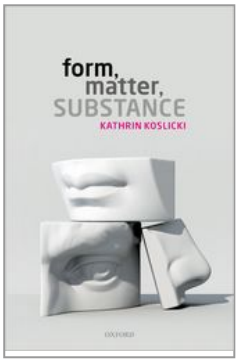

Form, Matter, Substance
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Ontological Dependence

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Abstract and Keywords

This chapter focuses on the question of whether concrete particular objects deserve to be classified as substances within a hylomorphic ontology, despite their metaphysical complexity, and, if so, according to what criterion of substancehood or "ontological privilege." It is common to conceive of the substances as ontologically independent, following some preferred sense of "independence." But what is this sense of "ontological independence" and do matter–form compounds qualify as substances when this notion is applied to them? This chapter discusses various relations defined in the literature under the heading of ontological dependence, beginning with existential construals of ontological dependence and turning next to construals of ontological dependence that are formulated in terms of a non-modal conception of essence. When evaluated against various plausible measures of success, it turns out that even the most promising candidate relations are open to objections.

Keywords: substance, ontological dependence, ontological independence, criteria for substancehood, existential dependence, essential dependence, modal conceptions of essence, non-modal conceptions of essence

5.1 Preliminaries

Ontological dependence is typically taken to be a relation whose relata are entities.[1] The following cases are often cited in the literature as putative candidates of pairs of entities which exhibit a relation of ontological dependence of some sort:

(a) Smiles ontologically depend on mouths that are smiling.
(b) (Non-empty) sets ontologically depend on their members.

(c) Events or states of affairs (e.g., lightning or heat) ontologically depend on their participants (e.g., electrons, molecules, and the like).
(d) Chemical substances (e.g., water) ontologically depend on their molecular/atomic constituents (e.g., H2O molecules, hydrogen and oxygen atoms, and the like).
(e) Tropes (e.g., the redness of a particular tomato) ontologically depend on their bearers (e.g., the tomato).
(f) Aristotelian universals (e.g., redness) ontologically depend on their bearers (e.g., objects that are red).
(g) Holes (e.g., the holes in a piece of Emmentaler cheese) ontologically depend on their "hosts" (e.g., the piece of Emmentaler cheese).
(h) Boundaries (e.g., the boundary around a football field) ontologically depend on their "hosts" (e.g., the football field).

In all of these cases, if in fact they do constitute examples of pairs of entities related by an ontological dependence relation of some sort, the dependence relation in question may plausibly be taken to be asymmetric.

Any number of relations have been defined in the literature under the heading of "ontological dependence." As we will see in what follows, some of the most popular definitions are formulated in modal terms; others in non-modal (e.g., explanatory or essentialist) terms; some (viz., the existential construals of ontological dependence) emphasize requirements which must be met in order for an entity to exist; others (viz., the non-existential essentialist construals of ontological dependence) focus on requirements which must be met in order for an entity to be the very entity that it is at **(p.136)** each time at which it exists; some are rigid, in the sense that they involve a relation between particular entities; others are generic, in the sense that they involve only a relation between an entity and some entities or other which bear certain characteristics. In Section 5.2, I discuss existential construals of ontological dependence; non-existential essentialist construals will be examined in Section 5.3 and in Chapter 6.[2]

With this plethora of defined relations, it is particularly important to set out clear and principled standards by which to evaluate the explanatory usefulness of one such technical notion as compared to another. One possible way to measure success in this area is by considering how well a particular notion does in classifying putative cases of ontological dependence, such as those mentioned earlier. This explanatory goal of classifying particular cases correctly, as is to be expected, does not yield an uncontroversial measure of success. For different philosophers, depending on their particular views concerning specific cases, will disagree over which putative cases constitute good examples of pairs of entities exhibiting a relation of ontological dependence of some sort and in which direction the dependence relation in question runs. For example, some trope theorists (namely, those who view concrete particular objects as bundles of

