needed to clarify what is meant by “a sentence [...] can be indeterminate” “according to [a fundamental] theory”. To avoid talking past each other, it is worth examining a specific case discussed by Barnes.

Barnes considers what Chalmers (2009, sec. 8) observed about the debates on mereological composition: The rivaling ontological positions, such as mereological nihilism and universalism, are in a complete stalemate. Chalmers' intuition is that, whatever the fundamental theory turns out to be, it does not decide whether the statement ‘There exists the mereological sum of the two cups’ is true or not. Even God cannot decide which position is true since “there's nothing about the world which settles whether nihilism or universalism is correct.” Hence, “It's indeterminate whether the simples compose a sum.” (Barnes 2014, 358)

⁴ See Dorr (2005) and Sider (2009; 2011) for further exposition of Ontologese.

⁵ It accords with Sider's (2011) conception of fundamentality that “the fundamental must be “complete”, that the fundamental must in some sense be responsible for everything.” (2011, sec. 7.1)

This instance can be generalized into the following pattern: Suppose there is a fundamental proposition, which can be expressed by a sentence of Ontologese, such that a theory that we take to be fundamental does not decide whether it is true or false. That is, the truth of the proposition is independent of the reality described by the fundamental theory; even God cannot decide whether the proposition is true or not. Then, we can safely claim that “according to that theory a sentence of Ontologese can be indeterminate.”

This characterization describes a *fundamental proposition that our fundamental theory is indeterminate about* (**FPF** for short). For Barnes, it provides a sufficient condition for the fundamental theory to be “committed to fundamental indeterminacy”. That is, given the theory we take to be fundamental, we should be committed to FI if we find an FPF. For example, if the Ontologese-translation of the statement ‘There exists the mereological sum of the two cups’ is indeed undecidable by the fundamental theory as Chalmers thinks, the proposition it expresses counts as an FPF; we should then accept FI.

Hence, what Barnes offers through her characterization is a methodological principle that tells us when to accept FI, which can be stated as the following: *Whenever confronted with an FPF, there is a reason to accept FI*. That is, if we find a proposition that our fundamental theory fails to decide, then there is a reason to believe that the world is fundamentally indeterminate in some respect. Hence, the notion of fundamental indeterminacy should be accepted as a part of the theory that describes the fundamental reality.⁶

As I stated in Section 1, I submit that the notion of FI can be intelligible; I do not object to the claim that a metaphysical account accepting FI can be consistent. Moreover, it seems to me that Barnes’

⁶ Note that this characterization is neither “conceptual analysis” nor “metaphysical analysis” of the nature of FI (Williams 2008, sec. 2.2). It only provides a sufficient condition for accepting FI. Hence, this characterization is not committed to a specific account of metaphysical indeterminacy (see footnote 1).

methodological principle captures a strong intuition about FI; I am open to the view that the discovery of an FPF may be a necessary condition for accepting FI.

I challenge, however, her sufficiency claim. Confronting an FPF does not give you a sufficient reason to accept FI. In other words, Barnes' inference from the discovery of an FPF to the acceptance of FI is unwarranted. Hence, without an alternative reason to accept FI,⁷ there is little reason to believe in FI.

Accepting FI is one of the available options we can take in the wake of an FPF. I argue in Section 5 that this option is not as promising as Barnes considers it to be. Before that, I consider two alternative options for addressing FPFs, which I suspect are more natural than accepting FI.

3 Option (A): Incompleteness of the theory

Suppose that you are constructing a theory of a certain domain. One central task is showing how this theory gives an answer to relevant questions. We expect it to decide whether contentious claims in the given domain are true or not. Imagine, however, you confronted a question that you cannot answer. Neither the truth nor the falsity of the claim can be decided. How should you react as a theoretician?

First, you may assert that the given question is 'beyond the scope'. Modern 'sciences', for example, have parted away from 'natural philosophy' by refusing to answer some intractable questions. Second, you may take it as an indication that we need to reconsider the theory we had; perhaps, our theory has had a blind spot all along. This indeterminacy may not prove that your theory is wrong, yet it seems to demonstrate that the theory is incomplete; the theory does not fully answer the questions of the given domain.

