

# Causal Foundationalism with a Difference: A Response to Ney on Physical Causation and Difference-Making

## ABSTRACT

Ney ([2009]) defends *causal foundationalism*, which she characterises as the thesis that facts about difference-making depend upon facts about physical causation. She takes this to imply that difference-making facts are not among the fundamental causal facts. I argue that Ney's characterisation of causal foundationalism is ambiguous (due to an ambiguity in the notion of *physical causation*). On one reading, the thesis does indeed imply the non-fundamentality of difference-making facts, but is not supported by Ney's arguments. On a second reading it is supported by Ney's arguments, but does not imply the non-fundamentality of difference-making facts. I end by offering some *prima facie* reasons for thinking that, *pace* Ney, difference-making facts *are* among the fundamental causal facts.

- 1 *Introduction*
- 2 *Physical Causation and Difference-Making*
- 3 *Ney's Arguments for Causal Foundationalism*
- 4 *Are Difference-Making Facts Among the Physical Causal Facts?*
- 5 *Conclusion*

## 1 Introduction

In a recent paper, Ney ([2009]; all subsequent references to Ney are to this paper) distinguishes two sorts of causal facts, which she respectively dubs "facts about difference-making" and "facts about physical causation" (p. 739). She argues that these different types of causal fact "bear an important relationship to each other" (p. 739). Specifically, Ney defends the thesis that "the difference-making facts depend upon the facts of physical causation" (p. 740). Borrowing some terminology from Woodward ([2007], p. 70), she calls this thesis 'foundationalism about causation' (p. 740), and takes it to imply that "causation is not fundamentally a matter of difference-making" (p. 758; see also pp. 740, 759).

The problem upon which I wish to focus is that Ney's causal foundationalist thesis (**CF**), does not obviously imply her conclusion (**C**). That is,

**CF:** The difference-making facts depend upon the facts about physical causation

does not obviously imply

**C:** Causation is not fundamentally a matter of difference-making.

In fact, **(CF)** will imply **(C)** only if the following proposition is analytic:

**P:** Difference-making facts are not among the facts about physical causation.

If **(P)** is *not* analytic then, in order to get a valid argument from **(CF)** to **(C)**, **(P)** must be explicitly included as an additional premise.

Whether or not **(P)** is analytic depends crucially on the meaning of ‘facts about physical causation’ and ‘facts about difference-making’. Yet, as shall be seen in §2, Ney’s characterisation of the former notion is ambiguous in such a way as to make it unclear whether or not **(P)** is intended as analytic. No matter: Ney’s argument for **(C)** is flawed either way. If ‘facts about physical causation’ is understood in such a way as to render **(P)** analytic, then it turns out that Ney’s arguments for **(CF)** are entirely spurious (or so I argue in §3). If, on the other hand, ‘facts about physical causation’ is understood in such a way that **(P)** is *not* analytic, then Ney is completely unjustified in taking **(P)** to be true (or so I argue in §4). Either way, at least one non-redundant premise of Ney’s argument for **(C)** is left unjustified, so she is not warranted in inferring its truth. Indeed the arguments of §4 show that there is *prima facie* reason to think that **(C)** is false—to think, in other words, that difference-making facts *are* after all among the fundamental causal facts.

## 2 Physical Causation and Difference-Making

In order to explicate the notions of facts about ‘difference-making’ and about ‘physical causation’, Ney distinguishes two traditions within the recent philosophical literature on causation:

“When it comes to the task of providing a philosophical account of causation, two kinds of projects are typically pursued. First, there are those who seek out a *physical account* of causation. The project in this case is largely empirical. Look to our fundamental, scientific theories and attempt to discover those features that might characterize all actual, causal relations ....

In contrast, and more commonly these days, there are those who pursue *difference-making accounts* of causation. These philosophers try to provide an account of our concept

of causation (though not always a reductive analysis). In general, the aim is to provide an account that captures the truth or assertability of most of the causal claims we make in ordinary circumstances.” (Ney, pp. 737-8; my italics)

Ney’s descriptions of the methods adopted by those seeking *physical* and *difference-making* accounts correspond respectively to Dowe’s ([2000], Ch. 1) characterisations of the projects of *empirical* and *conceptual* analysis. As Dowe describes it, empirical analysis involves an *a posteriori*, scientifically informed investigation of what all actual cases of causation have in common (ibid., esp. pp. 3-4). Conceptual analysis on the other hand is a relatively *a priori* project, the primary data for which is not scientific theory but rather linguistic intuitions concerning the extension of our causal concepts (ibid., esp. pp. 2-3). The aim of conceptual analysis is to capture what cases of causation have in common across possible worlds, as opposed merely to what causation contingently is in the actual world (ibid., esp. p. 6).