tropes) will disagree with other trope theorists (namely, those who do not view concrete particular objects as bundles of tropes) over the status of (e). Trope theorists of the first kind may take the bearers of tropes to depend ontologically on the tropes that compose the bundle in a manner analogous to (b), e.g., the way in which non-empty sets ontologically depend on their members, while trope theorists of the second kind may agree with the placement of tropes in (e) among the ontologically dependent items. Moreover, trope theorists of the second kind may or may not find it necessary to be committed to Aristotelian universals in addition to their commitment to tropes, which will affect the question of whether the entry (f) presents us with another genuine example of an ontologically dependent type of entity. Thus, whatever putative classifications we take as our starting point, they cannot be viewed as representing judgments that are universally agreed upon from the outset. Nevertheless, specific proposals can often be evaluated in an *ad hominem* way, relative to the commitments of a particular philosopher who is putting forward the definition under consideration; or, in at least some cases, they can be evaluated in a way that will, or at least ought to be, found compelling by reasonable interlocutors in general.

Secondly, as noted earlier, it is quite common for those who define relations of ontological dependence to employ these notions as markers of ontological fundamentality, especially in the context of formulating an independence criterion of substancehood. Such a criterion is intended to classify those entities as substances on which other types of entities ontologically depend and which do not themselves ontologically depend on other entities numerically distinct from themselves, according to some preferred **(p.137)** notion of ontological dependence. Those who find this connection between ontological independence and substancehood congenial can thereby avail themselves of a second possible measure of success by which to evaluate a particular proposed definition of ontological dependence, viz., to what extent the relation in question contributes to the formulation of a plausible criterion of substancehood. Unsurprisingly, this second possible measure of success also does not yield an uncontroversial measure by which to evaluate the explanatory usefulness of a particular definition of ontological dependence, since different philosophers will take different positions on the question of which entities (if any) should be classified as more deserving of substance status than entities belonging to some other relevant comparison class, or as substances *simpliciter*. Moreover, the question of whether and how ontological fundamentality or substancehood are connected with ontological dependence (or the lack thereof) is itself a matter of dispute.[3]

A third potential measure of success is how well the account in question accommodates the possibility that reasonable philosophers who agree on questions of existence might nevertheless carry on a substantive disagreement in ontology over questions of fundamentality. Thus, two philosophers might, for example, agree that both particulars and universals exist, but disagree over

whether one category of entities should be classified as absolutely fundamental (e.g., as substances *simpliciter*) or as more fundamental (e.g., as more deserving of substance status) than the other. One of these philosophers (e.g., Aristotle in the *Categories*) might hold the position that particulars are more deserving of substance status than universals, perhaps precisely because, in this philosopher's view, universals in some way ontologically depend on particulars. In contrast, the other philosopher (e.g., Plato during the middle period) might hold the position that universals should be classified as more deserving of substance status than particulars, perhaps precisely because, according to this second philosopher, particulars in some way ontologically depend on universals. But if a restriction to particulars were simply built into the definition of fundamentality or substancehood, then the thesis that particulars are more fundamental or more deserving of substance status than universals would simply follow from the definition in question and the opposing thesis, that universals are more fundamental or more deserving of substance status than particulars, would be blocked by the definition in question. Ideally, however, an account of ontological dependence should be sufficiently neutral on this question, so that it can make room for the possibility that disagreements in ontology over questions of fundamentality, such as the dispute just outlined, might be substantive, i.e., neither trivially answerable nor resulting in an inconsistency or incoherence of some sort. Since it is a contested matter whether (and, if so, which) particular disputes in ontology are of the kind just described, this third potential measure of success once **(p.138)** again cannot be expected to yield uncontroversial and universally agreed upon results when it is used to evaluate specific accounts of ontological dependence.[4]

Fourthly, suppose a particular definition of ontological dependence performs quite well with respect to the three goals just stated: it classifies some collection of phenomena in some particular desired way; it helpfully contributes to the formulation of a criterion of substancehood; and it makes intelligible how non-existential ontological disputes over questions of fundamentality can be substantive. It would be an added benefit if, in addition to satisfying these three explanatory goals, a definition of ontological dependence could also provide some degree of illumination concerning the nature of the connections at issue. To illustrate, an entity can be classified as more ontologically derivative than some other relevant comparison class for a variety of different reasons: e.g., because the entity in question is *abstracted* from something more complex (e.g., as a trope might be thought to be abstracted from its bearer); or because it is *constructed* from other entities (e.g., as a non-empty set might be thought to be constructed from its members); or because it is *artificial* (e.g., an artifact or artwork) as opposed to natural; or because it exhibits a low degree of *unity* compared to other more highly unified entities (e.g., as heaps might be thought to exhibit a lower degree of unity than other types of composite entities, such as structured wholes). The fourth criterion considers it to be a mark of explanatory

