

What is Hume’s Dictum, and Why Believe It?*

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Hume famously said “There is no object, which implies the existence of any other if we consider these objects in themselves”.¹ A typical, general, contemporary version of Hume’s Dictum reads: (HD) there are no metaphysically necessary connections between distinct, intrinsically typed, entities.

HD plays a key role in many metaphysical debates. Beyond Hume’s original application to the case of causal connections, HD serves, for example, as ultimate reason to accept some combinatorial account of modality (Lewis 1986; Armstrong 1989), and to reject states of affairs (Lewis 1992) and necessitarian accounts of properties and laws (Armstrong 1983). Especially in its combinatorialist guise HD crops up as a crucial premise (see van Cleve 1990 and Kirk 1996 in defense of supervenience-based formulations of physicalism, and Paull and Sider 1992, Bennett 2004, and Moyer forthcoming on whether certain supervenience relations are equivalent). Reflecting this influence, HD’s bearing on various positions is now a philosophical topic in its own right (see Hawthorne *et al.* 2006 on whether HD motivates “4-dimensionalism” about persons, and Cameron 2006 on whether HD is compatible with tropes’ being non-transferable).

One should ask of such an influential thesis: why believe it? Interestingly, arguments for HD are in short supply. As MacBride (2005, p. 127) notes, “it is a curious fact that the proponents of the contemporary Humean programme—Lewis included—having abandoned the empiricist theory of thought that underwrites Hume’s rejection of necessary connections provide precious little by way of motivation for the view”.

The absence of arguments for HD would make some sense if proponents believed HD on fairly immediately accessible grounds—if HD were, as I’ll put it, “directly” justified—either as being analytic, in following from the meaning of its constitutive concepts; or as being synthetic *a priori* (less clumsily: “intuitively motivated”), in expressing intuitions we have no good

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¹A *Treatise of Human Nature*, Book I, Part III, §VI.

reason to question.² As it happens, what “by way of motivation” contemporary proponents have provided appeals to one or other route to such direct justification. Ayer (1956) endorses HD as being a tautology, a motivation he also discerns in Hume; in conversation I have found some philosophers (e.g., David Braddon-Mitchell, p.c.) inclined to accept HD on such grounds; Stoljar (forthcoming, p. 5) argues that on certain readings, “Hume’s dictum [...] is not merely true but plausibly analytic”. Somewhat more common are suggestions that HD is supported by intuitions of one or other variety: Lewis frequently registers finding necessary connections unintelligible (e.g., in his 1983); Schaffer (2004) registers positive intuitions of the contingency of connections at issue (in some applications of) in HD; Armstrong (1983) registers both sorts of intuitions.

In what follows I will consider and assess these relatively direct grounds for belief in HD. For each I will show that a *prima facie* case for HD can be made on the grounds, then argue that the case fails, some things considered.³ I’ll close by sketching two ‘inference to the best explanation’ approaches to indirectly justifying HD, which deserve further exploration.

1 From Hume to HD

1.1 The general contemporary version

Hume’s version of his dictum is broadened and refined in contemporary applications.

First, the scope of Hume’s dictum is extended. Hume’s denial of necessary connections between objects is, in context, more generally aimed at denying necessary connections between distinct entities of any ontological category fit to be causal relata (e.g., events). Contemporary applications broaden the scope of the denial still further, to apply to distinct entities of potentially any ontological category and to any sort of connections (of the appropriate modal strength, to be next mentioned) between such entities. Moreover, some applications deny necessary connections between particular entities of the intrinsic types at issue, others between any entities of these types.

I will shortly expand on this particular/general distinction when providing formal expressions of the contemporary dictum. To forestall confusion, however, it is not too soon to note that the particular/general application distinction does not parallel the *de re/de dicto* distinction as applied to modal claims, in any interesting sense (see McKay and Nelson 2005

²Hume was arguably friendly to such motivations for his dictum; see §2.2 and §3.1.

³Conducting this investigation requires first getting clear on what HD is—that is, on what it says—and more specifically, on the interpretive options for key notions in this thesis: ‘distinct’, ‘intrinsic’, and ‘necessary’. In focusing on questions of formulation and interpretation, my approach to assessing HD as a metaphysical thesis is “bottom-up” or “foundationalist”. Stoljar (forthcoming) takes a similar approach, in arguing that a *prima facie* incompatibility between HD and non-reductive physicalism is resolved by attention to what notions of distinctness are at issue in these theses; Stoljar’s discussion independently confirms my taxonomy of ‘distinct’ and certain of my conclusions (as tracked below). Previous critical assessments of HD have typically been “top-down”, proposing seeming counterexamples to the thesis (see MacBride 1999; Bird 2001; Wilson 2005). That said, I will sometimes mention seeming counterexamples as indicating that the denial of a given version of HD isn’t contradictory.

for candidate senses). On the “syntactic” conception, a *de re* modal claim attributes modal properties to an entity or entities understood as independent of type(s); both particular and general applications of HD presuppose that the entities whose necessary connection is denied are intrinsically typed, so are in this sense all *de dicto*. On the “metaphysical” conception, a *de re* modal claim attributes modal properties to entities, not words; as the illustrative examples suggest, both particular and general applications of HD are in this sense all *de re*. Finally, on the “semantic” conception, a *de re* modal claim is one whose terms permit substitution *salva veritate*; but such opacity considerations are irrelevant to both particular and general applications of HD. Hence there is no conception of the *de re/de dicto* distinction that appropriately tracks particular vs. general applications of HD. More generally it seems clear that the *de re/de dicto* distinction (a hodge-podge in any case) is unilluminating so far as HD is concerned, and I will put it aside in what follows (barring one exception at the end of §1.2).⁴

Second, reflecting agreement that there may be nomologically necessary connections between distinct entities, the connections denied in contemporary applications are those holding with metaphysical necessity—that is, holding in all possible worlds;⁵ this is the contemporary correlate of Hume’s talk of “implication”. Of course, whether nomological necessity is weaker than metaphysical necessity is part of what is at issue between those who disagree about HD.

Third, reflecting agreement that (or at least, neutrality on whether) there can be metaphysically necessary connections between extrinsically typed entities, it is specified that the entities at issue are intrinsically typed (roughly: typed solely in terms of intrinsic properties);⁶ this is the contemporary correlate of Hume’s considering objects “in themselves”. This restriction covers the applications mentioned at the start of this paper, including those core applications (related to Hume’s) whereby it is denied that intrinsically typed entities (events, properties, kinds) that are actually connected in laws of nature are necessarily so connected. Perhaps some contemporary Humeans endorse the stronger claim that there are no necessary connections between distinct entities, however typed, but here I treat the weaker thesis, as historically motivated, easier for the Humean to justify, and (relatedly; see §2.2) as providing a *prima facie* basis for taking HD to be analytic.

The above considerations motivate the general contemporary version of Hume’s Dictum:

HD: There are no metaphysically necessary connections between distinct, intrinsically typed, entities.

Typical expressions of Hume’s Dictum are variations on this theme.

1.2 The formal expressions

The general contemporary version is ambiguous, in two respects.

⁴Thanks to two referees for helpful remarks concerning the bearing of the *de re/de dicto* distinction on applications of HD.

⁵As per usual, a connection might be seen as vacuously holding in worlds where neither relata exist; such worlds are not where the action is, so far as applications of HD are concerned.

⁶See, for example, Lewis’s (1986, p. 89) restriction of his HD-based modal recombination principle to (intrinsic) duplicates.

First, consider a case where (distinct, intrinsically typed) entities stand in some connection R . HD so applied might be intended to express that it is possible for either entity to exist without the other's existing—call this the denial of necessary existential connection. Alternatively, it might be intended to express that it is possible for one or both of the entities to exist and yet not stand in R (either because one but not the other exists, or because both entities exist yet do not stand in R)—call this the denial of necessary relational connection. Hume's version of his dictum explicitly expresses a denial of necessary existential connection (“There is no object, which implies the existence of any other . . .”), and typical applications of HD also focus on whether a given connection R that holds in fact⁷ gives rise to a necessary existential connection—perhaps because what is typically at issue is whether the entities stand in R in any world where either exists, in which case a failure of necessary relational connection follows upon a failure of necessary existential connection.⁸ In any case, the more formal expressions of HD to come will allow for disambiguation if needed.

Second, as indicated above HD is intended to apply not only to a diversity of ontological categories, but also to entities either in particular or in general. So, for example, given two distinct, intrinsically typed events that are in fact causally connected, HD might be intended to deny that those very intrinsically typed events must be causally connected, or that any events of those intrinsic types must be causally connected (Hume's own discussion is ambiguous between these readings). Such a distinction might be seen as motivating ‘particular’ (specific token of type) and ‘general’ (any token of type) versions of HD, as follows. Letting ‘I’ stand for ‘intrinsic’, ‘D’ stand for ‘distinct’:⁹

$$\text{HD}(\textit{particular}): [\forall RFGxy : IF, IG, Fx, Gy, Rxy, Dxy] \\ \diamond \exists z(z = x \wedge Fz \wedge \neg \exists z'(z' = y \wedge Gz' \wedge Rzz'))$$

$$\text{HD}(\textit{general}): [\forall RFGxy : IF, IG, Fx, Gy, Rxy, Dxy] \\ \diamond \exists z(Fz \wedge \neg \exists z'(Gz' \wedge Rzz'))$$

(I treat the antecedent conditions as part of a restricted quantifier for ease of readability.)

⁷I use the expression ‘in fact’ as a qualifier that restricts the claim or expression qualified to whatever world is considered as actual (along lines of a non-rigid ‘actually’). A special case of the standard case (see §2.1.3) is one where the entities at issue are actually connected in whatever way is at issue.

⁸This shortcut won't work, of course, if what is at issue is whether the entities are so related in any world where they both exist.

⁹Strictly speaking, what follows in the text are abbreviations of HD, in expressing only one of the two possibilities that are generally supposed to hold, for any given R (e.g., the possibility that a given event cause events different from those it in fact causes, and the possibility that a given event be caused by events different from those that cause it in fact). The unabbreviated version of the particular version would be:

$$\text{HD}(\textit{particular}): [\forall RFGxy : IF, IG, Fx, Gy, Rxy, Dxy] \\ \diamond \exists z(z = x \wedge Fz \wedge \neg \exists z'(Gz' \wedge Rzz')) \wedge \\ \diamond \exists z(z = y \wedge Gz \wedge \neg \exists z'(Fz' \wedge Rz'z))$$

In what follows I'll assume that the abbreviated versions can, for appropriate pairwise instances of R (e.g., ‘causes’ and ‘is caused by’), do the work of the unabbreviated versions.

A potential complication arises here concerning whether $\text{HD}(\textit{particular})$ presupposes any specific account of *de re* modal claims. As previously, HD is not intended to express the denial of necessary connections between extrinsically typed entities. But if one’s account of *de re* claims takes an entity’s modal properties to be independent of how it is typed (as per the syntactic conception), then $\text{HD}(\textit{particular})$ ends up expressing such a denial: if, for example, my mother and I fall under intrinsic types (of the sort that would be shared by our intrinsic duplicates), then $\text{HD}(\textit{particular})$ rules out that I am necessarily extrinsically connected to my actual mother.