The supposition that a physical account will be the upshot of the project of empirical analysis, whilst a difference-making account will result from conceptual analysis helps to explain Ney’s decision to call her position ‘foundationalism’ and her subsequent attempt (to be discussed in §3 below) to bring reductionist intuitions to bear in support of it. *Prima facie*, we might wonder why it should be considered more foundationalist to take difference-making facts to depend upon physical causal facts rather than conversely. But if a physical account is one arrived at by examining what fundamental physics tells us about causal interactions, whilst a difference-making account will be arrived at by examining our ordinary causal claims concerning the interactions of medium sized dry goods, then perhaps the facts deemed causal by the former sort of account might be considered of a lower ‘level’ than those deemed causal by the latter. This, at any rate, seems to be Ney’s reasoning (see p. 743, esp. 743n).<sup>1</sup>

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<sup>1</sup> Woodward, from whom Ney derives the term ‘causal foundationalism’, gives a characterisation of that thesis which makes no reference to *facts about physical causation* or to *facts about difference-making*. Rather, he characterises the causal foundationalist thesis as one

“[...] according to which fundamental physical laws supply a causal foundation for all of the causal claims occurring in the special sciences and according to which every application of a fundamental physical theory must be interpretable in terms of a notion of ‘cause’ possessing all of the features of the notion that figures in common sense and the special sciences.” (Woodward [2007], p. 70)

In any case, it is clear that Ney supposes difference-making accounts of causation to be the typical upshot of the project of conceptual analysis, and physical accounts to be the typical upshot of the project of empirical analysis. But does Ney intend simply to *define* a difference-making account just as any account that results from conceptual analysis? And does she similarly intend simply to *define* a physical account just as any account that results from empirical analysis? There are compelling reasons for favouring a negative answer to the former question. But, as we shall see, the reasons for a negative answer to the latter are rather less convincing.

One reason we should favour a negative answer to the former question is that the very terminology of *difference-making* suggests that this sort of account is to be defined in terms of its intrinsic nature, and not in terms of the characteristic *a prioristic* method by which it is typically arrived at. *Difference-making* accounts, of course, count as such because they have the intrinsic character of being accounts that say that causes make a difference to their effects. And, sure enough, Ney (pp. 738-9) distinguishes *counterfactual* and *probabilistic* varieties of difference-making account, according to the *kind* of difference they say that causes make. According to the simplest counterfactual theories, a cause *c* makes a difference to its effect *e* in the sense that, in the absence of *c*, *e* would not have occurred. Ney (pp. 738, 738n) cites the accounts of Lewis ([1986c], [2000]) and Yablo ([2004]) as examples of (rather more sophisticated) counterfactual theories. On the other hand, simple probabilistic theories say that *c* makes a difference to *e* in the sense that the probability of *e* is different (higher, if the causation is positive) in the presence of *c* than in its absence. Though Ney doesn't provide specific examples of probabilistic accounts we might, on her behalf, cite those of Good ([1961a], [1961b]), Reichenbach ([1971]), Suppes ([1970]), and Kwart ([2004]).

The *physical account* terminology is less transparent than the *difference-making* terminology. An account might deserve to be called *physical* in virtue of its being arrived by empirical means,

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So characterised, we can see why the term *foundationalism* is apt. For, on this characterisation, the thesis says that the high-level causal claims of common sense and the special sciences are grounded in low-level facts deemed causal by fundamental physical theory. The suggestion is that Ney's characterisation derives from Woodward's by incorporating the assumption that the high-level causal facts are difference-making facts, together with the assumption (or stipulation) that the low-level causal facts are physical causal facts.

through an investigation of fundamental physical theory. Equally, though, an account might warrant the use of that adjective in virtue of having a certain intrinsic nature, perhaps that of being a physical process account of causation. The terminology is inherited from Dowe (*op. cit.*, p. 12), who describes his own account as a “‘physical’ theory of causation”. Unfortunately the passage in which he does so—quoted by Ney (p. 2)—is itself ambiguous as to whether Dowe regards his account as *physical* just in virtue of its being offered as an empirical analysis, or whether its intrinsic nature as a process theory is relevant. Dowe’s is Ney’s main example of a physical account of causation and, although Ney does provide some further examples (to be considered in §4), they do little to resolve this ambiguity.