success if a candidate definition of ontological dependence gives us some insight into the particular explanatory factors that are at play in classifying an entity as ontologically dependent on, or independent of, some other entity. As in the previous three cases, however, it is again a matter of dispute whether the fourth criterion yields a plausible measure of explanatory success, since some may deny that candidate definitions of ontological dependence should be expected to illuminate the nature of the connections at issue.

One might be tempted to add to these four criteria by which to measure the explanatory success of a particular definition of ontological dependence a fifth one, viz., how well the definition in question manages to capture our so-called "intuitions" concerning the phenomena in question. It is a contested question among philosophers what exactly might be meant by "intuition," when some role is assigned to these epistemic states as yielding a potential data set with respect to which a given theory may allegedly be evaluated. Often, so-called "intuitions" are divided into those that are "pre-theoretic" or "pre-philosophical" and those that already carry with them some degree of theoretical commitment. Consider, for example, case (g), e.g., the relation between the holes in a particular piece of Emmentaler cheese and the piece of Emmentaler cheese in which they reside. If by "intuition" we have in mind the first kind (i.e., so-called "pre-theoretic" or "pre-philosophical" intuitions), then I am not sure that it is possible to have an "intuition" of this kind to the effect that holes are, in fact, related in this way to their "hosts." For how could one be in a position to judge that the case at issue follows the **(p.139)** pattern identified earlier, unless one is already in possession of some conception of what sorts of entities holes are and what sort of asymmetric explanatory relation holds between holes and their "hosts." But such a conception, if we have one at all, cannot very well be characterized as "pre-philosophical" or "pre-theoretic." If, on the other hand, by "intuition," we have in mind an epistemic state that is already informed by philosophical theorizing, then it is quite likely that the "intuition" in question is somehow wrapped up with the four explanatory goals I have identified earlier as potential measures of success against which a particular definition of ontological dependence may be evaluated. Or, if in addition to these four explanatory goals I have identified, there are additional ones that I have missed, then these should be made explicit as well. Once this has been done, their plausibility can be subjected to scrutiny; but, at that point, it seems that we have left appeals to "intuition" behind and have entered into the business of explicit theorizing. For these reasons, I see no need to add "Agreement with Intuitions" as a fifth criterion over and above the four already cited.

5.2 Varieties of Existential Dependence

5.2.1 Ontological Dependence in Aristotle's *Categories*

Ontological dependence is often construed existentially.[5] For example, Aristotle is standardly read as putting forward an existential claim when he famously states in the *Categories*:

> Thus all the other things are either said of the primary substances as subjects or in them as subjects. So if the primary substances did not *exist* it would be impossible for any of the other things to *exist*.
>
> (*Categories*, Ch. 5, 2b3–6; my emphasis)[6]

But where the English translation has “exist,” the Greek simply has the verb “*einai*” (“to be”), which can sometimes be rendered in an existential sense, but need not be so rendered. Thus, using the more neutral terminology of “being” rather than “existence,” we may read Aristotle as putting forward the following counterfactual dependence claim: “If the primary substances *were* not [or: did not have being], it would be impossible for any of the other things to *be* [or: to have being].”

Notice that Aristotle in the passage quoted just now speaks of two different ways in which the primary substances can be marked off from everything else: (i) all the other entities are either said of the primary substances as subjects; or (ii) they are (present) in the primary substances as subjects. Aristotle understands the phrase, “being in a subject,” in the following way: what is in something (a) not as a part, and (b) cannot *be* separately from what it is in (*Categories*, Ch. 2, 1a24–5). (Again, the occurrence of “to be” [“*einai*”] here is standardly translated as “exist” as well: “ … and cannot *exist* separately from what it is in”; but the point raised above applies here just the same.) **(p.140)** I interpret Aristotle’s two relations, *being said of a subject* and *being in a subject*, as indicating two ways in which all the other entities depend ontologically on the primary substances, while the primary substances do not in turn ontologically depend on anything else in either of these two ways. These two varieties of ontological dependence, for Aristotle, correspond to two different forms of predication: essential predication, as when we say of something (e.g., Socrates) that it is a member of a certain taxonomic category, i.e., a species (e.g., *human being*) or a genus (e.g., *animal*); and accidental predication, as when we say of something (e.g., Socrates) that it bears a certain accidental feature (e.g., paleness).[7]