One might deal with this complication by restricting HD to its general applications, but (unlike the restriction to intrinsically typed entities) this seems unprincipled, given that particular applications of HD are standard;¹⁰ relatedly, for purposes of conducting a general investigation into the viability of HD it seems unwise to ignore (or worse, reinterpret) such standard applications. A better strategy, sufficient unto present purposes, is to restrict the applications of $\text{HD}(\textit{particular})$ to those where the entities at issue fall under intrinsic sortals, or, more flexibly, to those where these entities are not essentially extrinsically typed in terms of each other. The latter approach seems especially promising so far as preserving standard particular and general applications are concerned.

In what follows, then, I’ll generally speak of ‘HD’, leaving context to decide whether particular or general applications (or both) are at issue; variations on the formal expressions will be in terms of the particular version, except when it matters (as in notes 29 and 32).

1.3 Implausibly strong versions of HD

So much for stage-setting; I turn now to brush-clearing, aimed at eliminating, without much ado, certain implausible versions of HD.

Especially in their destructive moods, some proponents of HD interpret ‘distinct’ in HD in fairly weak terms. For example, Lewis rejects states of affairs, understood as truthmakers for contingent predictions, on grounds that, while a contingent state of affairs Fa is distinct from a , the existence of the former entails the existence of the latter; here the conception of ‘distinct’ is relatively weak, compatible with one relata’s being a constituent of the other. Similarly, Lewis (1983) rejects Armstrong’s account of laws of nature as relations between universals (notwithstanding that Armstrong supposes these to be contingent) on grounds that a given (contingent) law of nature $N(F, G)$, in conjunction with the occurrence of Fa , is necessarily accompanied by the occurrence of Ga , though as Lewis acknowledges, “the sharing of universals detracts from the distinctness of the necessitating and necessitated states of affairs” (p. 40).

Two senses of ‘distinct’ might be at issue in such applications. The weakest is as per:

Numerical distinctness: Entities are distinct just in case they are not identical.¹¹

¹⁰So, for example, Lewis’s (1992) rejection of states of affairs (as involving a necessary connection between distinct existences Fa and a) is naturally seen as denying a particular necessity.

¹¹ $\forall x\forall y : Dxy \leftrightarrow \neg(x = y)$.

States of affairs and their individual constituents count as distinct by *Numerical distinctness*, since a state of affairs is not identical to any individual constituent; similarly for second-order relations (e.g., Armstrongian laws) and first-order states of affairs.

The second, less weak notion is as per:

Weak modal distinctness: Entities are distinct just in case it is possible for at least one to exist without the other.¹²

Weak modal distinctness counts states of affairs and their constituents as distinct, since a 's being only contingently F indicates that a could exist without being F ; hence without Fa 's existing. It also counts the conjunctive state of affairs consisting of $N(F, G)$ and Fa as distinct from Ga , supposing (as Lewis and Armstrong do) that Ga can exist without the conjunctive state of affairs' existing.

Understanding 'distinct' in terms of *Numerical distinctness* leads to a very strong formulation of HD:

HD (extreme): There are no metaphysically necessary connections between numerically distinct, intrinsically typed, entities.¹³

Understanding 'distinct' in terms of *Weak modal distinctness* leads to a less extreme, but still strong, formulation of HD:

HD (strong): There are no metaphysically necessary connections between weakly modally distinct, intrinsically typed, entities.¹⁴

¹² $\forall x \forall y : Dxy \leftrightarrow \diamond \exists z (z = x \wedge \neg \exists z' (z' = y)) \vee \diamond \exists z (z = y \wedge \neg \exists z' (z' = x))$.

¹³That is:

$$\text{HD (particular) (extreme): } [\forall RFGxy : IF, IG, Fx, Gy, Rxy, \neg(x = y)] \\ \diamond \exists z (z = x \wedge Fz \wedge \neg \exists z' (z' = y \wedge Gz' \wedge Rzz'))$$

¹⁴That is:

$$\text{HD (particular) (strong): } [\forall RFGxy : IF, IG, Fx, Gy, Rxy, \\ \diamond \exists z (z = x \wedge \neg \exists z' (z' = y)) \vee \diamond \exists z (z = y \wedge \neg \exists z' (z' = x))] \\ \diamond \exists z (z = x \wedge Fz \wedge \neg \exists z' (z' = y \wedge Gz' \wedge Rzz'))$$

Recall that HD, in either its general or particular applications, is intended to apply to entities understood as falling (possibly as well as actually) under the intrinsic types at issue. It is worth making this assumption explicit when a modal account of distinctness is at issue, by including, in the associated clause in the antecedent conditions, conjuncts specifying that the entities in the scope of the possibility operators fall under the intrinsic types F and G in question, as follows:

$$\text{HD (particular) (strong): } [\forall RFGxy : IF, IG, Fx, Gy, Rxy, \\ \diamond \exists z (z = x \wedge Fz \wedge \neg \exists z' (z' = y \wedge Gz')) \vee \diamond \exists z (z = y \wedge Gz \wedge \neg \exists z' (z' = x \wedge Fz'))] \\ \diamond \exists z (z = x \wedge Fz \wedge \neg \exists z' (z' = y \wedge Gz' \wedge Rzz'))$$

Either way, HD (*particular*) (strong) is not formally tautologous, since the antecedent conditions do not guarantee the truth of the consequent possibility.

Such strong versions of HD, based in weak notions of ‘distinct’, are too strong to be plausible, for they conflict with theses that the great majority of philosophers (including Humeans) accept. In particular, either version conflicts with commonly endorsed “constitutional necessities”, involving necessary connections between entities that are only weakly distinct, and where at least one constitutes the other. (Here it suffices to have in mind a rough notion of constitution, according to which a constitutes b just in case what it is to be b is, at least in part, to be a ; this rough notion will need tweaking, depending on the ontological categories of the entities involved.)

So, for example, HD (extreme) is incompatible with taking sets to exist and be numerically distinct from but necessarily connected to (since essentially constituted by) each of their individual members (such that, e.g., $\{a, b, c\}$ is necessarily connected to a), and with taking mereological fusions to exist and be numerically distinct from but necessarily connected to (since essentially constituted by) each of their individual parts. Such theses are also incompatible with HD (strong), since (given plausible assumptions about possible domains) sets and their individual concrete members, and fusions and their individual concrete parts, count as weakly modally distinct: a concrete member of a non-singleton set S may exist at a world w without S ’s existing, if any other members of S don’t exist at w ; a part of a fusion F may exist at a world w without F ’s existing, if any other parts of F don’t exist at w .

Other commonly accepted theses incompatible with HD (strong), hence HD (extreme), are: that instances of determinates (such as *being scarlet*) are distinct from but necessarily connected to instances of their determinables (such as *being red*);¹⁵ that kinds may have essential intrinsic properties (such that electrons are essentially negatively charged, and cubes are essentially six-sided);¹⁶ that certain physical states are distinct from but necessarily connected to certain mental states.¹⁷

Any of these commonly accepted constitutional necessities serve to model the denial of strong versions of HD. As such, there is not even a *prima facie* case to be made that strong versions of HD are analytic, on any live interpretation of the constituent notions. Nor is there even a *prima facie* case to be made that strong versions of HD are intuitively motivated, either by negative intuitions of the unintelligibility of such necessary connections, or by positive

¹⁵Standardly, a determinable can be instanced without any specific determinate’s being instanced; hence instances of determinables are weakly modally distinct, hence numerically distinct, from instances of determinates. But determinates can’t be instanced without each of their determinables’ being instanced; hence instances of determinates are necessarily connected to instances of determinables. Stoljar (forthcoming, pp. 3-4) cites this case as falsifying HD, understood as involving either numerical distinctness or weak modal distinctness.

¹⁶Standardly, a property essential to a kind can be instanced without being instanced in the kind; hence instances of a property essential to a kind are weakly modally distinct, hence numerically distinct, from instances of the kind. But an instance of the kind cannot exist without its essential features being instanced; hence instances of kinds are necessarily connected to instances of their essential features.

¹⁷Standardly, non-reductive physicalists maintain that mental states are multiply realizable, such that it is possible for a mental state type to be instanced without any specific physical state type’s being instanced; hence instances of mental states are weakly modally distinct, hence numerically distinct, from instances of physical states. But non-reductive physicalists also maintain that physical states determine, with metaphysical necessity, the mental states they do; hence instances of certain physical state types are necessarily connected to certain instances of mental state types.

intuitions of the contingency of the connections at issue. On the contrary, what is intuitively unintelligible is how such constitutional connections could be contingent: how could a set exist without each of its members existing? how could a fusion exist without each of its parts existing? how could an instance of a determinate exist without instances of its determinables existing? And so on.

Henceforth I put aside strong versions of HD, based in weak conceptions of ‘distinct’, as clearly not justifiably believed on grounds of being either analytic or synthetic *a priori*.

1.4 Moderate versions of HD

Reflecting that weak notions of ‘distinct’ render HD implausibly strong, proponents of HD typically take a stronger notion to be at issue in this thesis, flagged by use of ‘wholly distinct’.¹⁸ To the extent that the stronger notion rules out entities in commonly accepted constitutional necessities as being distinct in the relevant sense, the associated formulation of HD will be moderate, as per:

HD (moderate): There are no metaphysically necessary connections between wholly distinct, intrinsically typed, entities.

All unqualified references to HD in what follows will be to such a moderate version.

2 Is HD analytic?

2.1 ‘Wholly distinct’

Three strong conceptions of distinctness are found in the literature; I’ll start by putting these on the table, and saying a bit about how they differ in application. My aim is not to engage in an exhaustive taxonomy of the available ways in which entities might be wholly distinct, but rather to flag the usual suspects and note that two of these are not explicitly modal, whereas a third is. As we’ll see, the explicitly modal conception of distinctness renders HD, as typically formulated, analytic—though, I’ll go on to argue, there are two ways to resist taking this result as justifying belief in HD.

2.1.1 Strong non-modal distinctness

The first conception adverts back to Hume’s discussion, which centered, of course, on the case of causal connections. The entities Hume considers are distinct in the relatively straightforward sense that one (a billiard ball, or the event of the ball’s moving with a certain momentum) does not overlap in space with the “other” (a second billiard ball, or the event of the second ball’s moving with a certain momentum) at a given time (though one may be spatially contiguous

¹⁸So, for example, Armstrong (1997, p. 18) takes his modal recombination principle to allow recombination of any “wholly distinct existences”; other examples will be forthcoming.

to the other¹⁹). The contemporary version of Hume’s conception is in terms of spatiotemporal non-overlap:²⁰

Spatiotemporal distinctness: Entities are distinct just in case they do not spatiotemporally overlap.²¹

Spatiotemporal distinctness only appropriately applies to spatiotemporally located entities (hence does not make sense of applications of HD to universals and the like); but supposing that entities may be spatiotemporally located in virtue of their constituents’ (members, parts, etc.) being spatiotemporally located this conception will rule out as relevantly (wholly) distinct the entities causing trouble for strong versions of HD: sets and their concrete members; fusions and their concrete parts; (instances) of determinates and associated determinables; (instances of) features and associated natural kinds; mental states and physical base states; and so on. Plugging into HD gives:

HD (spatiotemporal): There are no metaphysically necessary connections between spatiotemporally distinct, intrinsically typed, entities.²²

A second conception invokes a mereological conception of distinctness, on which wholly distinct entities do not share any part:²³

Mereological distinctness: Entities are distinct just in case they do not share a mereological part.²⁴

Plugging into HD gives:

HD (mereological): There are no metaphysically necessary connections between mereologically distinct, intrinsically typed, entities.²⁵

¹⁹Depending on how such contiguity is to be understood, it may be that “failing to spatially overlap” is best understood as “failing to spatially overlap in any finite region”.