It might be thought that, since Ney clearly intends an intrinsic-nature definition of difference-making accounts, and since she intends a contrast between the two, she must also intend an intrinsic-nature definition of physical accounts. But the issue is muddied somewhat by the fact that, even if ‘physical account’ is instead defined synonymously with Dowe’s notion of an ‘empirical analysis’, a *de facto* contrast is ensured by Ney’s apparent assumption—for which she presumably takes Dowe’s project as evidence—that a correct empirical analysis (at least for our world) will be a process account. This assumption is presumably the reason that Ney is not careful to distinguish between the two possible definitions of a ‘physical account’.<sup>2</sup>

In fact, it seems to me that Ney equivocates between these two definitions. At certain points (e.g., p. 738n, p. 747n) she does seem just to *define* physical theories synonymously with empirical analyses. At another point, she implies that physical accounts are simply those that seek to discover the nature of “physical causation, whatever that comes to” by the method of “looking to our scientific theories” (p. 760). This makes it sound as though she intends no *a priori*, definitional constraint on the intrinsic nature of physical accounts (that is, on what they must say causation consists in). Yet elsewhere she suggests that the only sort of scientific theory that could inform a theory of physical causation is one that describes “the mechanisms of microphysical interactions” (p. 749n). Since ‘mechanisms’ are presumably to be thought of in physical-process terms, this makes it sound as though she is assuming an intrinsic-nature definition of physical theories as process theories. Ney also

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<sup>2</sup> The thought that some or other difference-making account must be the correct *conceptual* analysis of causation (see Ney, p. 761) might similarly explain Ney’s failure even to mention rival conceptual analyses (for example, Ducasse’s ([1968]) spatio-temporal contiguity analysis).

takes seriously the objection that cases of causation involving absence and omission cannot involve ‘physical causation’ (pp. 755-6), an assertion that only seems plausible if physical causation must be understood in terms of a connecting process.<sup>3</sup> And, indeed, one of her suggested responses to this objection is to point out that, in cases of causation by absence and omission, “there are genuine causal processes at work” (p. 755). Finally, some further evidence that she intends a process-theory definition of physical accounts comes from her talk of physical accounts as those that take causation to consist in ‘physical connection’ (p. 760), or ‘a physical causal relation linking two events’ (p. 740). Such talk sounds like process-talk.

Why does it matter so much precisely which definition of ‘physical account’ Ney intends? It matters because it has an important effect upon the meaning of Ney’s causal foundationalist thesis (**CF**). If Ney intends to define ‘physical account’ synonymously with Dowe’s notion of an ‘empirical analysis’, then her causal foundationalist thesis (**CF**) is to be disambiguated as (**CF1**):

(**CF1**) The difference-making facts depend upon the facts about physical causation (*viz.* those facts deemed causal by the best empirical analysis of causation).

The reading of ‘facts about physical causation’ that yields (**CF1**) is one that renders the proposition (**P**) equivalent to (**P1**):

(**P1**) Difference-making facts are not among the facts about physical causation (*viz.* those facts deemed causal by the best empirical analysis of causation).

Note that (**P1**) is not analytic since it is not *analytic* that the best empirical analysis of causation is not a difference-making account. The contrary is surely *a priori* possible.<sup>4</sup> For all we know *a priori*, it could be the case that when we look closely enough at our best physical theories, all we will find is difference-making.<sup>5</sup> If this possibility were realised, (**P1**) would be false.

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<sup>3</sup> For discussion of the difficulties posed by causation involving absence and omission for physical process accounts see, for example, Dowe (*op cit.*, ch. 6) and Hall ([2004], pp. 243, 249).

<sup>4</sup> I assume that *a priori* possibility is a good guide (or at least the best we have) to whether or not a statement is analytic.