Neither the variety of ontological dependence which corresponds to the relation, *being in a subject* (as indicated by accidental predication), nor the variety of ontological dependence which corresponds to the relation, *being said of a subject* (as indicated by essential predication), should be read in an exclusively existential way.[8] If the particular instance of paleness that inheres in Socrates at a particular time is construed as a non-repeatable and non-transferable entity (e.g., a trope, mode, or moment), then it is certainly true that it would be impossible for this individual instance of paleness to exist unless Socrates exists as well. And, given an Aristotelian conception of universals, it would similarly be impossible for universals in any category to exist unless concrete particular objects exist as well. For in order for the universal, color, to exist for example, individual instances of color must exist as well; and in order for individual

instances of color to exist, concrete particular objects must exist in which these individual color instances can inhere.

At the same time, as has often been observed, if we construe ontological dependence in Aristotle's *Categories* in a purely existential fashion, then the entities he identifies there as most deserving of substance status compared to everything else (e.g., concrete particular objects, such as human beings or horses) would lack the distinctive *asymmetric* ontological independence from other entities which Aristotle seems to **(p.141)** want to attribute to them. For in order for a concrete particular object, such as Socrates, to exist, some other individuals and universals must exist as well which can be either said of Socrates or present in him as a subject. Even though Socrates can exist without the particular color instances that are predicated of him accidentally at any particular time, some color instances or other must be present in him at any time at which he exists. And the existence of some color instances or other in turn necessitates the existence of some more general qualitative universals as well, such as paleness and color, to which these individual color instances essentially belong. Finally, if the more general taxonomic categories of which Socrates is essentially a member (e.g., the species, *human being*, or the genus, *animal*) did not exist, it would be impossible for Socrates to exist as well.

Therefore, if the notion of ontological dependence at work in Aristotle's *Categories* were interpreted in a purely existential manner, then concrete particular objects, such as Socrates, would come out as roughly on a par with respect to their degree of ontological independence with other entities, e.g., qualitative universals such as color. But in the *Categories* Aristotle clearly thinks that concrete particular objects, such as Socrates, are ontologically independent of other entities in a way in which other types of entities are not and that entities of other types are ontologically dependent on concrete particular objects in a way in which they are not in turn also ontologically dependent on other types of entities. We should thus conclude that an exclusively existential construal of Aristotle's independence thesis in the *Categories* does not provide the most charitable reading of what Aristotle has in mind there when he claims that all the other entities in some way asymmetrically depend on those entities which are most deserving of substance status, viz., the primary substances.[9],[10]

(p.142) 5.2.2 Modal Existential Dependence

5.2.2.1 Rigid Existential Necessary Dependence

A straightforward modal/existential notion of ontological dependence is, for example, that defined by E. J. Lowe under the heading, "Rigid Existential Necessary Dependence":[11]

(ND1) *Rigid Existential Necessary Dependence*:
x is rigidly existentially necessarily dependent on y $\equiv_{def}$
Necessarily, x exists only if y exists.

Earlier (see Section 5.1), I identified the following explanatory goals against which a particular definition of ontological dependence may be evaluated. Firstly, does it achieve a particular desired classification of paradigmatic cases of ontological dependence? Secondly, is it useful from the point of view of formulating a criterion of substancehood? Thirdly, does it allow for substantive non-existential disagreements in ontology over questions of fundamentality? Fourthly, is it sufficiently fine-grained to capture and illuminate the nature of the connections at issue? When evaluated against these explanatory goals, a straightforwardly modal/existential construal of ontological dependence along the lines of (ND1) turns out not to be satisfactory. Such a construal of ontological dependence is susceptible to objections coming from all four criteria; for reasons of brevity, I confine myself here to some well-known difficulties connected with just the first two explanatory goals.