²⁰See Lewis’s (1986, p. 88) presentation of his HD-based modal recombination principle as “the principle, roughly, that “anything can exist with anything else, at least provided they occupy distinct spatiotemporal positions”.

²¹ $\forall x\forall y : Dxy \leftrightarrow \neg\exists r(\text{region}(r) \wedge \text{occupies}(x, r) \wedge \text{occupies}(y, r))$.

²²That is:

$$\begin{aligned} \text{HD (particular) (spatiotemporal): } & [\forall RFGxy : IF, IG, Fx, Gy, Rxy, \\ & \neg\exists r(\text{region}(r) \wedge \text{occupies}(x, r) \wedge \text{occupies}(y, r))] \\ & \diamond\exists z(z = x \wedge Fz \wedge \neg\exists z'(z' = y \wedge Gz' \wedge Rzz')) \end{aligned}$$

²³See, e.g., Vallentyne 1997, p. 210: “understand references to a *distinct* object as references to an object that is *wholly distinct* (i.e., having no parts in common)”; see also Gendler and Hawthorne (2002, p. 21, note 44), who characterize the distinctness at issue in Hume’s dictum in terms of “non-overlap”.

²⁴That is: $\forall x\forall y : Dxy \leftrightarrow \neg\text{overlaps}(x, y)$.

²⁵That is:

$$\begin{aligned} \text{HD (particular) (mereological): } & [\forall RFGxy : IF, IG, Fx, Gy, Rxy, \neg\text{overlaps}(x, y)] \\ & \diamond\exists z(z = x \wedge Fz \wedge \neg\exists z'(z' = y \wedge Gz' \wedge Rzz')) \end{aligned}$$

A mereological conception of distinctness is in certain respects broader than a spatiotemporal conception, in allowing for entities to be distinct from the spatiotemporal regions they occupy, and for there to be multiple wholly distinct entities occupying a single spatiotemporal region (e.g., a ghost and the wall it passes through). A mereological conception is also broader in making sense of distinctness in cases where the entities involved are not spatiotemporally located (e.g., the intervals $[0,1)$ and $(1, 2]$).

On the other hand, since membership isn't parthood, a mereological conception doesn't rule out even concrete sets and their members as being wholly distinct, and so in this respect is narrower than a spatiotemporal conception. More generally, neither spatiotemporal nor mereological conceptions entail that (all) sets fail to be wholly distinct from their members, so one starts to wonder whether these conceptions are specific cases of a more general conception—say, one according to which wholly distinct entities are such that neither constitutes (spatiotemporally, mereologically, set-theoretically, or otherwise) the other.

Let's not get distracted, however, by whether a general conception of strong distinctness underlies the accounts so far considered. More important is to observe that the spatiotemporal and mereological conceptions are not explicitly modal, in that they do not express the conditions required for whole or strong distinctness as depending on what is possible for the entities at issue. They do not require, for any specific connection R that wholly distinct entities in fact stand in, that such entities might not stand in R (so do not impose a denial of necessary relational connection); nor do they require that wholly distinct entities are such that one or either might exist without the other's existing (so do not impose a denial of necessary existential connection). They rather appear to be neutral on such possibilities.²⁶

Moreover, it is again straightforward to model the denials of the associated versions of HD. There is no contradiction in supposing that spatiotemporally or mereologically distinct, intrinsically typed, entities that are in fact connected are necessarily existentially connected—if, say, everything that exists necessarily exists (as per Williamson 2002). Nor is there any contradiction in supposing that spatiotemporally or mereologically distinct entities that are in fact connected by relation R must be necessarily so connected—if, say, everything that exists necessarily exists and the relation at issue is the 'occupying the same world as' relation. Of course one might be willing to reject theses that obviously falsify HD, but the broader moral is that a version of HD appealing to a non-modal conception of distinctness does not wear its truth on its sleeve, either in general or in its specific applications; hence is not analytic.

2.1.2 Strong modal distinctness

The third conception strengthens *Weak modal distinctness*, and initially does better by way of motivating HD as an analytic claim. Recall that *Weak modal distinctness* takes two entities to be distinct just in case one can exist without the other; *Strong modal distinctness* additionally

²⁶Stoljar (forthcoming) characterizes mereological distinctness broadly (as entailing that distinct entities "share no parts or constituents"); he argues that, since it is unclear how to apply such a conception to properties and since Hume's dictum is supposed to apply to properties, "if 'distinct' means 'mereologically distinct', neither Hume's dictum nor its negation is contradictory" (p. 6).

requires that *either* entity can exist without the other’s existing (hence non-singleton sets might be weakly, but are not strongly modally distinct from their members).²⁷ As previously, say that such entities are not necessarily existentially connected. Then we have:

Strong modal distinctness: Entities are wholly distinct just in case they are not necessarily existentially connected.²⁸

Indeed (abstracting from Hume’s focus on connections between ideas), the view that HD expresses an obvious fact about wholly distinct entities is arguably found in Hume’s remarks:

The mind can never find the effect in the supposed cause, by the most accurate scrutiny and examination. For the effect is totally different from the cause, and consequently, can never be discovered in it. (*Enquiry*, §4, Part I)

Ayer (1956) focuses on this passage as providing the basis for a “very simple” and “decisive” refutation of the view that there are metaphysically necessary causal connections:

[T]he point of Hume’s argument is [...] that there could not be any such relation, not as a matter of fact but as a matter of logic. What Hume is pointing out is that if two events are distinct, they are distinct: from a statement which does no more than assert the existence of one of them it is impossible to deduce anything concerning the existence of the other. This is, indeed, a plain tautology. Its importance lies in the fact that Hume’s opponents denied it. They wished to maintain both that the events which were coupled by the laws of nature were logically distinct from one another, and that they were united by a logical relation. But this is a manifest contradiction. (p. 811)

Ayer’s Humean argument suffers in assimilating necessary connection to logical (analytic) connection, and relatedly, in assuming that such connections are “deducible”. But these now-controversial assumptions are not crucial to appreciating Ayer’s point that if one endorses an understanding of distinctness on which distinct entities are not necessarily connected, then it will be “a plain tautology” that distinct entities are not necessarily connected—not just causally, but in any way that might be at issue.

Ayer’s claim that Hume’s version of his dictum is trivial looks to be preserved on a strong modal interpretation of HD. Inputting *Strong modal distinctness* into HD, we get:

HD (strong modal): There are no metaphysically necessary connections between intrinsically typed entities that are not necessarily existentially connected.²⁹

²⁷So, for example, Armstrong (1989, p. x) characterizes “Hume independence” as requiring “two-way logical independence”.

²⁸ $\forall x\forall y : Dxy \leftrightarrow \diamond\exists z(z = x \wedge \neg\exists z'(z' = y)) \wedge \diamond\exists z(z = y \wedge \neg\exists z'(z' = x))$.

²⁹Here it is worth distinguishing the particular and general versions, in each case making explicit (in the antecedent conditions) that the entities at issue are assumed to fall (possibly as well as actually) under the intrinsic types at issue:

This version of HD is not yet “a plain tautology”, but it can be worked into one. Assuming that the account of distinctness applies to entities typed intrinsically, we can strip off that specification, to read:

There are no metaphysically necessary connections between entities that are not necessarily existentially connected.

As before, the denial of metaphysically necessary connections in HD might be directed at either existential or relational necessary connections; but also as before, applications of HD typically focus on failures of necessary existential connection. Adopting that focus, we may replace ‘metaphysically necessary’ with ‘necessary existential’ to get:

There are no necessary existential connections between entities that are not necessarily existentially connected.

This is a plain tautology, which is one good way to be an analytic truth.³⁰

That said, there are two ways to resist taking this result as justifying belief in HD.

The first starts with the observation that, as above, there are alternative, non-modal conceptions of ‘wholly distinct’ which do not render HD analytic. To be sure, when a thesis is rendered analytic by a specific conception of a constituent notion, the mere availability of alternative conceptions not doing so need not undermine believing the thesis on grounds of its analyticity, so long as the analyticity-inducing conception is plausibly the “default” option. But *Strong modal distinctness* does not occupy such a privileged position, either theoretically or intuitively. The main theoretical motivation for an account of ‘wholly distinct’ is as ruling out as relevantly distinct entities that are merely weakly distinct (e.g., sets and their members, fusions and their parts, and so on). To be sure, *Strong modal distinctness* preserves the desired contrast with weakly distinct entities; but so do non-modal accounts, either jointly or as instances of a more general non-modal constitutional account of ‘wholly distinct’. Nor does *Strong modal distinctness* have any intuitive advantage over non-modal accounts; if anything, intuitive paradigm cases of whole distinctness seem best captured by spatiotemporal and mereological accounts.

HD (*particular*) (strong modal): $[\forall RFGxy : IF, IG, Fx, Gy, Rxy,$
 $\diamond\exists z(z = x \wedge Fz \wedge \neg\exists z'(z' = y \wedge Gz')) \wedge \diamond\exists z(z = y \wedge Gz \wedge \neg\exists z'(z' = x \wedge Fz'))]$
 $\diamond\exists z(z = x \wedge Fz \wedge \neg\exists z'(z' = y \wedge Gz' \wedge Rzz'))]$

HD (*general*) (strong modal): $[\forall RFGxy : IF, IG, Fx, Gy, Rxy,$
 $\diamond\exists z(Fz \wedge \neg\exists z'Gz') \wedge \diamond\exists z(Gz \wedge \neg\exists z'Fz')]$
 $\diamond\exists z(Fz \wedge \neg\exists z'(Gz' \wedge Rzz'))]$

Note that both versions are formally tautologous.

³⁰As Stoljar (forthcoming, p. 5) puts it, for the case of properties: “On this [strong modal] interpretation, what Hume’s dictum says is that if a property *F* is distinct from a property *G*, it is possible that *F* is instantiated and *G* is not and *vice versa*. Since the possibilities of instantiation at issue here are precisely what people have in mind when they speak of necessary connection, Hume’s dictum is on this interpretation not merely true but plausibly analytic”.

This might be the end of the story; but there is a second way to undercut taking the analyticity result to justify belief in HD. I'll now argue that, even granting that 'wholly distinct' in HD is understood in strong modal terms, the resulting thesis, when properly filled in, is not analytic.