⁷ Barnes (2014) may argue that there is an alternative; a mere instance of derivative indeterminacy alone can serve as a reason to accept FI, which has been contested (see footnote 3). Again, the present paper remains neutral about this alternative approach.

Consider a metaphysical theory deemed fundamental facing an FPF. A fundamental theory is, according to Barnes' characterization, supposed to govern all metaphysical facts there are; in principle, there can be nothing "beyond the scope" of the theory. It implies that only the second option for addressing indeterminacy is available; discovering an FPF indicates that the given theory is incomplete. In turn, it means that the theory fails to be a "complete true description of how things are fundamentally", showing that the theory is in fact not fundamental. Contrary to Barnes' view, an FPF does not lead to accepting fundamental indeterminacy, but instead to reckoning the non-fundamentality of the theory. Call this 'Option (A)' for addressing FPFs.

For example, assume that the existence of irreducible phenomenal consciousness is not decided by the best metaphysical theory we have, but at the same time, the non-existence of phenomenal consciousness does not follow either. Both defenders and critics of phenomenal consciousness will, despite very different reasons, find the theory wanting. They expect the fundamental theory to decide whether it is true that humans have irreducible phenomenal consciousness or not; if the theory doesn't, then their disagreement remains unresolved.⁸

Note that a similar point is even more strongly affirmed in Sider's (2009; 2011) framework, which Barnes herself tentatively employs in her paper. He argues that even a non-fundamental, derivative, indeterminacy can revise the fundamental. In Sider's terms, failing to give a suitable "metaphysical semantics" for a certain metaphysical proposition can lead us to revise the fundamental theory and its language, i.e., Ontologese:

8 This claim is weaker than the thesis that 'phenomenal consciousness' is not vague (Antony 2006; Simon 2017; O'Rourke, n.d.). First, it is consistent with the view that 'phenomenal consciousness' is indeterminate in a derivative or non-metaphysical ways. Second, it is also consistent with a revisionary proposal that 'phenomenal consciousness' can be more definitely understood as a graded concept as it does not appeal to the notion of indeterminacy. This revisionary proposal entails that the traditional binary conception of 'phenomenal consciousness' is not perspicuous, which makes it closer to 'Option (B)' that will be discussed in Section 4.

Consider, for example, the controversy over whether causation is fundamental. To help resolve this controversy, we might try to produce reductive (i.e., not involving ‘cause’) toy metaphysical truth-conditions for ‘cause’. If all attempts fail, then the case for fundamental causation will receive a nice boost, especially if we discern in-principle reasons for the failures. (Sider 2011, sec. 7.6)

In a nutshell, suppose we did not take causation to be fundamental so that ‘cause’ is not a part of Ontologese. Yet we confronted a problematic metaphysical proposition involving ‘cause’; we cannot decide what it takes for the fundamental to make this proposition true. It indicates that we need to revise what we have taken to be fundamental, which gives us a reason to add ‘cause’ to the lexicon of Ontologese. Sider’s view agrees with the gist of Option (A) that confronting FPFs can lead us to reconsider the given ‘fundamental’ theory.

Of course, it does not critically refute Barnes’ view. For the sake of argument, we can restrict the scope of her discussion to hypothetical cases where the theory is indeed fundamental. It leads us to the next option for addressing FPFs.

4 Option (B): Anti-realism

Suppose that our theory is indeed fundamental so that it captures all that God has created. Imagine that we faced an FPF. Does it entail that we should accept FI? I argue that it does not.

A natural response, I suggest, is that finding some question to be an FPF should be taken as evidence that it is a ‘non-question’. Given that the right answer for an FPF is in principle unavailable such that even “God couldn’t get deciding evidence” (Barnes 2014, 358), it is hard to make sense of the claim that there is a fact of the matter about the question at all.⁹ A more plausible explanation is available: We were led to believe, due to confounding factors (e.g., linguistic convention, heuristics,

⁹ Compare with Quine’s (1987, 9–10) distinction between the underdetermination of science and the indeterminacy of translation.

biases), that there is a substantive question about the world even though there was not. This is the reason why even God cannot give an adequate answer to this question. Hence, we cannot, and should not, expect our theory to give an answer to this question as there is no fundamental fact of the matter about the question.