<sup>5</sup> Dowe (*op cit.*, pp. 11-12) observes that it is *a priori* possible that a *single* theory of causation should serve both as a successful conceptual analysis *and* as a successful empirical analysis. There seems to be no absurdity in the notion that a difference-making theory should do so.

Now it is straightforward to see that, because of the non-analyticity of **(P1)**, **(CF1)** fails to imply Ney's conclusion **(C)**:

**(C)** Causation is not fundamentally a matter of difference-making.

In order to get a valid argument from **(CF1)** to **(C)**, **(P1)** itself must be added as a supplementary premise. Since **(P1)** is non-analytic, its truth can only be established *a posteriori* by establishing (*a posteriori*) that the correct empirical analysis is not a difference-making analysis. The trouble is that Ney provides no evidence for the *a posteriori* truth of this proposition. Perhaps she takes others (including Dowe *op cit.*) to have already established it. If so, she is not explicit about this. But, in any case I shall argue in §4 that it is *far* from clear that **(P1)** is an established truth (indeed I shall argue that there are good reasons for thinking it false). Ney is therefore not entitled to rely upon it in arguing for **(C)**.

Suppose on the other hand that Ney intends, not to define 'physical account' synonymously with Dowe's notion of an 'empirical analysis', but rather to give an intrinsic-nature definition of the former notion. If so, she might intend to stipulate the intrinsic nature of a physical account in such a way as to exclude difference-making accounts from counting as physical. The specific suggestion made above was that Ney might intend an account to count as physical in virtue of its having an intrinsic nature like that of Dowe's: namely, as an analysis of causation in terms of connecting processes, where processes are not themselves to be understood in difference-making terms.

If this is the intended definition of 'physical account', Ney's causal foundationalist thesis **(CF)** is to be disambiguated not as **(CF1)**, but rather as **(CF2)**:

**(CF2)** The difference-making facts depend upon the facts about physical causation (*viz.* the process-facts [where 'process-fact' is not to be understood in difference-making terms]).

(As before, the text in rounded brackets serves to indicate the relevant reading of 'facts about physical causation'. The text in square brackets serves to indicate the relevant reading of 'process-fact'.) Now **(CF2)**, unlike **(CF1)**, implies **(C)** without further supplementation. This is because the reading of 'facts about physical causation' that yields it is one that renders **(P)** equivalent to the analytic **(P2)**:

(P2) Difference-making facts are not among the facts about physical causation (*viz.* the process-facts [where ‘process-fact’ is not to be understood in difference-making terms]).

But, although (CF2) entails (C), I will show in the next section that Ney’s arguments for causal foundationalism *do not at all* support (CF2). They *do* provide some support for (CF1), but (CF1) requires supplementation by the unsupported (P1) in order to entail her conclusion (C). So whether we construe Ney’s causal foundationalist thesis as (CF1) or (CF2) (corresponding to the two possible readings of ‘the facts about physical causation’ that she fails to distinguish), there is at least one essential premise of her argument for her conclusion (C) that is left completely unsupported. She is therefore unjustified in drawing it. Indeed, it is only Ney’s equivocation between the two definitions of ‘the facts about physical causation’ that might make it appear that the version of causal foundationalism she argues for (namely (CF1)) is the same as the one (namely (CF2)) that implies her conclusion (C).

### 3 Ney’s Arguments for Causal Foundationalism

When it comes to considering “positive arguments that may be offered for causal foundationalism” (p. 757), Ney says that:

“The most compelling kind of argument is based on the physicalist point [...] that physics does not just provide us with a comprehensive account of what exists in the universe but an account as well of why these events occur. That is, physics provides us with not only an ontology and laws for allowable synchronic states, but dynamical laws as well. These laws single out those features of systems that are causally relevant to the production of effects. So, as physicalists who recognize that physics has this role, we should prefer causal foundationalism.” (ibid; see also pp. 740-1)

It is important to be clear about what the ‘physicalist point’ appealed to by Ney *does* and what it *does not* show. This point—that physics not only provides us with an ontology, and a set of static laws constraining synchronically compossible states, but also with dynamic laws that provide information about causal relations—may go some way to supporting the view that the project of empirical analysis is likely to be a fruitful pursuit. If physical theory is not entirely silent on issues of causal relevance, then we can look at physics to see what all interactions that by its lights are causal have

in common. Granting Ney's apparent supposition (mentioned in the previous section) that the facts deemed causal by such a project will be of a 'lower level' than those deemed causal by a correct conceptual analysis we might, as good physicalists, suppose that the latter are somehow dependent upon the former. On the additional assumption (also made by Ney) that the correct conceptual analysis is a difference-making analysis, this perhaps adds up to something of a case for **(CF1)**—the thesis that facts about difference-making depend upon physical causal facts (*viz.* those facts deemed causal by the correct empirical analysis of causation). At least this seems to be what Ney has in mind.