2.1.3 Interlude: HD (causal) and conditional necessary connections

At this point it is heuristically useful to attend more closely to what (again, following Hume) is a central case about which advocates of HD intend to advance a substantive philosophical doctrine; namely, the case of causal connections, and the question of whether such connections are metaphysically necessary, in the sense (see note 5) that natural entities (or any tokens of their intrinsic types) must be governed by the same laws in any world where such tokens exist. Here I will assume that the entities at issue are events, understood as particulars which can bear properties. This focus reflects events' being the most commonly accepted category of causal relata, and has the advantage that for events understood as particulars, both non-modal and modal conceptions of 'wholly distinct' are applicable. Moreover, since events are the bearers of properties, we may appeal to one or other account of intrinsic properties as specifying what it is for events to be intrinsically typed (namely, to be typed solely in terms of intrinsic properties).

The simplest such case takes as its starting point actual events that are wholly distinct, actually causally connected, and typed by intrinsic properties F and G , respectively. I aim to consider HD as applied to this case. As a first pass, we have:

HD (causal, first pass): There are no metaphysically necessary causal connections between wholly distinct, intrinsically typed, events.³¹

This is just a first pass, since there is an uninteresting and irrelevant way in which HD (causal, first pass) appears obviously (if not quite trivially) true. The match's being struck causes the match's bursting into flame; the cue ball's impacting the eight-ball causes the latter's ricocheting; the salt's being introduced into water causes the salt's dissolving. Are such connections necessary or contingent? Contingent, say friends of HD; but foes of HD might well agree. Both friends and foes of HD will agree that the holding of a given causal connection between two events of intrinsic types F and G requires more than just an event's being F . In addition, it is required that the event occur in circumstances in which hold certain positive conditions (e.g., the presence of oxygen) and certain negative conditions, including the absence of maskers (e.g., bubble wrap), finks (e.g., a sorcerer who renders a vase non-fragile whenever it's about to be struck), and interrupters of the causal process (e.g., antidotes, the world's coming to the end).

³¹That is (replacing ' R ' with ' C ', for 'causes'):

HD (*particular*) (causal, first pass): $[\forall FGxy : IF, IG, Fx, Gy, Cxy, Dxy]$
 $\diamond \exists z(z = x \wedge Fz \wedge \neg \exists z'(z' = y \wedge Gz' \wedge Czz'))$

Call circumstances in which hold the conditions relevant to F -events' actually causing G -events $K(F, G)$ ("background conditions", for short). Some remarks: the background conditions (a) do not include the occurrence of the relevant F -event (the F -event occurs in the background conditions, and so is not part of them); (b) do not include the holding of a law or other state of affairs to the effect that F -events always cause G -events (such an inclusion would render HD applied to causal connections trivially false); (c) should be specified at an appropriate level of abstraction, compatible with $K(F, G)$'s occurring in other possible worlds.

Since HD (causal, first pass) makes no reference to background conditions, someone holding that causal relations are metaphysically necessary could agree that HD (causal, first pass) is true since its consequent is true: for any actual case of causal connection, there could be worlds (maybe even the actual world) where an F -event exists but the conditions $K(F, G)$ not hold, so that no G -event is caused.

HD (causal, first pass) should be revised accordingly, to incorporate the holding of the relevant background conditions. Our second and final pass, then, is:

HD (causal): There are no (conditional or unconditional) metaphysically necessary causal connections between wholly distinct, intrinsically typed, events.

More formally, I'll treat ' $K(F, G)$ ' as a predicate, such that ' $K(F, G)x$ ' abbreviates ' x occurs in circumstances in which hold the conditions relevant to F -events' (rigidly) actually causing G -events' (for short: x occurs in background conditions $K(F, G)$). Then we have:

HD(*particular*) (causal): $[\forall FGxy : IF, IG, Fx, Gy, Cxy, Dxy, K(F, G)x]$
 $\diamond \exists z(z = x \wedge Fz \wedge K(F, G)z \wedge \neg \exists z'(z' = y \wedge Gz' \wedge Cz'z'))$

HD (causal) appropriately accommodates the fact that philosophers disagree about the status of this thesis as applied to the case of causal connections: proponents and opponents agree that in the actual world, F -events in conditions $K(F, G)$ cause G -events; but disagree about whether it is possible that F -events can exist in worlds with different laws, such that an F -event can exist in conditions $K(F, G)$, yet not cause a G -event. Hence proponents of HD should (and do) reject conditional necessary causal connections (such that given that an F -event exists, then it is necessary that *if* the F -event occurs in conditions $K(F, G)$ then it will cause a G -event); and formulating HD as applied to the causal connection requires explicit reference to such conditions.

2.1.4 HD (causal) and *Strong modal distinctness*

Now let's return to assessing whether *Strong modal distinctness* renders HD analytic. As above, a strong modal account does render HD, as typically generally formulated, analytic. This analyticity, however, is an artifact of the typical formulation's failing to explicitly incorporate the denial of conditional necessary connections. When HD is filled in so as to explicitly incorporate this denial, the resulting thesis is not analytic, even when interpreted as per *Strong modal distinctness*. By way of illustration, consider HD (causal), so interpreted:

HD (causal, strong modal): There are no conditional or unconditional metaphysically necessary causal connections between intrinsically typed entities that are not necessarily existentially connected.³²

HD (causal, strong modal) is not a tautology, even stripping off the reference to intrinsic types, and replacing ‘metaphysically necessary causal connections’ with ‘necessary existential causal connections’:

There are no conditional or unconditional necessary existential causal connections between entities that are not necessarily existentially connected.

In particular: even supposing that events of the relevant types, since wholly distinct, are not necessarily existentially connected (in that either can exist apart from the other), it remains open that such events *are* necessarily existentially connected (such that at least one cannot exist apart from the other) when conditions $K(F, G)$ are in place. In turn it remains open that the events are necessarily causally connected when conditions $K(F, G)$ are in place. Suppose, for example, that it is necessary that F -events, in conditions $K(F, G)$, cause G -events. Such a conditional necessary connection is compatible with the possibility of F -events existing without G -events existing (if the background conditions are not in place), and with the possibility of G -events existing without F -events existing (if G -events can be caused by events other than F -events)—in other words, is compatible with F -events and G -events being strongly modally distinct. Such a case models the denial of HD (causal, strong modal); hence HD (causal, strong modal) is not analytic.

2.1.5 HD and *Strong modal distinctness*

The previous result may be diagnosed, in general terms, as follows. *Strong modal distinctness* establishes only that there are no unconditional necessary connections between wholly distinct entities; hence that there are conditional necessary connections (in particular, conditional necessary causal connections) is left open by HD (strong modal).

What is the significance of this result for whether belief in HD is justified on grounds of its analyticity? Might the significance of HD’s compatibility with conditional necessary connections be deflected by maintaining that belief in HD is justified, so long as this thesis is understood as applying only to unconditional necessary connections?

³²Again distinguishing particular and general versions:

HD (*particular*) (causal, strong modal): $[\forall F G x y : IF, IG, Fx, Gy, Cxy,$
 $\diamond \exists z(z = x \wedge Fz \wedge \neg \exists z'(z' = y \wedge Gz')) \wedge \diamond \exists z(z = y \wedge Gz \wedge \neg \exists z'(z' = x \wedge Fz')), K(F, G)x]$
 $\diamond \exists z(x = z \wedge Fz \wedge K(F, G)z \wedge \neg \exists z'(z' = y \wedge Gz' \wedge Cz z'))$

HD (*general*) (causal, strong modal): $[\forall R F G x y : IF, IG, Fx, Gy, Cxy,$
 $\diamond \exists z(Fz \wedge \neg \exists z'Gz') \wedge \diamond \exists z(Gz \wedge \neg \exists z'(Fz'))]$
 $\diamond \exists z(Fz \wedge K(F, G)z \wedge \neg \exists z'(Gz' \wedge Cz z'))$

Note that neither version is formally tautologous (compare note 29).

To see why not, note that in addition to undermining the primary negative applications of HD (against there being necessary causal connections, and relatedly, against associated necessitarian accounts of properties and laws) the result undermines the primary positive application of HD, in service of one or other combinatorial theory of possibility. Both Lewis (1986, pp. 87–88) and Armstrong (1997, p. 18) cite HD as the governing principle of a combinatorial account, such that the space of natural possibilities (specifying what is possible for broadly scientific entities) admits of every combination (or decombination) of intrinsically typed, relevantly distinct entities, in the sense, crucial to a Humean combinatorialism, making room for natural entities to be governed by different (causal or noncausal) laws. But since HD does not rule out conditional necessary connections between such entities, the truth of this thesis will not guarantee that every such Humean combination will be possible. For example, if it is conditionally necessary that F -events in background conditions $K(F, G)$ cause or are otherwise lawfully connected to G -events, then worlds in which an F -event exists in conditions $K(F, G)$ without a G -event's existing will not be possible, after all. The analytic version of HD thus fails to support the primary destructive and constructive applications of this thesis. There is no hope, then, of salvaging HD as a thesis applying only to unconditional necessary connections: any thesis worthy of the name “Hume’s Dictum” must incorporate the denial of conditional connections, as per:

HD (adequate): There are no conditional or unconditional metaphysically necessary connections between wholly distinct, intrinsically characterized, entities.

That belief in HD (strong modal) cannot be justified on grounds of its being analytic follows accordingly. On the one hand, we can assume that HD elliptically applies to conditional necessary connections, in which case HD (strong modal) appropriately covers core applications of HD, but is not analytic. On the other hand, we can take HD at face value as not applying to conditional necessary connections, in which case HD (strong modal) is analytic but fails as an adequate formulation of HD. Either way, there is no formulation of HD (strong modal) that is both analytic and adequate. Drawing on previous results, it more generally follows that no interpretation of ‘wholly distinct’ renders an adequate version of HD analytic.

One might object that there is a way for a proponent of (the analytic reading of) HD (strong modal) to accommodate the denial of conditional necessary connections.³³ Again, to fix ideas let us consider the case of causal connection. As above, the proponent of HD (causal) is committed to denying that F -events, in conditions $K(F, G)$, are necessarily causally connected to G -events. But, the suggestion goes, the denial of this conditional necessary connection between F -events and G -events can be recast as the denial of an unconditional necessary connection. Let E refer to whatever type of complex entity corresponds to F -events’ occurring in conditions $K(F, G)$. Supposing that E -tokens and G -events are strongly modally distinct, and given that HD (strong modal) (understood as denying any unconditional necessary connections) is analytic, it will follow that the denial of the conditional necessary (here, causal) connection is also analytic.

³³Thanks to David Chalmers for raising this objection.