As Barnes notes, this response amounts to inferring anti-realism from indeterminacy. Note that this form of anti-realism is *local*, which is distinct from a more *global* version of anti-realism that deflates metaphysics in general. You still remain a realist about the fundamental structure of reality, believing that we can answer many metaphysical questions. Nevertheless, once some proposition turned out to be an FPF, you no longer believe that its local subject matter is real in a metaphysical sense. It explains why the given proposition is an FPF; we expect our fundamental theory to track all there is in reality, but cannot expect it to resolve the question which lacks a fact of the matter. Call this ‘Option (B)’ for addressing FPFs.

Option (B) rejects FI. As in Option (A), an FPF does not make us accept FI. Given that neither φ nor $\neg\varphi$ is decided by our fundamental metaphysical theory, the anti-realism about φ tells us that we no longer expect our theory to address φ at all. In Sider’s terms, they are no longer sentences of Ontologese. For example, going back to Chalmers’ case of mereological composition, we can conclude that there is no fact of the matter about whether mereological universalism is correct or nihilism is correct. It was a mistake to believe that an ontological question such as ‘Do simples always compose a sum?’ is a legitimate metaphysical question. Hence, according to Barnes’ own criterion, FI does not arise.

Barnes objects to this conclusion: “the *kinds* of motivation that push Chalmers toward antirealism could instead be used to motivate fundamental indeterminacy—especially once the link

between indeterminacy and antirealism is broken.” (Barnes 2014, 359) Her argument for breaking the link between indeterminacy and anti-realism, however, is thin. I offer two arguments against her claim.

First, I argue that a specific example that Barnes offers in support of her view, a structural realist (SR) interpretation of quantum mechanics (French and Krause 2006), rather disconfirms her view. As Barnes correctly describes, according to SR, it is indeterminate whether fundamental identity facts hold for quantum particles, and more strongly, whether they are individuals at all.¹⁰ From this she infers the following:

they are certainly not antirealist about that question, even though they end up with large swaths of indeterminacy in their fundamental theory. The world has a mind-independent structure, on this view, but that structure simply leaves underdetermined important, substantive questions about identity. (Barnes 2014, 360)

She writes as if SR accepts FI as a part of its theory, but I argue that this is an unconventional, if not incorrect, interpretation. For many structural realists argue that indeterminacy leads us to discredit the questions of individuality at all.

We need to recognise the failure of our best theories to determine even the most fundamental ontological characteristic of the purported entities they feature. It is an ersatz form of realism that recommends belief in the existence of entities that have such ambiguous metaphysical status. What is required is a shift to a different ontological basis altogether, *one for which questions of individuality simply do not arise*. Perhaps we should view the individuals and nonindividuals packages, like particle and field pictures, as different representations of the same structure. (Ladyman 1998, 419–20, emphasis added)

This ‘metaphysical underdetermination’ argument by Ladyman, a structural realist, can be understood as an instance of Option (B).¹¹ According to SR, the question about the identity of quantum particles is an FPF; our fundamental theories fail to decide the individuality of quantum particles or lack thereof.

¹⁰ SR is not without its critics. See, e.g., Saunders (2006) and Muller and Saunders (2008).

¹¹ See French (2014, chap. 2; 2020) for more recent expositions of the metaphysical underdetermination argument.

Then our ontology consists of entities with “ambiguous metaphysical status” such that even their “most fundamental ontological characteristic” remains indeterminate.

If Barnes were true, then SR would accept these indeterminate objects as real entities; the questions about their individuality would remain substantive. However, Ladyman finds this “ersatz form of realism” problematic. It leads him to “shift to a different ontological basis altogether” so as to prevent “questions of individuality”, which are FPFs, from arising at all. This solution amounts to, using Sider’s terms, rejecting the notion of ‘individual’ from the lexicon of Ontologese. It supports the conclusion that both the affirmation and the negation of the given question are “different representations of the same structure”; in other words, the difference between them is merely conceptual, not metaphysical. Hence, the well-known slogan of SR “that there are no ‘things’ and that structure is all there is” (Ladyman 2016, sec. 4) follows.