But observe that the physicalist point *does not at all* support the view that the correct empirical analysis will turn out to be anything other than a difference-making analysis (it does not, for example, support the view that it will turn out to be a process-analysis, where processes are analysed in non-difference-making terms). Someone who believes that a difference-making analysis *is* likely to turn out to be the best empirical analysis can readily agree that the dynamic physical laws provide us with information about causal relations, but will presumably insist that they do so by providing us with information about patterns of difference-making (by furnishing us with information about counterfactual or probabilistic dependencies, for instance).<sup>6</sup>

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<sup>6</sup> Such a person can also readily agree with another point made by Ney: namely, that physics tells us that the causes of any given event are of a far greater number than those that make a difference to *whether-or-not* it occurs (pp. 740-2). There are, of course, more ways to make a difference to an event than by making a difference to whether-or-not it occurs (or even to its probability of occurrence). Thus Lewis's ([2000]) account of causation in terms of a counterfactually defined notion of influence (which is cited by Ney as an example of a sophisticated difference-making account, p. 738n) allows that *c* may be a cause of *e* provided merely that whether-or-not *c* occurs (or the manner in which *c* occurs) makes a difference to the *manner* in which *e* occurs.

Granted that (when we take into account differences made to its manner of occurrence) there are many difference-makers for an event, the difference-making theorist must account for the fact that we typically only pick out a few as 'the causes'. But this is a task that can be accomplished with relative ease by observing that difference-making admits of degrees and that it is typically only the (relatively) big difference-makers that are mentioned in our causal explanations (see Lewis, *ibid.*, pp. 188-9). The process-theorist has more difficulty in accounting for the discriminatory nature of our causal talk, since physical process connection doesn't obviously admit of degrees. This may account for why Ney herself appeals to difference-making facts in order to explain such discriminations (pp. 742, 751, 760-1).

So whilst this physicalist argument, which Ney describes as the ‘most compelling’ argument for causal foundationalism, can perhaps be taken to provide some support for **(CF1)**, it provides no support at all for **(CF2)**—the thesis that facts about difference-making depend upon physical causal facts (viz. process-facts [where ‘process-fact’ is not to be understood in difference-making terms])—or for any thesis asserting a dependence of difference-making facts upon non-difference-making facts. And, as already noted, **(CF2)** is the only version of causal foundationalism that implies **(C)** without further supplementation. **(CF1)** requires supplementation by the unjustified **(P1)**. So, in the absence of some further argument for **(CF2)**, it seems that Ney is not warranted in her inference to the truth of **(C)**.

Now Ney does describe two additional arguments for causal foundationalism. True, she regards these arguments as merely ‘supplementary’ (p. 757) to the main physicalist argument described above. She even says that she doesn’t wish to endorse the second of them (p. 759n), but merely mentions it ‘because it has been historically important’ (p. 758)). Nevertheless, it is worth giving some consideration to these arguments to see if they can provide the needed support for **(CF2)**.

The first of the supplementary arguments (pp. 757-8) appeals to the existence of pre-emption cases. Such cases are often deployed in the literature to show that the relations of causation and difference-making come apart, thus supposedly demonstrating the falsity of difference-making theories of causation. Ney claims that cases of pre-emption support causal foundationalism because “[a]ccording to the foundationalist, causation is not fundamentally a matter of difference-making” (ibid., p. 758). Now the latter assertion is just false if the foundationalist thesis is construed as **(CF1)**. On the other hand, construed as **(CF2)**, foundationalism *only* implies that causation is not fundamentally a matter of difference-making because it says that difference-making facts are dependent upon process-facts. Yet the existence of pre-emption cases has no tendency to show that this dependence holds (nor that difference-making facts depend on any *other* sort of non-difference-making fact).<sup>7</sup>

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<sup>7</sup> Indeed, in arguing from the non-fundamentality of difference-making to the truth of foundationalism (which—when read as **(CF2)**—merely *entails* the non-fundamentality of difference-making), Ney seems straightforwardly guilty of the fallacy of affirming the consequent.