It is unclear that the recasting strategy works, however, since it is unclear that the recast claim will be an instance of HD. $K(F, G)$, after all, specifies the holding not only of positive conditions requisite for F -events' actually causing G -events (e.g., the presence of oxygen) but also of negative conditions requisite for this (e.g., the absence of maskers and finks, and the world's not coming to an end). Since E 's occurring incorporates the holding of such conditions, it is unclear whether there is any meaningful sense in which E may be intrinsically typed, compatible with the intuitive notion of an intrinsic property (to be discussed further shortly) as one whose having is 'independent of the world outside' of the entity so typed. Relatedly, it is unclear just what complex type of entity E is supposed to be. One might wonder if E could be identified with the backwards causal cone of the effect; but this won't do, since the occurrence of such an E doesn't rule out the world's coming to an end before the G -event occurs. This problem indicates another reason to think the recasting strategy won't work—namely, that E , understood as incorporating the holding of the background conditions, must temporally overlap the minimal duration of the G -event it causes (that is: whatever duration minimally suffices for the G -event to occur); but intuitively, causes needn't temporally overlap the duration of their effects. These concerns provide reason to doubt that the denial of a conditional necessary connection between wholly distinct, intrinsically typed entities, can always be recast as the denial of an unconditional necessary connection between wholly distinct, intrinsically typed entities. To the extent that one can reasonably be pessimistic on this score, we are still lacking any adequate formulation of HD (strong modal), capable of handling cases of conditional necessary connection, that is also analytic.

Drawing on previous results, we may more generally conclude: while there may be multiple interesting senses of 'wholly distinct'—spatiotemporal, mereological, strong modal—none render (an adequate version of) HD analytic.

2.2 'Intrinsic'

I now turn to a second substantive way in which HD, as typically generally formulated, can appear analytic, involving an interpretation of 'intrinsic' as it appears in this thesis. Let's start with a couple of intuitive characterizations of such properties:

I have some of my properties purely in virtue of the way I am. (My mass is an example.) I have other properties in virtue of the way I interact with the world. (My weight is an example.) The former are the intrinsic properties, the latter are the extrinsic properties. (Weatherson 2002)

You know what an intrinsic property is: it's a property that a thing has (or lacks) regardless of what may be going on outside of itself. (Yablo 1999, p. 479)

Common to such characterizations is an understanding of intrinsic properties as properties an entity can have in some sense "independent" of how things in some sense "outside" the entity are. What it is for one entity to be outside another is standardly cashed in spatiotemporal or mereological terms; where accounts of 'intrinsic' differ is mainly in how the notion of independence is understood.

On one approach, independence is understood in modal combinatorial terms, such that (perhaps among other requirements) it is possible that an entity x having F exist unaccompanied—that is, exist in a “lonely” world where no entities wholly distinct from x exist. This is the case on (a common reading of) Kim’s (1982) account of intrinsicness, as well as on Langton and Lewis’s (1998) account (on which intrinsic properties are those whose having is “independent of accompaniment”) and Vallentyne’s (1997) account (on which intrinsic properties are those an entity can possess in a “contracted” world, from which entities outside of x have been removed).³⁴ Let us specify this necessary condition on modal intrinsicness:

Combinatorial intrinsicness: A property F is intrinsic only if it is possible that an entity x having F exist unaccompanied.

Combinatorial accounts have their problems, of course, but let us focus on how interpreting ‘intrinsic’ in HD along these lines bears upon the seeming analyticity of this thesis. One route to such analyticity is suggested by Weatherson’s remarks:

If any kind of combinatorial analysis of intrinsicness can work, we have to assume something like Hume’s Dictum that there are no necessary connections between distinct existences. Indeed, all combinatorial theories of intrinsicness do assume this, and further that the range of what is possible can be taken as given in crafting a theory of intrinsicness. This might be thought problematic, since the best way to formally spell out Hume’s dictum itself appeals to the concept of intrinsicness. (Weatherson 2002)

If a combinatorial account of ‘intrinsic’ does presuppose HD, then a formulation of HD based in such an account might well be analytic, at least when this content is made explicit.³⁵

We can make the appearance of analyticity explicit by inputting *Combinatorial intrinsicness* into HD. Since the entities at issue in HD are intrinsically typed, then on a combinatorial account it is possible for either to exist without the other’s existing—which is just to say that intrinsically typed entities are not necessarily existentially connected.³⁶ Inputting into HD, we have:

HD (combinatorial intrinsicness): There are no metaphysically necessary connections between wholly distinct entities that are not necessarily existentially connected.

³⁴See also Weatherson 2001 and Witmer *et al.* 2005.

³⁵As a referee noted, the assumption that HD should be interpreted as appealing to *Combinatorial intrinsicness* might be seen not as analytic, but as question-begging, by the opponent of HD. Perhaps the charge of question-begging could be deflected, on grounds that a combinatorial account is independently motivated (as, say, the only viable account of ‘intrinsic’) or on grounds that the interdependence at issue is illuminating, even if circular. As I’ll shortly argue, the former strategy isn’t promising. But in any case, my aim is to show that even granting that a case can be made for interpreting ‘intrinsic’ in HD in combinatorial terms, doing so will not justify belief in (an adequate version of) HD.

³⁶Here it is again assumed that we have ruled out that intrinsically typed entities may stand in necessary extrinsic connection, in one or other of the ways discussed at the end of §1.2.

Assuming, as per *Strong modal distinctness*, that entities that are not necessarily existentially connected to each other are wholly distinct, we may strip the latter specification off, to read:

There are no metaphysically necessary connections between entities that are not necessarily existentially connected.

As before we may replace the denial of metaphysically necessary connections with the denial of necessary existential connections typically at issue in applications of HD, to get:

There are no necessary existential connections between entities that are not necessarily existentially connected.

HD (combinatorial intrinsicness) is a tautology; hence analytic.

Here again, there are two ways to challenge the bearing of this result on whether HD is justifiably believed. The first begins by observing that there are alternative conceptions of ‘intrinsic’ on which HD fails to be analytic.

On one alternative approach, the independence at issue in intrinsicness is a matter of failure of non-relationality: roughly, a property is extrinsic just in case an entity’s having it consists in the entity’s standing in relations to other entities outside of it; and a property is intrinsic just in case it is not extrinsic (see Francescotti 1999 for a more sophisticated variation on this theme). Here it remains to say what it is for some property to “consist in” the holding of a given relation (as needed to define ‘extrinsic’); in general, however, a non-relational account will not render HD analytic. Consider our standard case of causal connection. On Francescotti’s preferred account, to ‘consist in’ is to be identical to; but from the fact that an event x ’s having F , at a world, is not identical to x ’s standing in any relation to wholly distinct entities at that world, nothing follows about whether it is possible that an F -event exist (either in conditions $K(F, G)$ or not) and yet not cause a wholly distinct G -event.

On another alternative approach, the independence at issue in intrinsicness is a matter of (something like) internal constitution: roughly, a property F is intrinsic just in case x ’s having F is entirely constituted by conditions that are inside of x (alternatively: that are part of x).³⁷ Here it remains to say what it is for an entity’s being F to be constituted (only) by goings-on that are inside of or part of x ; in general, however, a constitutional account of ‘intrinsic’ will not render HD analytic. For example, on Yablo’s account, the notion of internal constitution is cashed in terms of x ’s having F being independent of expansion of x ’s containing world by a part;³⁸ but from the fact that x ’s having F is in this sense independent of goings-on outside of x , nothing follows about whether it is possible that an F -event exist (either in conditions $K(F, G)$, or not) and yet not cause a wholly distinct G -event.

As in the case of ‘wholly distinct’, the availability of alternative conceptions of ‘intrinsic’ needn’t prevent HD from being appropriately seen as analytic, if analyticity-inducing conceptions have clear advantages over others. But again, this does not appear to be the case.

³⁷C.f. Yablo 1999.

³⁸Depending on how a “containing world” is understood, this understanding of internal constitution may or may not be explicitly modal.

For ‘intrinsic’, the primary desiderata are to provide an account conforming to the paradigm cases, and more generally to illuminate the pretheoretic conception of intrinsic properties as properties an entity can have independent of how things in some sense outside the entity are. The alternative accounts do as well or better as combinatorial accounts in conforming to the paradigm cases (see the aforementioned articles for discussion); moreover, they arguably better illuminate the notion of ‘independence’ in the pretheoretic conception, in analyzing this notion in terms potentially satisfiable in the populated conditions under which the pretheoretic conception arose.

2.2.1 HD and *Modal intrinsicness*

As before, there is a second way of undercutting the analyticity result as justifying belief in HD. I’ll now argue that, even granting that ‘intrinsic’ is understood in combinatorial terms, HD, properly understood, is not analytic.

This result again turns on the fact that (in particular) appropriate application of HD to the core case of causal connections requires that background conditions $K(F, G)$ be incorporated into this thesis. Such conditions may well require that some entity or entities exist—for example, oxygen atoms—wholly distinct from the event which is F . If so, then even if F ’s being intrinsic entails, as per a modal combinatorial account, that its possessors could exist unaccompanied, it will not follow that it is possible, as per HD (causal), for an event x to be F and conditions $K(F, G)$ be in place, and yet this event not cause a G -event.

Again, we have a choice. We can assume that HD elliptically applies to conditional necessary connections, in which case HD (combinatorial intrinsicness) appropriately covers core applications of HD, but is not analytic; or we can take HD at face value as not applying to conditional necessary connections, in which case HD (combinatorial intrinsicness) is analytic but fails as an adequate formulation of HD. Either way, there is no formulation of HD (combinatorial intrinsicness) that is both analytic and adequate.

Drawing on previous results, we can more generally conclude: while there may be multiple interesting senses of ‘intrinsic’—combinatorial, non-relational, constitutional—none render (an adequate version of) HD analytic.

3 Is HD synthetic *a priori*?

I now consider whether HD is justified by intuitions we have no good reason to question.³⁹

3.1 Intuitions and *prima facie* support for HD

As noted, both negative and positive intuitions are cited in support of HD. I want to start by making explicit what *prima facie* support for HD attaches to each sort of intuition.

Consider first negative intuitions of the unintelligibility of necessary connections. Such intuitions are cited by both Lewis and Armstrong; but, I’ll now argue, only Armstrong is in

³⁹What follows draws on results from Wilson forthcoming.

a position to draw upon such intuitions in support of HD. Lewis claims to find mysterious all necessary connections between distinct, intrinsically typed entities, including those holding between entities that are only weakly distinct; hence Lewis’s intuition bears upon a strong, not moderate, version of HD, and as previously discussed, there is not even a *prima facie* case to be made that necessary connections between weakly distinct, intrinsically typed entities are unintelligible. By way of contrast, Armstrong finds mysterious only necessary connections between wholly distinct, intrinsically typed entities.⁴⁰ Hence (though he is not explicit about why he distinguishes these cases) Armstrong may plausibly appeal to negative intuition as providing *prima facie* support for a moderate version of HD, on grounds that necessary connections between wholly distinct entities are not relevantly like those between weakly distinct entities, which we are in position to understand. (I’ll develop this suggestion in §3.2.)

As for positive intuitions of the contingency of a given connection: there is no special difficulty in seeing how these would provide *prima facie* support for a given application of HD, though it is unclear how one could have general such intuitions, covering any and all entities and connections that might be at issue. In fact, those citing positive intuitions of contingency usually register these just for causal connections (or other connections at issue in laws of nature). Hume notably registered his intuitions that, for any entity that actually causes another, it is possible for the cause entity to occur without the effect entity’s occurring; Schaffer (2004) registers that, e.g., it is possible that like charges attract; and Armstrong (1983, p. 158) says, “It would have to be admitted, at the least, that the laws of nature give a definite impression of contingency”.⁴¹ Such limited appeals suggest that positive intuitions do not directly justify HD as a general thesis, but I won’t pursue this concern here, on the assumption that negative intuitions can take up any slack.