As we see, contrary to Barnes’ claim, the case of SR strengthens the link between indeterminacy and anti-realism than breaking it. Of course, Barnes can argue that the proponents of SR are wrong in inferring the anti-realism about individuals from their metaphysical underdetermination. Nevertheless, it is dialectically self-undermining given that she intended SR to be a piece of evidence supporting her view.

My second argument against breaking the link between indeterminacy and anti-realism concerns the classic debate between Carnap (1950) and Quine (1948; 1951). According to one version of the history, Carnap championed ‘global’ anti-realism about ontological questions (which should be distinguished from a ‘local’ anti-realism discussed above) as a logical empiricist, and it “was Quine who single handedly made Ontology a respectable subject” (Putnam 2004, 78–79) again. Hence, Quine secured the legitimacy of realist metaphysics against Carnap’s anti-realism about metaphysics.¹²

¹² See Tahko (2015, chap. 2) for an accessible introduction to this debate. For an alternative view that challenges the ‘received’ interpretation of the debate, see, e.g., Price (2009).

Carnap's argument for anti-realism was linguistic. He famously distinguished internal from external questions of existence: The internal questions ask whether certain entities exist within some linguistic framework, which makes them analytic. In contrast, the external questions go beyond that and ask whether such entities have reality in themselves; they ask which framework is the right one. Carnap only takes internal questions to be substantive philosophical questions and accuses external questions of being "non-cognitive" at best.

I cannot think of any possible evidence that would be regarded as relevant by both philosophers, and therefore, if actually found, would decide the controversy or at least make one of the opposite theses more probable than the other. [...] Therefore I feel compelled to regard the external question as a pseudo-question, until both parties to the controversy offer a common interpretation of the question as a cognitive question; this would involve an indication of possible evidence regarded as relevant by both sides. (Carnap 1950, sec. 4)

The external questions are, according to Carnap, indeterminate; there is in principle no evidence to favor one answer over another. For example, platonism and nominalism disagree about the existence of numbers as abstract objects, but it is not possible to decide which side is correct since they belong to different linguistic frameworks. The external problem is not "cognitive" because no correct answer can be given in principle.

Note that Carnap appeals to linguistic indeterminacy; the external question is indeterminate since incompatible answers to the question can all be analytically true within their own respective linguistic framework. The legacy of Quine (1951) is often interpreted as undermining Carnap's anti-realism by demonstrating the corrigibility of analytic truths. The rejection of the analytic-synthetic distinction implies the defeasibility of linguistic frameworks themselves. Hence, even though an external question may be linguistically indeterminate, we expect there to be extra-linguistic evidence that favors one answer over another. Therefore, *contra* Carnap, we expect the external questions, asking what is *real*, to have correct answers as well.

Hence, the disagreement between Carnap and Quine boils down to whether there is room for a correct answer to the external question: Carnap said ‘no’ based on the linguistic indeterminacy that no evidence is available beyond the linguistic framework. Quine challenged Carnap by securing the room for extra-linguistic evidence. Thanks to Quine, metaphysicians are again encouraged to believe that they can in principle find the correct answers to the external questions, which resuscitated metaphysics as a discipline.

I argue that accepting FI undercuts at least the motivation of Quine's solution to anti-realism about metaphysics. Carnap's anti-realism was based on linguistic indeterminacy, which was then challenged by Quine. Now enters FI, which is more extreme than linguistic indeterminacy. By definition, FI does not allow any determinate answer in principle. Quine's solution is of no avail; all it does is securing the room for extra-linguistic evidence, and FI implies that there cannot be any decisive evidence regardless. Hence, Quine's solution to Carnapian anti-realism does not resolve FI.

Note that FI is strictly speaking not inconsistent with the Quinean claim itself. All that Quine establishes is a modal claim that extra-linguistic evidence for metaphysics is possible, not that evidence actually exists in all cases. Nevertheless, it is no longer clear if the Quinean solution can defend realist metaphysics once FI is accepted.