Suppose that Aristotle's claim in the *Categories* is correct and everything in some way ontologically depends on concrete particular objects, while they themselves do not in the same way ontologically depend on the other entities. As pointed out, for example, in Lowe (1994a), among the apparent trouble cases which arise for (ND1) are the following. Suppose that a certain concrete particular object can exist only if certain of its constituents exist; then, by (ND1), such an entity will turn out to depend ontologically on these constituents.[12],[13] The same will be true if, in some cases, **(p.143)** a concrete particular object can exist only if it originated from certain antecedently existing entities. For example, a human being might be thought to be related in this way to the particular sperm and egg or to the particular zygote from which he or she developed. Moreover, suppose there are objects which exist necessarily (e.g., the number 8); then again, by (ND1), everything will ontologically depend on them. Finally, suppose there are particularized properties which are necessarily had by their bearers (e.g., Socrates' humanity) or four-dimensional entities which are necessarily coexistent with the concrete particular objects with which they are affiliated (e.g., Socrates' life); then again, by (ND1), concrete particular objects will turn out to be ontologically dependent on these entities. Cases such as these indicate that modal/existential dependence is too coarse-grained to yield an explanatorily useful notion of ontological dependence.

5.2.2.2 Generic Existential Necessary Dependence

Not all cases of existential dependence are cases in which an entity can be said to be rigidly existentially dependent on another entity. In some cases, an entity may only require for its existence that *some* entities *or other*, which bear certain characteristics, exist as well. To capture these sorts of cases, Lowe defines the notion of "Generic Existential Necessary Dependence":[14]

(ND2) *Generic Existential Necessary Dependence*:
x is generically existentially necessarily dependent on Fs
$\equiv_{\text{def}}$ Necessarily, x exists only if some Fs exist.

To illustrate, those who subscribe to an Aristotelian (as opposed to a Platonist) conception of universals will presumably take (ND2), but not (ND1), to be appropriate for a characterization of the relation between universals and the particulars that instantiate them. For it is part of the Aristotelian conception that universals can only exist if particulars instantiating them exist as well. But the existential dependence in question would have to be generic and not rigid, since the Aristotelian conception certainly does not commit one to thinking that a universal, e.g., redness, can exist only if some specific concrete particular red object, e.g., a particular tomato, exists as well, only that the existence of some red objects or other is required for the existence of the universal, redness.

(p.144) (ND2), however, is overly coarse-grained for much the same reasons as (ND1) is: existentially generalized versions of all of the same counterexamples that were seen to arise for (ND1) can be generated for (ND2) as well. Suppose, for instance, that a certain concrete particular object, such as Socrates, turns out to be rigidly existentially necessarily dependent, in the sense of (ND1), on certain of his constituents, his origins, the number 8, certain necessary properties, or necessarily coexistent four-dimensional entities. Then, by (ND2), Socrates will also turn out to be generically existentially necessarily dependent on *some* constituents or other, *some* entities from which he originated or other, *some* necessary existents (e.g., numbers) or other, *some* necessary properties or other, as well as *some* necessarily coextensive four-dimensional entities or other. When (ND2) is interpreted as yielding a criterion of substancehood, these entities on which Socrates generically necessarily depends will then in turn be ranked as more deserving of substance status than Socrates, which, I take it, would be generally agreed to be an unwelcome result. And even if we leave aside the second explanatory goal (viz., the formulation of a plausible criterion of substancehood), (ND2) also leads to undesirable consequences with respect to the first criterion (viz., the adequate classification of paradigmatic cases of ontological dependence). For, to illustrate, according to (ND2), a universal (e.g., redness), for example, turns out to be generically existentially necessarily dependent not only on its instances (viz., the particular red objects), but also on numbers, triangles, sets, and everything else that can plausibly be taken to exist necessarily. Thus, while the notion of dependence defined in (ND2) may achieve some explanatory goals (e.g., it may be of help in characterizing the relationship between an Aristotelian universal and the particulars that instantiate it), it certainly cannot single-handedly satisfy all that we expect from a notion of ontological dependence.