Whether positive or negative intuitions are at issue, the attendant *prima facie* support for HD initially looks weak, from a contemporary perspective. Here it’s relevant to consider Hume’s main argument for his version of HD, which appeals to positive intuitions of contingency:

There is no object, which implies the existence of any other if we consider these objects in themselves, and never look beyond the ideas which we form of them. Such an inference wou’d amount to knowledge, and wou’d imply the absolute contradiction and impossibility of conceiving any thing different. But [...] ’tis evident there can be no impossibility of that kind. (*Treatise*, Book I, Part III, §VI; pp. 86–7).

Hume’s argument relies on assumptions that contemporary philosophers (including Humeans) typically reject (for example, that inference to the best explanation is unwarranted), hence in its entirety cannot be the source of contemporary acceptance of HD. Also problematic from a contemporary perspective is Hume’s assumption that intuitive conceivings are a sure guide to possibility. This assumption makes some sense given that the subject matter of Hume’s

⁴⁰So, for example, Armstrong’s (1978) account of laws of nature, his (1991) account of set membership, and his (1997) all involve necessary connections between weakly distinct entities; Lewis resists each of these accounts on grounds that such necessary connections are mysterious; see Lewis 1983, 1991, and 2001*b*.

⁴¹One might question whether such intuitions support the wide-ranging contingency countenanced by HD (causal) (see Wilson 2005); but here I grant that the requisite intuitions are in place.

conceivings are relatively superficial sensory “ideas formed” of entities, but if the conceivings/intuitions at issue aim to identify possibilities for the entities themselves, then the attendant support for HD looks initially quite weak, given that standard philosophical methodology indicates that there might be any number of potential reasons for questioning intuitions of contingency—say, competing intuitions (along lines of those Kripke takes to establish various *a posteriori* necessities), or competing views or theses (of the sort Shoemaker and others argue we have good reason to accept). In fact, those appealing to intuitions in support of HD typically don’t address many, if any, of the candidate reasons for questioning such intuitions. Given that philosophers do endorse theses at odds with HD, the Humean who appeals to intuitions as fairly straightforwardly justifying HD needs some principled reason for thinking that, at least from their perspective, no good reason for questioning intuitions of contingency is likely to be forthcoming.⁴²

3.1.1 Lack of “comparable compulsion”?

Schaffer 2004 attempts to identify such a principled reason in support of his intuition that (e.g.) it is possible that like charges attract, against Shoemaker’s (1998) suggestion that, just as intuitions of the contingency of identity were mistaken, so too are intuitions of causal contingency:

The Kripkean manoeuvre is compelling for water = H₂O because there is an identity, and identities are necessary [Kripke 1980: 97–105]. Hence any conception of water being *XYZ* can only be an illusion. But the relation between [e.g.,] charge and Coulomb’s law is governance rather than identity, and hence no comparable compulsion to necessity exists. (p. 218)

Here Schaffer appears to be proposing a criterion for when one is entitled to rest with intuitions of contingency; namely, whenever there is no compulsion to necessity comparable to that motivating the necessity of identity.

What may serve as “comparable compulsion” is unclear in Schaffer’s discussion, but as I’ll now argue, neither of the options available for the case of identity do the job Schaffer needs comparable compulsion to do. First, there is a broadly logical (hence compelling) proof for the necessity of identity, while there is no such proof for the necessity of causal connections; but there isn’t any broadly logical proof for many of the commonly accepted necessities (discussed in §1.3) involving constitutional connections between weakly distinct entities. Hence the motivation for requiring such proof prior to accepting necessary connections between wholly distinct entities seems unprincipled. Second, in arguing for the necessity of identity Kripke appeals not

⁴²To be sure, some contemporary philosophers (e.g., Bealer (2002) and Chalmers (2002)) accept suitably restricted (ideal, all-things-considered) intuition or conceivability as a sure guide to possibility. When appealing to intuitions proponents of HD do not claim or argue that these result from ideal or all-things-considered deliberations; in any case, since argument is required to establish that a claim is warranted by ideal or all-things-considered intuitions, any associated justification for HD is better seen as indirect (closer to the IBE end of the spectrum).

to proof, but rather to semantic intuitions extracted by synthetic *a priori* deliberation about relevant hypothetical situations. It may be that some constitutional necessities are comparably motivated, but this and other sorts of broadly non-logical “proof” (including those aiming to show that a given claim is analytic) may be disputed (as in §2 of this paper), and hence seem incapable of compelling assent, in the way that a broadly logical proof is able to do. More importantly, it is not obvious that claims of causal necessity can’t be similarly motivated.⁴³ Neither of the available understandings of “comparable compulsion” relevant to the case of identity seem adequate, then, to motivate resting with intuitions of causal contingency.

That said, a better case can be made for doing so. It is here that considerations of how best to understand ‘necessary’ as it appears in HD indirectly come into play. In what follows, I’ll develop this better *prima facie* case for HD’s being intuitively motivated; then argue that the case fails, some things considered.

3.1.2 *Constitutional necessity*

If intuitions of contingency are to provide direct justification for HD, what is needed is a principle that makes general room for constitutional necessities (beyond necessities of identity) while excluding causal and other necessities between wholly distinct entities, as per HD.

A principle seemingly able to do this work isn’t hard to find. As above, commonly accepted necessary connections between intrinsically typed entities are cases of constitutional necessity, in which the entities are moreover not wholly distinct. Taking identity to be a limiting case of constitution, the Humean may correspondingly suggest that such constitutional necessity is the *only* sort of necessity between intrinsically typed entities. In other words, they may endorse:

Constitutional necessity: Intrinsically typed entities are (conditionally or unconditionally) necessarily connected just in case (i) the entities are not wholly distinct; and (ii) at least one entity constitutes the other.

Constitutional necessity appears well-suited for the Humean’s purposes, whatever account of ‘wholly distinct’ is at issue. First, the principle makes room for Humean acceptance of constitutional necessities besides identities. Second, the principle entails HD, since it rules out necessary connections between wholly distinct entities (as per (i)). Third, the principle requires, in addition to being wholly distinct, that the entities at issue be constitutionally connected (as per (ii)). This requirement is crucial, since Humeans also mean to deny conditional necessary connections between wholly distinct entities, and (as per §2.1) no account of ‘wholly distinct’ is itself up to this task. Fourth, the principle doubly warrants the Humean’s rejection of necessary causal connections, since (all parties agree) causes and effects are wholly distinct (on every candidate conception), and neither constitutes the other. Fifth and finally, acceptance of the principle seems principled, since all and only constitutional necessities are commonly accepted.

⁴³In conversation, Kripke registered having intuitions supporting its being necessary that like charges repel; nor is it obvious, especially from a scientific perspective, that the claim that like charges repel is not analytic.

Constitutional necessity, if true, would provide the Humean with a general, principled basis for accepting constitutional necessities while rejecting causal necessities (and indeed, any necessities between wholly distinct entities). And the Humean may furthermore claim that the grounds of their reasonable acceptance of *Constitutional necessity* are equally grounds for thinking that good reasons to question intuitions of causal contingency, in particular, will not be forthcoming.

3.2 From constitutional necessities to causal necessities

Nonetheless, I will shortly argue that a closer look at what facts might plausibly justify our belief in certain constitutional necessities indicates that *Constitutional necessity* is false, for these facts presuppose that there are certain causal necessities.

Our interest here is with competing Humean vs. non-Humean frameworks in the metaphysics of science, so let us consider two claims, expressing certain constitutional necessary connections between broadly scientific entities:

(N1) Necessarily, anything that is scarlet is red.

(N2) Necessarily, anything with a certain mean molecular kinetic energy (MMKE) has a certain temperature.

N1 and N2 express certain necessary connections between properties that are either identical or just partly distinct, in being connected by way of the determinable-determinate relation (henceforth: “determination”) (N1) and identity or realization (N2), and where at least one of the entities constitutes the other. In particular: *being scarlet* is constituted by *being red* (for something to be scarlet is, at least in part, for it to be red);⁴⁴ *having a certain MMKE* constitutes *having a certain temperature* (for something to have a certain MMKE is, at least in part, for it to have a certain temperature).

N1 is a clear truth, and N2 expresses the sort of (presumed true) theoretical connection that is common currency in the metaphysics of science (any physicalist will be inclined to endorse N2, for example). Note that Humeans are not in the business of rejecting such necessities, since HD denies necessary connections only between wholly distinct entities; if accepting HD required rejecting either (N1) or (N2), that would be an unexpected and unattractive consequence of the Humean’s view. Hence Humeans and non-Humeans alike should aim to accommodate the truth of both N1 and N2. Moreover, Humeans and non-Humeans alike will agree that N1 and N2 involve entities that are not wholly distinct, where at least one constitutes the other. (The Humean moreover holds, as per *Constitutional necessity*, that all necessities are of this variety.)

The question I now want to ask is: what *metaphysical* facts are plausibly cited as *justifying* our beliefs in claims such as N1 and N2? There are really two questions here, for a given such claim. First, what are the metaphysical facts at issue such that the holding of these facts

⁴⁴Again, the relevant sense of constitution is neutral on the order of metaphysical explanation between the entities involved. It is compatible with determinates being more fundamental than determinables (as many believe) that for something to be scarlet is for it to be, at least in part, red.

would ground the truth of the claim? Call this ‘the ground question’. Second, how are we in position to justifiably believe that these metaphysical facts are in place? Call this ‘the access question’.⁴⁵ Joint answers to the ground and access questions for a given claim constitute an account of the justificatory facts for that claim; such an account is good to the extent that it provides plausible and illuminating answers to these questions.

Note that it is not enough, in giving an account of the justificatory facts for a given claim, to merely cite that the claim is analytic or otherwise *a priori*. Consider N1, for example. All will agree that N1 is justifiably believed, given competence with the terms or concepts at issue, as either analytic or (perhaps) synthetic *a priori*. This much doesn’t settle what justificatory facts are at issue in N1, however. As Williamson (2007) notes, to say that a truth is analytic or otherwise *a priori* itself leaves all the epistemological questions open, if the truth is about entities in the world, as opposed to about its constitutive terms or concepts: “[Metaphysical accounts of analyticity, as truth in virtue of meaning, or in virtue of synonymy with a logical truth] provide no reason to regard analytic truths as in any way insubstantial. Even if core philosophical truths are analytic in the relevant sense, that does not explain how we can know or justifiably believe them” (Ch. 3, p. 6).⁴⁶ N1 is such a truth about the world (being about properties to which we can ostend); hence to say that N1 is analytic or otherwise *a priori* does not explain how we are justified in believing it. I would moreover add that to say that a truth is analytic or otherwise *a priori* leaves all the metaphysical questions open. In particular: granting that the truth of N1 may be established by attention to its constitutive words or concepts, both the ground and access questions remain: what metaphysical facts about the entities at issue in N1 are such that expressions for or concepts applying to these entities incorporate their necessary connection, and how might such facts be revealed in a *a priori* deliberation (call this ‘the access question’)? More generally, an adequate account of the justificatory facts at issue in an analytic or otherwise *a priori* truth must thus do more than cite said *a priori*; it must moreover answer both the ground and the access questions—again, in plausible and illuminating fashion.