But although the appeal to pre-emption fails to support causal foundationalism on either construal, it does bear directly upon Ney's ultimate conclusion (**C**). For, if pre-emption cases show that causation is not a matter of difference-making, they presumably show that (**C**)—it is not *fundamentally* a matter of difference-making. Of course, sophisticated difference-making theories (including those of Yablo [2004], and Lewis [2000]) have resources for dealing with at least some cases of pre-emption. But Ney does not discuss these. Nor does she discuss important counter-arguments made by difference-making theorists against their rivals, most notably process theories of causation. As shall be seen in §4, one particular problem for the latter is the difficulty of distinguishing causal from non-causal processes without recourse to causal facts or their difference-making surrogates. So, whilst it is true that appeal to pre-emption cases is one way to argue for the (**C**), Ney hardly builds a compelling case along these lines. And it cannot simply be assumed as obvious that pre-emption cases are devastating for the view that causation is fundamentally a matter of difference-making.

The second supplementary argument cited by Ney for causal foundationalism (*ibid.*, pp. 758-9) appeals to some *prima facie* reasons for thinking that facts about difference-making aren't objective. Since causation seems to be an objective relation, it is concluded that causation cannot be fundamentally a matter of difference-making. Just like the previous argument, this argument provides no obvious support for (**CF**) on either construal. Indeed it seems actually to count *against* (**CF2**), which is the version that implies (**C**). For if *physical causal facts* are construed as presumably objective facts about processes, then demonstrating that patterns of counterfactual or probabilistic difference-making are less than fully objective will, it would seem, make it *harder* rather than *easier* to ground them in physical causal facts.

But once again, although the thesis that difference-making facts are not fully objective fails to support causal foundationalism, it does rather directly support Ney's conclusion (**C**)—that difference-making facts are not among the fundamental causal facts. At least it does so on the reasonable assumption that causal facts (including the fundamental ones) are themselves objective. It is therefore worth considering the arguments for the non-objectivity of difference-making facts.

The first argument that Ney cites concerns *probabilistic* difference-making facts, and appeals to claim that the reference-class problem shows there to be no objective fact of the matter

about whether one event makes a probabilistic difference to the occurrence of another (p. 759). The second concerns counterfactual difference-making accounts, and appeals to the claim that the truth-value of ordinary counterfactuals is typically indeterminate (ibid.).

Now there are perfectly reasonable things that the difference-making theorist can say in defence of her position. First, it is not at all clear that the reference-class relativity of probability shows *probabilistic* difference-making relations to be less than fully objective. Provided the reference-classes in question are themselves fully objective, it would seem that reference-class relativised probabilities are too.<sup>8</sup> It is therefore open to the difference-making theorist to acknowledge the reference-class relativity of probability, and say either (a) that causation is itself reference-class-relative<sup>9</sup> or (b) that there is some reference-class (perhaps the most specific one<sup>10</sup>) such that probabilistic difference-making relative to *that* reference class is relevant for assessing whether the case is one of causation. Second, Lewis's closest-worlds semantics for counterfactuals, together with the similarity metric that combines with it to yield non-backtracking counterfactuals (see Lewis [1986b]), constitutes an attempt to show that there *is* an objective fact of the matter about how counterfactuals must be evaluated to get the results required by a *counterfactual* difference-making account.

So whilst the 'subjectivity' argument, like the 'pre-emption' argument, bears rather directly on the issue of whether causation is fundamentally a matter of difference-making, Ney hardly builds a compelling case for her conclusion (**C**) along these lines. Indeed it is because Ney recognises the scope for convincing replies to the 'subjectivity' argument that she doesn't endorse it (pp. 759, 759n). Since Ney fails to build a robust case for (**C**) by appeal to either of these supplementary arguments, much turns upon her principal 'physicalist' argument, discussed above. Unlike the supplementary arguments this is correctly regarded as, in the first place, an argument for causal foundationalism rather than an argument directly for (**C**). Yet, as has already been seen, it only supports a version of causal foundationalism (namely (**CF1**)) that fails on its

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<sup>8</sup> Thus Hájek ([2007]) maintains that objective chances are reference-class relative.