5.2.3 Other Forms of Existential Dependence

5.2.3.1 Necessary vs. Essential Existential Dependence

A persistent problem which plagues all modal/existential construals of ontological dependence, as noted earlier, is that they appear to be too coarse-grained to yield the correct results in cases involving necessarily existing entities. For example, as it stands, all of the modal/existential construals of

ontological dependence considered so far seem to misclassify the relationship between concrete particular objects, such as Socrates, and the number 8 or numbers in general. For example, according to (ND1), Socrates would be classified as rigidly existentially necessarily dependent on the number 8, since necessarily Socrates exists only if the number 8 exists, given our assumption that the number 8 exists necessarily. Similarly, (ND2) classifies Socrates as generically existentially necessarily dependent on numbers in general, since necessarily Socrates exists only if some numbers or other exist, given our assumption that numbers in general exist necessarily. Moreover, we also noted that, independently of the question of whether a particular criterion succeeds in yielding a plausible criterion of substancehood, (ND2) **(p.145)** also leads to the unattractive result that the universal, redness, for example, turns out to be dependent on necessarily existing entities, such as numbers, triangles, and sets. And while one might have the reaction that these apparent difficulties could be avoided by simply excluding necessary existents from the scope of the relations in question, such a restriction is unattractive in view of the fact that some of the items to which ontological dependence relations are intended to apply are themselves presumed to be necessary existents (e.g., God, Platonic universals, sets, etc.).[15]

One possible solution to these problems (endorsed by E. J. Lowe and Kit Fine) is to adopt a *non*-modal conception of essence (see Section 1.6). Those who are attracted to such a conception of essence now have the option of formulating stronger essentialist versions of (ND1) and (ND2), as illustrated by Lowe's (ED1) and (ED2):

(ED1) *Rigid Existential Essential Dependence*:
x is rigidly existentially essentially dependent on y $\equiv_{\text{def}}$ It is part of the essence of x that x exists only if y exists.

(ED2) *Generic Existential Essential Dependence*:
x is generically existentially essentially dependent on Fs $\equiv_{\text{def}}$ It is part of the essence of x that x exists only if some Fs exist.

Presumably, given an appropriately constrained non-modal conception of essence, (ED1) and (ED2) are not open to the same range of apparent counterexamples as (ND1) and (ND2). To illustrate, even though it is a *de re* necessary truth about Socrates that he exists only if the number 8 or numbers in general exist, it is not similarly plausible to think that what it is to be Socrates has anything to do with numbers. Hence, with a suitably narrow conception of essence in hand, we can resist classifying the proposition that Socrates exists only if the number 8 exists or the proposition that Socrates exists only if numbers in general exist as an essential truth about Socrates. In what follows,

when I speak of “essence,” “essential truths,” etc., I have in mind such a suitably constrained non-modal conception of essence.

Unfortunately, even if we move from modal to non-modal formulations of existential dependence, there are still reasons to be dissatisfied with purely existential construals of ontological dependence from the point of view of meeting the explanatory goals set out earlier. Potential trouble cases for non-modal existential construals of ontological dependence include the following: Socrates’ humanity (which may be taken to be, depending on one’s outlook, for example, a trope that essentially belongs to Socrates or **(p.146)** a universal that is essentially instantiated by Socrates); Socrates’ form (according to a hylomorphic analysis of concrete particular objects); Socrates’ essential proper parts (if he has any); or Socrates’ origin (assuming Kripke’s Essentiality of Origins thesis). If in at least some of these cases it is plausible to think that it is part of the essence of Socrates, say, that he exists only if the entity in question exists, then such concrete particular objects as Socrates will again be classified as existentially dependent on other entities numerically distinct from themselves even according to (ED1) and (ED2). In this way, they will be ranked as less deserving of substance status than these other entities on which they are existentially dependent, provided that (ED1) or (ED2) are used for the purposes of formulating an independence criterion of substancehood.