To prefigure the rest of the paper: I’ll now argue that the non-Humean has available accounts of the justificatory facts at issue in N1 and N2 that are clearly better, from the standpoint of plausible and illuminating metaphysics and epistemology, than those available to the non-Humean. The upshot will be that the best accounts of the justificatory facts at issue in certain constitutional necessities (involving entities that are not wholly distinct) presuppose

⁴⁵I understand these questions (and their answers) as presupposing a broadly realist semantics and ontology for the claims at issue. This assumption begs no questions here, since Humean and non-Humean parties to the debate are typically realists, and indeed, scientific realists.

⁴⁶More: “[A]nalytic truths are not supposed to be about words or concepts, even if words or concepts are supposed to play a special role in explaining their truth. The sentence ‘Vixens are female foxes’ is in no useful sense about the word ‘vixen’ or any other words; it is about vixens, if anything” (Ch. 3, p. 1). Linguistic practice is besides the point here: “How do I know ‘Every vixen is a female fox?’ Why am I justified in assenting to it? The lazy theorist may try to dismiss the question, saying that it is simply part of our linguistic practice that ‘Every vixen is a female fox’ has that positive epistemic value for whoever understands it. But the examples of defective practices show that it is not simply up to linguistic practices to distribute positive epistemic status however they please” (Ch. 4, p. 13).

that there are certain causal necessities (involving wholly distinct entities). This provides good reason to think that *Constitutional necessity* is false, and in turn undermines the Humean’s only principled grounds for generally assuming (as opposed to arguing, on a case-by-case basis) that intuitions of contingency supporting HD are not subject to challenge.

3.2.1 The non-Humean’s accounts

Let us start with N1 (‘necessarily, anything that is scarlet is red’). The non-Humean’s answer to the ground question for N1 begins by registering various plausible claims, with which the Humean can (and typically will) agree: that we have knowledge of the actual causal powers (the “forward causal profile”) of *being red* and *being scarlet*, specifying what effects instances of the properties can enter into producing, when in appropriate circumstances;⁴⁷ that we actually individuate these properties by means of these forward causal profiles; that the forward causal profile of *being red* is contained in the forward causal profile of *being scarlet*, supporting the claim that anything that is actually scarlet is actually red. The non-Humean furthermore maintains, compatible with the denial of HD, that the forward causal profiles of *being red* and *being scarlet* are modally stable. As such, the forward causal profile of *being red* will be necessarily contained in the forward causal profile of *being scarlet*, supporting the claim that necessarily, anything that is scarlet is red. Such metaphysical facts about a necessary overlap in such modally stable causal profiles straightforwardly suffice to ground the truth of N1. Hence:

The non-Humean’s answer to the ground question for N1: the necessary connection at issue in N1 is grounded in a modally stable overlap in the forward causal profiles of the properties involved.

The non-Humean answers the access question for N1 as follows. As above, we have access to and actually individuate *being scarlet* and *being red*, as instanced throughout space and time, in terms of their forward causal profiles. N1, however, is a claim requiring our access to modal facts—in particular, facts about how these properties are individuated in modal contexts. How can a *priori* investigation reveal these individuation conditions, and the associated facts grounding N1? For the non-Humean, the answer is straightforward. Whether it is the analytic or synthetic *a priori* of N1 that is at issue, the non-Humean can appeal to the “default” assumption that our terms and concepts for the associated properties incorporate the individuation conditions to which we uncontroversially have access, as applying not just throughout space and time, but modally. Such an assumption is appropriately considered the default, on grounds of being the simplest and most straightforward extension of our actual individuation conditions for these properties to modal contexts. Of course, here as per usual, the default assumption might be overturned, given good reason. I will later argue that there

⁴⁷I won’t speculate here about how we gain knowledge of causal profiles; all parties agree that we have such knowledge, and that will be sufficient for present purposes. Note also that reference to causal profiles is neutral on whether colors are functionally characterizable in non-qualitative terms; perhaps the production of certain qualitative experiences is an irreducible part of the causal profiles at issue.

isn't any good reason presently on the Humean's table; for the present my point is simply that, given the default assumption and our knowledge of the actual individuation conditions of *being scarlet* and *being red*, the non-Humean has a straightforward answer to the question of how a *priori* investigation into the terms or concepts for these properties can result in justified belief in N1, as follows:

The non-Humean's answer to the access question for N1: we have knowledge of actual individuation conditions for *being scarlet* and *being red*, and (as per the default assumption) terms and concepts for these properties incorporate individuation conditions extending actual such conditions to modal contexts; hence a *priori* deliberation involving these terms or concepts for these properties can (and does) reveal a modally stable overlap in their forward causal profiles.

How about N2 ('anything with a certain MMKE has a certain temperature')? This constitutional necessity arguably differs from N1 in being an *a posteriori* necessity, whose truth is at least partly a matter of empirical investigation. This difference makes no difference, however, to the non-Humean's strategy for accounting for the justificatory facts. Humeans and non-Humeans may agree that, when entities stand in necessary *a posteriori* connection, empirical investigation is required only to establish that the entities *actually* stand in the relation at issue; so far as the modal aspect of the claim is concerned, this is still a matter of either analytic or synthetic *a priori*.⁴⁸ So, for example, Humeans and non-Humeans may agree that the property *having a certain temperature* is (at least in part) stipulatively defined in terms of a particular causal profile (as giving rise to certain experiences, etc.), and it is an empirical discovery that a certain physical property—*having a certain MMKE*—has, as it happens, a forward causal profile containing that of *having a certain temperature*. Humeans and non-Humeans may also agree on the modal aspect of N1's justification as being either analytic or synthetic *a priori*. This agreement in mind, let us turn to the non-Humean's account of the justificatory facts at issue in N2, understanding that it is the justificatory facts pertaining to the modal, presumably *a priori* aspect of N2 that is our focus.

The strategy here is a variant on that implemented in the case of N1, so I'll be brief. To start, the non-Humean plausibly maintains that we have knowledge of the actual causal profiles of *having a certain temperature* and *having a certain MMKE*, and knowledge of the fact that the forward causal profile of *having a certain temperature* is contained in the forward causal profile of *having a certain MMKE*, such that anything that actually has a certain MMKE actually has a certain temperature. Compatible with their denial of HD, the non-Humean can maintain that the causal profiles of the properties *having a certain temperature* and *having a certain MMKE* are modally stable, in which case the causal profile of *having a certain temperature* will be necessarily contained in the causal profile of *having a certain MMKE*, supporting the

⁴⁸So, for example, while empirical investigation may be needed to determine that Hesperus and Phosphorus are identical, it is a *priori* that identical entities are necessarily so. Such an epistemological stance on *a posteriori* necessities reflects what, post-Kripke, is a minimal departure from the traditional empiricist view that what is necessary is *a priori*, and indeed was arguably endorsed by Kripke himself (on his preferred account, the modal aspect of *a posteriori* necessities is typically synthetic *a priori*).

claim that necessarily, anything that has a certain MMKE has a certain temperature. Again, facts about a necessary overlap in modally stable causal profiles straightforwardly suffice to ground the truth of N2, as per:

The non-Humean's answer to the ground question for N2: the necessary connection at issue in N2 is grounded in a modally stable overlap in the forward causal profiles of the properties involved.

And again, the non-Humean can tell one or other story about how the modal stability of the causal profiles of these properties is revealed in either analytic or synthetic deliberation, reflecting the default assumption that our terms and concepts for these properties incorporate modal individuation conditions that are the same as those that we actually use to individuate properties throughout space and time, as per:

The non-Humean's answer to the access question for N2: we have knowledge of actual individuation conditions for *having a certain MMKE* and *having a certain temperature*, and (as per the default assumption) terms and concepts for these properties incorporate individuation conditions extending actual such conditions to modal contexts; hence *a priori* deliberation involving these terms or concepts for these properties can (and does) reveal a modally stable overlap in their forward causal profiles.

3.2.2 The Humean's accounts

What accounts can the Humean give of the justificatory facts at issue in N1 and N2? As with the non-Humean's accounts, the Humean's best available accounts of N1 and N2 will implement similar strategies, so I will treat these in parallel.

To start, can the Humean answer the ground question for N1 and N2 along lines of the non-Humean, as appealing to modally stable causal profiles? It seems not. After all, according to HD, the causal profiles of properties are not modally stable; hence notwithstanding that the forward causal profiles of these properties actually overlap (as Humeans will agree), the Humean has no reason to suppose that they necessarily overlap.

The Humean might nonetheless attempt to ground the truth of N1 or N2 in such a necessary overlap, by maintaining that the properties at issue are not subject to HD. Some Humeans (e.g., Lewis and Armstrong) restrict the application of HD to sparse (perfectly natural, fundamental) entities—allowing, in particular, that certain non-fundamental (e.g., functional or structural) entities have stable modal profiles.⁴⁹ Consider N1. If HD is so restricted, and if color properties are functional or structural, then the Humean could maintain that the properties *being scarlet* and *being red*, being functionally or structurally defined, have modally stable,

⁴⁹Hence it is that a Humean can accept the conclusion of Bird's (2001) argument that acceptance of certain necessities of identity ('Necessarily, salt is NaCl') requires acceptance of certain causal necessities ('Necessarily, salt dissolves in water') while retaining their Humeanism; see Wilson forthcoming.

necessarily overlapping forward causal profiles.⁵⁰ But color properties appear to be simple, and in any case are not obviously structural or functional (see, e.g., Campbell 1993). To be sure, many Humeans are also physicalists, and so will be inclined to suppose that color properties (understood as appearance properties that are at least partly psychological) are, contrary to appearances, structural or functional; hence are nothing over above physical goings-on. But that's a further issue: nothing in HD entails that colors are not fundamental. As it stands, there is no guarantee that the Humean can tell the plausible, illuminating story available to the non-Humean, concerning the ground of N1's truth.⁵¹

As for N2: the Humean can definitely not tell the non-Humean's story. To be sure, the Humean can take the forward causal profile of *having a certain temperature* to be modally stable, as a matter of stipulative definition. But the forward causal profile of *having a certain MMKE* is not stipulated; and so, it seems, as per HD, might vary in such a way as not to include that of *having a certain temperature*. Moreover, there is no hope here of achieving the desired modal overlap in causal profiles, by taking *having a certain MMKE* as being a functional or structural property; for this property is a mathematical average of an additive intrinsic property (kinetic energy) of whatever fundamental entities compose molecules. As such, even the "sparse" Humean is committed to *having a certain MMKE* (and indeed, to every property that is an additive function of intrinsic properties of fundamental entities, such as *having a certain mass*) being such as to have a modally unstable causal profile, just as the properties that additively compose it do.