Dialectically, Quine's claim is taken to have revived metaphysics by showing that Carnap's pessimism is unwarranted; metaphysical questions can be answered since they are “cognitive”. Once FI is accepted, however, this promise cannot be guaranteed any longer since the metaphysical questions may be unanswerable after all. Carnap's pessimism then strikes back; if Quine's claim fails to demonstrate that metaphysical questions can be answered, then in what sense does it resuscitate metaphysics? It rather seems to strengthen the anti-realist position that such metaphysical questions cannot be answered, so not “cognitive”. Of course, the Quineans can still consistently maintain that

metaphysics has revived yet its question may not have an answer, but they can no longer defeat Carnap's pessimism, losing their dialectical upper hand.

Contrast it with the approach that rejects FI, where the link between FPFs and anti-realism is maintained. In case no evidence, including extra-linguistic ones, fails to decide a question in principle, then we conclude that it is a 'non-question'; it leads us to 'local', not 'global', anti-realism. Conversely, every 'legitimate' metaphysical question can be decided in principle.¹³ In this approach, Quine's proposal fully meets the anti-realist challenge. The scope of 'legitimate metaphysical questions' is narrowed down to the questions where extra-linguistic evidence can be given in principle, and it guarantees that metaphysics as a discipline is no longer subject to the Carnapian pessimism. Hence, it can be safely argued that Quine's argument defends realist metaphysics when you reject FI. The narrative of Quine's revival of metaphysics is restored, which was lost when we accepted FI.

Again, this argument does not claim that realist metaphysics is incompatible with FI. For example, it may be the case that Carnapian anti-realism about metaphysics is long dead and we no longer need the Quinean argument to defend realist metaphysics. However, as Barnes (2014, n. 35) seems to admit herself, I suspect that meta-metaphysical challenges to realist metaphysics remain relevant (Hirsch 2011; Thomasson 2015); after all, Sider's (2011) framework is intended to offer a defense against such anti-realist charges. Hence, I argue that the present argument at least serves as a *pro tanto* reason against accepting FI if we endorse realist metaphysics as Barnes does.

Thus, Option (B), which presupposes the link between indeterminacy and anti-realism, remains plausible.

13 Note that the scope of "every 'legitimate' metaphysical question" only includes fundamental questions; it is not concerned with a possible instance of non-fundamental metaphysical indeterminacy, which goes beyond the scope of this paper (see footnote 3). I tentatively suggest that non-fundamental indeterminacy can be accepted in realist metaphysics since you can brush off a more pressing ontological question as being "beyond the scope" of the given non-fundamental domain (see Section 3).

5 Option (C): ‘Fundamental indeterminacy’ as a forced choice?

In the preceding sections, I argued that finding an FPF does not make us accept FI. However, one may still want to accept FI without much further ado, which I call ‘Option (C)’ for addressing FPFs. In this section, I aim to show that not much can be gained when one insists on accepting FI.

First, I examine a case of grounding failure discussed by Barnes. Her toy example, which admittedly resembles the singlet quantum entanglement state,¹⁴ involves two particles *a* and *b* along with two properties *F*-ness and *G*-ness.

One of each of *a* and *b* is one of each of *F* and *G*. It’s not the case that both *a* and *b* are *F*, or that both *a* and *b* are *G*. But [...] nothing settles whether *a* is *F* and *b* is *G*, or vice versa. [...] In a case like this, there are global facts about the instantiation and distribution of *F*ness and *G*ness that fail to be grounded or determined by the basic particles and the properties they instantiate. (Barnes 2014, 348, italics added)

A common response to this case appeals to the global system *a+b* or property *F+G* for sufficient grounding. Barnes argues that “[c]ommitments of this kind are ontological complications” (349) as they demand extra ontology. Instead, she argues that FI can help:

it’s indeterminate whether *a* is *F* and indeterminate whether *b* is *F*, but determinate that either *a* is *F* or *b* is *F*. That is, determinately one of *a* or *b* is *F*, but it is indeterminate which. If we say the same for *G*, and then add the claim that determinately only one thing is *F* and determinately only one thing is *G*, we’ve settled the distribution of *F* and *G*. (Barnes 2014, 350, italics added)

This indeterminate characterization, Barnes argues, is superior to the common response appealing to extra ontology.