<sup>9</sup> In fact, I think that this is just what the 'level' relativity of causation—to which Ney herself seems to subscribe—amounts to.

<sup>10</sup> Unless one assumes a naive frequentist interpretation of probability—which contemporary defenders of probabilistic analyses would likely reject—there is no reason to suppose probabilities relative to maximally specific reference classes will necessarily be trivial.

own to entail (C). The premise (P1), which is the needed supplement to (CF1) in a valid argument for (C), is one that Ney leaves completely unsupported. And it shall now be seen that she is not entitled simply to take it for granted.

#### 4 Are Difference-Making Facts Among the Physical Causal Facts?

Ney seems to suppose that the outcome of the project of empirical analysis will be some or other sort of process theory, where the notion of a physical process is understood in non-difference-making terms. And it seems that she takes Dowe's ([2000]) project to provide some evidence for this. Indeed, perhaps she takes the work of Dowe and other process theorists simply to have established (P1)—that difference-making facts are not among the facts about physical causation (*viz.* the facts deemed causal by the correct empirical analysis)—which is the needed supplement for (CF1) in a valid argument for (C).

But there are good reasons for thinking this not to be the case. In particular, there are good reasons to think that any adequate, non-circular process theory of causation will have to make use of difference-making facts, especially when it comes to making the important distinctions between causal and non-causal processes and interactions. Consequently, even if some process theory does turn out to be the correct empirical analysis (and such theories seem to be the main 'rivals' to difference-making analyses), it will plausibly be one that includes difference-making facts among those facts that it deems causal. Indeed, it will plausibly be one that deems difference-making facts to be more basic than process-facts.

Thus, for example, the most influential process theory of causation is due to Salmon ([1984]). And his criteria for distinguishing causal from non-causal processes and causal from non-causal interactions are formulated in explicitly counterfactual terms (*ibid.*, pp. 148, 171).<sup>11</sup> Dowe, by contrast, seeks to avoid this by defining a causal process as the world-line of a conserved

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<sup>11</sup> More recently, Salmon ([1994], [1997]) attempted to characterise causal processes and interactions without the use of counterfactuals. Hitchcock ([1995], pp. 314-5) presents an example designed to show he is not successful in doing so. Whilst Salmon ([1997], pp. 470-4) responds to Hitchcock's example, there are cases in the vicinity that seem immune to Salmon's treatment. In addition, Dowe ([2000], pp. 120-1) presents an example which seems to show that Salmon must appeal to a notion of diachronic object identity in his account of causal processes. And, as I am about to suggest, it is plausible that the former notion must be understood in difference-making terms.

quantity-possessing object and a causal interaction as an intersection of such processes that involves the exchange of a conserved quantity (*op cit.*, p. 90). The problem with Dowe's definition of a causal process (a problem that infects his definition of a causal interaction) is that it relies upon a notion of diachronic object identity, and the most plausible accounts of the latter are themselves *causal*. This presents a dilemma: *either* the notion of causality involved in the analysis of diachronic object identity is itself to be analysed in terms of processes, leading to a circularity or regress, *or* it is to be analysed in difference-making terms, with the resulting account deeming facts about difference-making to be causal (and indeed to be causal facts that are more basic than causal process facts). Dowe (*ibid.*, pp. 101-9) seeks to avoid this dilemma by presenting some rivals to the causal theory of identity (pp. 102-4) and by presenting some arguments against the causal theory (pp. 104-7). Though this is not the occasion to go into the details, it is worth observing that Dowe's arguments against the causal theory are far from compelling, whilst the rivals he presents seem to be subject to even worse objections.

So Ney is wrong if she thinks that it can simply be taken as established that the best empirical analysis of causation is a process analysis that has no need to appeal to difference-making facts. She is consequently wrong if she thinks that **(P1)** stands without need of argument. In fact, as shall now be seen, there is some evidence that Ney herself finds plausible an empirical analysis on which **(P1)** is straightforwardly *false*—more straightforwardly than on Dowe's process theory.