There is no doubt much that could be said by the defender of a non-modal existential conception of ontological dependence about each of the items on this list of apparent trouble cases. For example, one could deny that concrete particular objects are hylomorphic compounds; or that they are numerically distinct from their forms; or that they have essential proper parts; or that their origins are essential to them; and so on. One rather popular strategy which, as I argue in Koslicki (2013b) and in Chapter 6, is to be avoided is simply to exclude by stipulation some group of apparent counterexamples (e.g., universals) from one’s favorite definition of ontological dependence or from one’s preferred criterion of substancehood. Those who endorse this strategy violate the third of the four explanatory goals identified earlier (viz., to allow for meaningful non-existential disagreements in ontology over questions of fundamentality), since questions which should be considered to be substantive are then classified as either trivially answerable (because their answers follow straightforwardly from a definition) or as resulting in an inconsistency or incoherence (if it is assumed, for example, that by definition particulars are more deserving of substance status than anything else). For example, such apparently substantive disputes may concern the question of whether universals or particulars deserve to be included among the absolutely fundamental entities (e.g., among the substances *simpliciter*); or whether universals should be designated as more fundamental (e.g., as more deserving of substance status) than particulars or vice versa.

5.2.3.2 Rigid and Permanent Existential Dependence

Fabrice Correia and Benjamin Schnieder have also put forward an existential construal of ontological dependence which is not purely modal, since it makes use of the connective, “because,” on the right-hand side of the definition. This connective, due to its explanatory nature, is not assumed to be open to an analysis in exclusively modal terms. The following definition of “Rigid Permanent Existential Dependence” (RPED) comes from Schnieder (2006):[16]

> **(p.147)** (RPED) *Rigid and Permanent Existential Dependence*:
>
> x rigidly and permanently existentially depends upon y $\equiv_{\text{def}}$ There is an F, such that necessarily for any time, t, at which x exists, x exists at t because y is F at t.

Schnieder considers the following to be a paradigmatic case of (RPED): a particular redness trope, in his view, is rigidly and permanently existentially dependent on a particular rose, say, in which it inheres, since there is an F, viz., redness, such that necessarily for any time, t, at which the rose’s redness trope exists, it exists at that time because the rose is red at that time.

(RPED) strikes me as problematic for several reasons. To avoid the apparent counterexamples considered earlier to which modal/existential construals of ontological dependence fall prey, we have to assume that the explanatory connective, “because,” sets some constraints on how F may be picked relative to the objects, x and y, under consideration.[17] Consider, for example, the following blatantly unhelpful attempt at instantiating (RPED): Socrates rigidly and permanently existentially depends on the number 8 just in case there is an F, e.g., actually numbering the planets, such that necessarily for any time, t, at which Socrates exists, Socrates exists at t because the number 8 actually numbers the planets at that time. Clearly, it should turn out not to be the case that Socrates depends on the number 8 in this way. And, needless to say, it does sound extremely odd to say that Socrates exists at any time, t, because the number 8 actually numbers the planets at that time: for the fact that the number 8 actually numbers the planets at any particular time strikes us as explanatorily completely irrelevant to the question of why Socrates exists at that time. But unless more is said about how to construe explanatory relevance and irrelevance in this context, the oddness of “Socrates exists at t *because* the number 8 actually numbers the planets at t” does not strike me as in any way illuminating of the oddness we already recognize in “Socrates’ existence at t *depends on* the number 8 actually numbering the planets at t.” If anything, it seems that the direction of illumination would have to go the opposite way: the fact that the number 8 actually numbers the planets at a time t is explanatorily irrelevant to Socrates’ existence at t because Socrates’ existence at t does not depend on the number 8 actually numbering the planets at t; and not conversely. In other

words, it is not that two entities, facts, states of affairs, or what have you, stand in a dependence relation because an explanatory link obtains between them; rather, a good explanation should reflect an underlying dependence relation between the relata in question, as, for example, the job of a good causal explanation is to capture an underlying causal dependence relation.[18]

(p.148) Suppose, on the other hand, that implicit guidelines are in place for how F in (RPED) is to be chosen relative to the entities, x and y. When the entities in question are, for example, the rose's redness trope and the rose in which it inheres, then we may assume that it is somehow determined that the explanatorily relevant F in question that must be exhibited by the rose at each time at which the rose's redness trope exists is redness (rather than, say, color), in which case the right-hand side of (RPED) reads as follows: there is an F, redness, such that necessarily for any time, t, at which the rose's redness trope exists, it exists at t because the rose is red at that time.