14 See Glick (2017) for a critical discussion of the arguments for metaphysical indeterminacy specifically from quantum physics.

My contention is that merely adding indeterminacy does not solve the problem since an ‘emergent’ structure remains implicit in this characterization. Consider a formulaic version of the above characterization, where ‘**def**’ stands for the determinacy and ‘**indef**’ for the indeterminacy.

$$\mathbf{indef}(Fa) \wedge \mathbf{indef}(Fb) \wedge \mathbf{def}(Fa \vee Fb) \wedge \mathbf{indef}(Ga) \wedge \mathbf{indef}(Gb) \wedge \mathbf{def}(Ga \vee Gb) \wedge \exists x \exists y (\mathbf{def}(Fx) \wedge \mathbf{def}(Gy) \wedge x \neq y))$$

Notice that ‘ $\exists x \exists y (\mathbf{def}(Fx) \wedge \mathbf{def}(Gy) \wedge x \neq y)$ ’, which is a regimentation of “determinately only one thing is F and determinately only one thing is G ” in the above quote, is indispensable. It is an existential generalization, the truth of which is arguably grounded in atomic facts about individuals. The given characterization cannot be fundamental as its truth is grounded in other facts. The same goes for replacing existential generalization with a subsentence that only involves individual constants ‘ a ’ and ‘ b ’ such as ‘ $(\mathbf{def}(Fa) \wedge \mathbf{def}(Gb)) \vee (\mathbf{def}(Fb) \wedge \mathbf{def}(Ga))$ ’; it fails to be fundamental too since the truth of a disjunctive sentence is partially grounded in its disjuncts.¹⁵

An adequate characterization of the given scenario needs to capture the relational nature of a and b . Barnes argued that adopting FI can handle this, but as I showed, her characterization fails to be fundamental. Hence, contrary to her assessment, this scenario inherently involves an “emergent” character that cannot be exhausted by atomic facts about individuals a and b whether we adopt indeterminacy or not.

One may complain that existential generalization can still figure in a fundamental characterization without being grounded in atomic facts about a and b . That is, an existential generalization should count as a part of Ontologese. If that is the case, then the above argument can be resisted.

15 One may reject the ground-theoretic conception of fundamentality (e.g., Fine 2012) and opts for the “D-project” that allows disjunctive facts to be fundamental (see Sider 2013). In this case, my following argument about the case where existential characterization is allowed in a fundamental characterization can be applied *mutatis mutandis* to show that indeterminacy is no longer needed.

My response is that indeterminacy is no longer required if we accept this objection. For a simple existential generalization ' $\exists x \exists y (Fx \wedge Gy \wedge x \neq y)$ ' alone can sufficiently characterize the given scenario, which states that there are at least two objects, one of which is F and another of which is G , without determining which one is which. We needed indeterminacy in the first place because of the implicit assumption that a fundamental characterization should be exhausted by characterizations of individuals a and b . This assumption can no longer be held once we grant that a generalized statement, which does not specify individuals, can be fundamental too.

Hence, Barnes faces a dilemma: Her indeterminacy-based characterization requires an “emergent” factor anyway, and if it can be resolved at all, then indeterminacy is no longer required. Either way, the notion of indeterminacy is not doing a lot of work.¹⁶

My second argument concerns her general assessment of what theoretical benefits we get by accepting FI:

By incorporating indeterminacy, someone attracted to a sparse fundamental ontology can ground phenomena that might otherwise be inexplicable, and she can do this without committing to more *things*. (Barnes 2014, 347)

The idea can be put more explicitly as follows: Suppose that the theory F , which we believed to be fundamental, fails to decide whether the metaphysical proposition P is true or false, i.e., P is an FPF. Since F fails to predict P , F fails to explain P . Contrast it with the theory $F+$, which adds the following sentence to F : '*It is indeterminate that P .*' $F+$ gives a verdict to P as being indeterminate, unlike F which is silent about P . Hence, it can be said that $F+$ is more fundamental than F given that $F+$ covers more phenomena than F . Therefore, FI should be accepted following $F+$.