Although Ney neither endorses any existing empirical account of causation (such as those of Dowe or Salmon) nor seeks in detail to develop her own, some brief remarks suggest that she is sympathetic to a process account that cashes out the notion of a causal process in terms of relations of lawful determination (p. 753, esp. p. 753n). Of course she accepts that it is not plausible to

“... think of determination as being equivalent to the causal relation. In general what gets determined by the laws are states of entire systems. Causes may be parts of these systems, or parts of these systems that have particular features...” (p. 753)

She notes such an account “of physical causation owes a lot to the account of causation found in Mill ..., revised by Mackie ... and then by Strevens” (p. 753n).

Yet, if such an empirical analysis is correct, then it seems that **(P1)**—the proposition that difference-making facts are not among the physical causal facts (*viz.* the facts deemed causal by the correct empirical analysis of causation)—is false. For accounts within the Mill/Mackie/Strevens tradition *are* naturally regarded as difference-making accounts. In this tradition (as the above-quoted passage suggests), a cause is analysed as a non-redundant component of a set of antecedent conditions nomically sufficient for the effect. At least on Mackie’s version, this set must be the only such set present on the occasion in question ([1965], p. 247). The non-redundancy of the cause to the set ensures that there is a good sense in which it makes a difference to the effect (for without the cause the set wouldn’t have sufficed for it). This is the reason why Strevens—who besides Dowe is Ney’s main example of someone advancing a physical theory of causation—regards such accounts as “vindicating the difference-making intuition” ([2007], p. 95, see also p. 97). The difference-making appealed to is not counterfactual or probabilistic, but *nomical*.

The sort of empirical account to which Ney seems sympathetic is one that—like that of Strevens (and indeed Mackie)—comprises process, as well as nomic difference-making, elements. But even though such a theory may not be a *pure* difference-making theory, holding it would still be incompatible with maintaining **(P1)**. For it still deems difference-making facts to be among the causal facts. Indeed, the sort of account suggested by Ney’s brief remarks (pp. 753, 753n) is one on which the nomic difference-making facts are *more basic* than the process facts. Given the difficulties (attested to by the efforts of Salmon and Dowe) of analysing the notion of a causal process in non-difference-making terms, it is hardly surprising that Ney should be drawn to such an account.<sup>12</sup>

## 5 Conclusion

In this paper, I have argued that Ney’s arguments fail to establish her conclusion **(C)**—that facts about difference-making are not among the fundamental causal facts. Her main argument

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<sup>12</sup> One suspects that Ney would have to rely heavily upon appeals to nomic difference-making in cashing out her frequent talk of ‘physical causal influence’ (Ney, pp. 740, 741, 742, etc.) and ‘interaction’ (p. 741, 746, 749, etc.), notions that she supposes an account of physical causation will have at its disposal. Strevens too makes heavy use of a notion of causal influence but is clear that this notion may have to be understood in difference-making terms (Strevens [2007], p. 110).

(considered in §3) appeals to the causal foundationalist thesis (**CF**)—that facts about difference-making depend upon facts about physical causation. On one possible reading of that thesis, namely (**CF2**), it implies (**C**) but is unsupported by her argument for causal foundationalism. On the other possible reading, namely (**CF1**), it is (somewhat) supported by her argument for causal foundationalism, but fails to imply (**C**) without supplementation by the proposition (**P1**)—that difference-making facts are not among the facts about physical causation (*viz.* those facts deemed causal by the best empirical analysis of causation). But Ney nowhere argues for the truth of (**P1**), and it has now been seen that she cannot simply assume its truth, for plausibly it is false. Consequently, regardless of how we interpret (**CF**), at least one essential premise of Ney’s argument for (**C**) is left unsupported, though it stands in need of support.

Indeed the arguments of the previous section, which were intended to show that Ney is not entitled to take for granted the proposition (**P1**), to some extent also count directly against (**C**). Those arguments involved giving *prima facie* reasons for thinking that process-theories—the most popular rival to a pure difference-making empirical analysis of causation—must themselves appeal to difference-making in analysing the notion of a causal process. If this is the case, then causal process facts are not among the most basic causal facts, but rather difference-making facts are still more basic. This may supply at least a presumption that difference-making facts are among the basic causal facts. Whilst there is nothing to warrant Ney’s description of the view that this is so as *anti-foundationalist* (p. 740) it might, as compared with Ney’s brand of causal foundationalism, aptly be considered causal foundationalism with a difference.

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