How else might the Humean answer the ground questions for N1 and N2? The remaining option appeals to a posit commonly accepted by Humeans (see Lewis 2001*a*; Armstrong 1989, p. 44; Schaffer 2004): *quiddities*—primitive identities, that are the property equivalent of haecceities—of the properties at issue. Quiddities, for the Humean, float free of causal profiles, just as haecceities do.⁵² If quiddities are related in the right way—say, as being identical, partly identical, or otherwise constitutionally overlapping, then this would provide, in general, a metaphysical ground for the associated properties' being necessarily connected. Moreover, this strategy could be implemented whether or not the associated properties are sparse. So, for example, the Humean may take the truth of N1 to be grounded in the identity, partial identity, or other form of overlap of the quiddities associated with *being scarlet* and *being red*; and similarly for the truth of N2. So we have:

The Humean's answer to the ground questions for N1 and N2: the necessary connections at issue in N1 and N2 are in each case grounded in the quiddities associated with the properties at issue's being identical, partly identical, or otherwise constitutionally overlapping.

⁵⁰The same strategy is at work in Armstrong's (1989) attempt to accommodate necessary exclusions between same-level determinates (such that, e.g., nothing can be both red and blue all over).

⁵¹In any case, the non-Humean's account will retain the advantage that telling it is neutral on whether colors are functional/structural or not.

⁵²I say 'for the Humean', for non-Humeans about properties need not be causal structuralists, maintaining that all there is to a property is its causal profile; alternatively, they may maintain that properties are individuated by 'causal' quiddities, from which associated causal profiles flow.

How might the Humean answer the access questions for N1 and N2? Here the answer is unclear. On the face of it, we do not experience quiddities, even in the indirect sense that we are able to experience, e.g., properties of quarks; indeed, if quiddities are non-causal (as the Humean assumes) and our (direct or indirect) experience of properties is limited to their causal aspects (as is plausible), such experience is in-principle unavailable. No doubt relatedly, we do not actually individuate properties by reference to quiddities; nor does it seem that reference to quiddities is any part of terms or concepts for any of the properties at issue in N1 or N2 (nor, more generally, of terms or concepts for any scientific properties). Given that we do not actually experience quiddities or individuate properties by reference to quiddities, it is unclear how we might access modal facts involving quiddities, of the sort that enter into the Humean’s answer to the ground questions for N1 and N2. Most crucially: without any experiential handle on quiddities, how can we tell whether these are identical, partly identical, or otherwise constitutionally overlap?

One strategy of response might be for the Humean to insist that we do have experience of an indirect sort of quiddities—at least, to the extent that we can demonstratively refer to them (I can refer to the quiddity of *being red* by pointing to something red).⁵³ Having secured such reference, and supposing that the quiddistic referent is thereby incorporated into the associated terms and concepts, then (the story goes) one is in position to deliberate in the preferred *a priori* fashion concerning (in particular) N1. But there remain two gaps in this story. First, what reference we secure to underlying non-causal quiddities is still not within our epistemological purview: indirect demonstrative reference to quiddities at best gains us reference to a Lockean ‘something I know not what’. Second and relatedly, in order to answer the access question for N1, we need not just to secure reference to quiddities, but to be able to tell how quiddities stand to one another. But having demonstratively referred to the quiddities of *being red* and of *being scarlet*, we remain in the dark as regards how these quiddities are related. So the suggested strategy does not provide a basis for a Humean answer to the access questions for N1 and N2.

I think there is only one strategy remaining for the Humean here; namely, to maintain that our epistemological access to the existence of and relations (e.g., overlap) between quiddities proceeds indirectly, by way of theoretical motivation. But here again the Humean faces a difficulty, for it remains unclear what such theoretical motivation might be.⁵⁴ To start, there does not seem to be any motivation, independent of prior acceptance of HD, for positing quiddities. Science doesn’t posit quiddities. Nor (pace Armstrong’s 1983 suggestion) is the motivation for quiddities on a par with that for haecceities; for while the latter reasonably explain our experience of particulars as persisting through extreme changes in their properties, we do not experience or theorize about properties as persisting through any but minor changes in their forward causal profiles. Nor are quiddities needed to provide an account of the justificatory facts at issue in various commonly accepted constitutional necessities: as above,

⁵³Thanks to David Braddon-Mitchell and Eric Liu for this suggestion.

⁵⁴Here I return to the question of whether the Humean has good reason to reject the “default assumption” that the non-Humean appeals to, in their account of the justificatory facts at issue in N1 and N2.

the non-Humean can account for these facts without appeal to quiddities. So far as I can tell, the only present theoretical motivation for accepting quiddities proceeds from prior acceptance of HD: as I have just argued, if HD is accepted, quiddities are needed as the Humean's best shot at providing an account of the grounding of certain commonly accepted constitutional necessities. But now we have returned to the original problem, indicating that this best shot doesn't go far enough; for while acceptance of HD may motivate acceptance of quiddities, it does not provide the Humean with any clear answer to the access question for N1 and N2, indicating how we can know how the quiddities at issue in these claims stand to one another.⁵⁵

3.3 Comparative assessment, and the status of *Constitutional necessity*

Let us now comparatively assess the non-Humean's and Humean's accounts of the justificatory facts at issue in N1 and N2. The non-Humean's answer to the ground question (appealing to overlap in modally stable causal profiles) is plausible and metaphysically illuminating. Plausibly, broadly scientific properties have forward causal profiles; plausibly, in the cases at issue these profiles actually overlap, such that one is contained in another; supposing these profiles are modally stable then we have in hand a metaphysically illuminating account of why N1 and N2 are true. The non-Humean's answer to the access question is also plausible and epistemologically illuminating. Plausibly, we have access to actual forward causal profiles of the properties at issue; plausibly, it is simplest and most natural to assume that terms and concepts for these properties incorporate modal individuation conditions that are the same as those we actually use; supposing so then we have in hand an epistemologically illuminating account of how we can access the facts (about necessarily overlapping causal profiles) that make N1 and N2 true.

The Humean's accounts of the justificatory facts at issue in N1 and N2 do not fare so well. The Humean's answer to the ground question (appealing to overlap in quiddities) is potentially metaphysically illuminating, in that we understand how identity, partial identity, or other forms of overlap may give rise to necessary connections. But this advantage is undermined by the answer's *prima facie* implausibility, in light of the fact that broadly scientific properties are not actually individuated by quiddities. The potential illumination of the Humean's answer to the ground question is also undermined by the fact that the Humean has no clear answer to the question of how we might access the facts about quiddistic overlap, much less a plausible and epistemologically illuminating answer.

⁵⁵Schaffer argues that there is no skeptical epistemological problem with the posit of quiddities, on grounds that the usual responses to external world skepticism may be applied to skepticism about quiddities. However, even supposing Schaffer is right that quiddistic skepticism may be avoided, the present concern about access remains. Relevant here is an important disanalogy between our situation *vis-à-vis* the external world, and *vis-à-vis* quiddities, once skepticism has been put aside. Post-skepticism about the external world, we are in position to justifiably believe certain facts about the occupants of the external world and their relations: I can justifiably say, of a given table, that it overlaps with its legs, and does not overlap with a given chair, and so on. Not so for the case of quiddities: having put skepticism about these aside, we remain in the dark about how quiddities stand with each other; hence the access question remains unanswered. Thanks to Stephen Biggs for this insight.

There is no contest here: the non-Humean's accounts of the justificatory facts at issue in N1 and N2 are clearly superior, in respect of both plausibility and (metaphysical and epistemological) illumination, to the Humean's.

We can now close the circle of the present dialectic. N1 and N2 are each constitutional necessities; N1 is a clear truth, and N2 expresses the sort of theoretical connection that is common currency in the metaphysics of science; Humeans and non-Humeans alike need to accommodate the truth of such constitutional necessities. The upshot of the previous discussion is that the non-Humean's accounts of the justificatory facts at issue in N1 and N2 are considerably more plausible and illuminating than the Humean's. This strong advantage supports the non-Humean's view of the metaphysical facts at issue in these and related claims—as showing, in particular, that acceptance of certain constitutional necessities (such as N1 and N2) requires acceptance of certain causal necessities (associated with the modally stable forward causal profiles of the properties involved), as per:

Constitutional→*Causal*: Acceptance of certain constitutional necessities (between entities that are not wholly distinct) requires acceptance of certain causal necessities (between entities that are wholly distinct).

This result is evidence that *Constitutional necessity* (according to which the only necessities are constitutional necessities) is false—in any case, is open to question. But as goes then *Constitutional necessity*, so goes the Humean's warrant for resting with intuitions of contingency supporting HD. Given that *Constitutional necessity* is open to question, the Humean cannot avoid argumentatively engaging with the full range of reasons to question intuitions of contingency providing seeming support to HD.

3.3.1 Room for moderation?

The broader moral of the previous result, establishing *Constitutional*→*Causal*, goes beyond a mere failure for HD to be directly justified by intuitions we have no good reason to question. It moreover indicates that HD, understood in moderate terms, is not a stable position: contra HD (moderate), there is no principled means of accepting certain necessary connections between weakly distinct entities while rejecting all those between wholly distinct entities.

4 Why believe HD? Two indirect routes

I have argued that neither strong nor moderate versions of HD are directly justifiably believed, either as being analytic or as being motivated by intuitions we have no good reason to question. This leaves open, however, that some version of HD might be indirectly justifiably believed, on argumentative grounds. Here I briefly mention two strategies with some promise of justifying belief in HD on such indirect grounds.

The first attempts to motivate HD as providing a systematic and illuminating basis for philosophical theorizing. Here the proponent of HD takes a page from Lewis's (1986, pp. 3–5)

discussion of set theory. We are justified in believing in sets, Lewis notes, primarily on grounds that these entities, and the associated theory of sets, provide a comprehensive and fruitful systematization of mathematical theory. Lewis's discussion of sets is in service of motivating acceptance of concrete possible worlds; but he and other proponents of HD might attempt to apply the same reasoning as motivating rejection of necessary connections, either between wholly distinct entities or between any distinct entities whatsoever. Supposing it could be made out, this motivation would have the advantage of making sense of why HD serves, as it in fact does, as the cornerstone for a fairly comprehensive framework of philosophical theses and positions. Establishing that such a cornerstone is the best way of systematizing philosophical theory would take considerable doing, however. First, live alternative frameworks based in the denial of HD would have to be shown not to have similar advantages of fruitfulness and systematicity; second, considerations raised in this paper, concerning the intuitive implausibility of strong versions of HD along with the arguable instability of moderate versions, would need to be addressed and overcome.

A second, somewhat more contained strategy for motivating (at least some applications of) HD would focus specifically on its advantages in providing an account of natural modality. There is a principled generator of the space of logical possibility—the requirement of consistency—but this requirement is too weak to characterize what is possible and necessary for broadly natural entities. This is where HD comes in, as motivating one or other principle of recombination, which then serves as a principled basis for generating a somewhat more restricted space of natural possibility. Indeed, post-Hume, the most powerful applications of HD have been in service of formulating such principles of recombination. Making out this motivation for HD would also take some doing; among other things, one would have to show that alternative accounts aren't in a position to provide a more plausible, non-arbitrary basis for generating the restricted natural possibilities.

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