I argue that more needs to be shown to establish that $F+$ indeed ‘covers’ P any more than F does. It is not clear to me whether explicitly stating that P is indeterminate adds anything more

¹⁶ Also see Assadian and Nassim (2019) for other responses to Barnes’ case for FI based on the grounding failure case.

theoretically significant than just being silent about P . Either way, P being an FPF is recognized; simply stating that ' P is indeterminate' does not seem to improve the theoretical virtues.

It should be not be confused with the claim that demonstrating P to be an FPF is insignificant. For example, the proof that Zermelo-Frankel theory (ZF) does not decide the continuum hypothesis (CH) surely is a great discovery. It does not, however, imply that CH is fundamentally indeterminate; Gödel (1947) famously argued that the independence of CH should be interpreted as a sign of the contemporary set-theoretic axioms' incompleteness, following Option (A).¹⁷ To say that CH is indeterminate alone does not seem to make it any more "explicable".

If my twofold argument is correct, then some of the theoretical advantages of Option (C) argued by Barnes are not valid.

6 Conclusion

In this paper, I identified the cases which Barnes takes to be demonstrating FI. I argued, however, that these cases do not demonstrate FI or Barnes' choice is not rewarding enough. It should not be conflated with an argument for the unintelligibility of the notion of FI; this paper does not challenge Barnes' account as a coherent formulation of FI. The notion's intelligibility alone, however, does not imply that the notion applies to the real world. If I am correct, more needs to be shown to motivate FI *pace* Barnes.

¹⁷ Set-theoretic multiverse theorists (e.g., Hamkins 2012) may dissent from this view, but they do not accept FI either since they still accept definite truths relative to set-theoretic universes.

References

- Antony, Michael V. 2006. "Vagueness and the Metaphysics of Consciousness." *Philosophical Studies* 128 (3): 515–38. <https://doi.org/10.1007/s11098-004-7488-8>.
- Assadian, Bahram, and Jonathan Nassim. 2019. "Indeterminacy and Failure of Grounding." *Theoria* 85 (4): 276–88. <https://doi.org/10.1111/theo.12196>.
- Barnes, Elizabeth. 2014. "Fundamental Indeterminacy." *Analytic Philosophy* 55 (4): 339–62. <https://doi.org/10.1111/phib.12049>.
- Barnes, Elizabeth, and J. Robert G. Williams. 2011. "A Theory of Metaphysical Indeterminacy." In *Oxford Studies in Metaphysics Volume 6*, edited by Karen Bennett and Dean W. Zimmerman, 103–48. Oxford University Press.
- Carnap, Rudolf. 1950. "Empiricism, Semantics, and Ontology." *Revue Internationale de Philosophie* 4 (11): 20–40.
- Chalmers, David John. 2009. "Ontological Anti-Realism." In *Metametaphysics: New Essays on the Foundations of Ontology*, edited by David John Chalmers, David Manley, and Ryan Wasserman. Oxford University Press.
- Dorr, Cian. 2005. "What We Disagree About When We Disagree About Ontology." In *Fictionalism in Metaphysics*, edited by Mark Eli Kalderon, 234–86. Oxford University Press.
- Eva, Benjamin. 2018. "Emerging (In)Determinacy." *Thought: A Journal of Philosophy* 7 (1): 31–39. <https://doi.org/10.1002/tht3.266>.
- Evans, Gareth. 1978. "Can There Be Vague Objects?" *Analysis* 38 (4): 208–208. <https://doi.org/10.1093/analys/38.4.208>.
- Fine, Kit. 2001. "The Question of Realism." *Philosophers' Imprint* 1 (1): 1–30.
- . 2012. "Guide to Ground." In *Metaphysical Grounding*, edited by Fabrice Correia and Benjamin Schnieder, 37–80. Cambridge University Press.
- French, Steven. 2014. *The Structure of the World: Metaphysics and Representation*. Oxford University Press.
- . 2020. "Metaphysical Underdetermination as a Motivational Device." <http://philsci-archive.pitt.edu/16922/>.
- French, Steven, and Décio Krause. 2006. *Identity in Physics: A Historical, Philosophical, and Formal Analysis*. Oxford: Oxford University Press. <https://doi.org/10.1093/0199278245.001.0001>.
- Glick, David. 2017. "Against Quantum Indeterminacy." *Thought: A Journal of Philosophy* 6 (3): 204–13. <https://doi.org/10.1002/tht3.250>.
- Gödel, Kurt. 1947. "What Is Cantor's Continuum Problem?" *The American Mathematical Monthly* 54 (9): 515–25. <https://doi.org/10.1080/00029890.1947.11991877>.
- Hamkins, Joel David. 2012. "The Set-Theoretic Multiverse." *The Review of Symbolic Logic* 5 (3): 416–49. <https://doi.org/10.1017/S1755020311000359>.
- Hirsch, Eli. 2011. *Quantifier Variance and Realism: Essays in Metaontology*. New to this Edition: Oxford, New York: Oxford University Press.
- Ladyman, James. 1998. "What Is Structural Realism?" *Studies in History and Philosophy of Science Part A* 29 (3): 409–24.
- . 2016. "Structural Realism." In *The Stanford Encyclopedia of Philosophy*, edited by Edward N. Zalta, Winter 2016. Metaphysics Research Lab, Stanford University. <https://plato.stanford.edu/archives/win2016/entries/structural-realism/>.
- Mariani, Cristian. forthcoming. "Indeterminacy: Deep but Not Rock Bottom." *Analytic Philosophy*. <https://doi.org/10.1111/phib.12215>.
- Muller, F. A., and Simon Saunders. 2008. "Discerning Fermions." *The British Journal for the Philosophy of Science* 59 (3): 499–548.

- O'Rourke, Joshua. n.d. "Phenomenal Consciousness Must Be Sharp."
- Price, Huw. 2009. "Metaphysics After Carnap : The Ghost Who Walks?" In *Metametaphysics: New Essays on the Foundations of Ontology*, edited by David John Chalmers, David Manley, and Ryan Wasserman, 320–46. Oxford University Press.
- Putnam, Hilary. 2004. *Ethics Without Ontology*. Harvard University Press.
- Quine, Willard Van Orman. 1948. "On What There Is." *Review of Metaphysics* 2 (5): 21–36.
- . 1951. "Two Dogmas of Empiricism." *Philosophical Review* 60 (1): 20–43.
- . 1987. "Indeterminacy of Translation Again." *The Journal of Philosophy* 84 (1): 5–10. <https://doi.org/10.2307/2027132>.
- Saunders, Simon. 2006. "Are Quantum Particles Objects?" *Analysis* 66 (289): 52–63.
- Schaffer, Jonathan. 2009. "On What Grounds What." In *Metametaphysics: New Essays on the Foundations of Ontology*, edited by David Manley, David John Chalmers, and Ryan Wasserman, 347–83. Oxford University Press.
- Sider, Theodore. 2009. "Ontological Realism." In *Metametaphysics: New Essays on the Foundations of Ontology*, edited by David John Chalmers, David Manley, and Ryan Wasserman. Oxford University Press.
- . 2011. *Writing the Book of the World*. Oxford University Press.
- . 2013. "Replies to Dorr, Fine, and Hirsch." *Philosophy and Phenomenological Research* 87 (3): 733–54. <https://doi.org/10.1111/phpr.12073>.
- Simon, Jonathan A. 2017. "Vagueness and Zombies: Why 'Phenomenally Conscious' Has No Borderline Cases." *Philosophical Studies* 174 (8): 2105–23. <https://doi.org/10.1007/s11098-016-0790-4>.
- Tahko, Tuomas E. 2015. *An Introduction to Metametaphysics*. Cambridge University Press.
- Thomasson, Amie. 2015. *Ontology Made Easy*. Oup Usa.
- Williams, J. Robert G. 2008. "Ontic Vagueness and Metaphysical Indeterminacy." *Philosophy Compass* 3 (4): 763–88. <https://doi.org/10.1111/j.1747-9991.2008.00151.x>.
- Wilson, Jessica M. 2013. "A Determinable-Based Account of Metaphysical Indeterminacy." *Inquiry* 56 (4): 359–85. <https://doi.org/10.1080/0020174X.2013.816251>.