But now we ought to wonder whether (RPED) has really characterized the direction exhibited by the alleged explanatory connection in question correctly for the following reasons. Only certain kinds of trope theorists would find this particular instance of (RPED) congenial. As noted in Section 5.1, some trope theorists (who take the bearers of tropes to be mere bundles of tropes) would presumably think that the ontological dependence between tropes and their bearers runs in the opposite direction, i.e., that the bearers of tropes are ontologically dependent on the tropes that make up the particular bundle in question, analogously to the way in which non-empty sets are ontologically dependent on their members. So we should ask ourselves whether (RPED) in fact correctly represents the commitments of those trope theorists who are sympathetic to the idea that tropes ontologically depend on their bearers, and not the other way around.

Under certain construals of the proposal under consideration, (RPED) fails to capture the explanatory link in question correctly. For one thing, the kind of trope theorist we have in mind might not take the existence of the rose's redness trope at t to be really a distinct fact or state of affairs from the rose's being red at t. If, on the one hand, we are dealing here with just a single fact, then the irreflexivity of the explanatory "because" has been violated by this putative instance of (RPED), since now a single fact or state of affairs is said to be explained in a circular fashion in terms of itself.[19] If, on the other hand, the existence of the rose's redness trope at t does, for the trope theorist at issue, constitute a distinct fact from the rose's being red at t, then such a philosopher may want to explain the rose's being red at t in terms of the existence of a redness trope that inheres in the rose at t, and not the other way around. After all, the trope theorist's commitment to the existence of tropes has to do some philosophical work; otherwise, **(p.149)** it seems that we could get by just as well without the commitment to tropes. According to either of these two

construals, then, (RPED) does not correctly capture the relevant trope theorist's conception of the relation between the rose's redness trope and the rose in which it inheres.[20]

5.2.4 Being vs. Existence

In addition to the more detailed objections to various specific existential construals of ontological dependence we have considered in the foregoing sections, there are also more general reasons for wanting to divorce ontological dependence from existential dependence (whether modally analyzed or not). Even though the putative cases of ontological dependence we have considered all seem to involve existential dependence, the existential construals of ontological dependence nevertheless do not really get us to the heart of what is at issue in the distinction between the fundamental and the derivative. For this reason, the existential definitions of ontological dependence considered in this chapter are all susceptible to worries coming from the fourth criterion for explanatory success by means of which approaches to fundamentality may be evaluated (Explanatory Fine-Grainedness). In a similar vein, Fine (1995a) comments on the coarse-grainedness of existential accounts of ontological dependence as follows:

> The present examples [viz., impossible objects and identity properties] highlight a problem that besets any existential account of dependence, whether it be modal or essentialist in form. For it does not seem right to identify the "*being*" of an object, its being what it is, with its existence. In one respect, existence is too weak; for there is more to what an object is than its mere existence. In another respect, existence is too strong; for what an object is, its *nature*, need not include existence as a part.
>
> (Fine (1995a), p. 274; my emphasis)[21]

(p.150) It is tempting to think that the relationship between smiles and mouths, for example, is not exhausted by noting that while the existence of smiles requires the existence of mouths (pace the Cheshire Cat), the reverse is not the case. Rather, as we will explore in Section 5.3, what seems to move us closer to the core of the notion of ontological dependence is an idea central to non-modal essentialist approaches: that in saying what it is to be a smile we must appeal to mouths and what these mouths can do; but in saying what it is to be a mouth, we need not in turn appeal to smiles and what smiles can do. We would not have exhausted the full force of the relation of ontological dependence if we were to construe the use of the verb, "to be," in the context of this "what it is to be" construction, in an exclusively existential way. Nevertheless, it does seem plausible to think (in a wide range of cases at least) that ontological dependence entails modal/existential dependence, i.e., that when an entity, x, ontologically depends on an entity, y, it is also true that necessarily x exists only if y exists (see also Lowe (1998)). The converse, on the other hand, does not

always hold, as the trouble cases for the modal/existential approach rehearsed earlier illustrate: it is not true across the board that if necessarily x exists only if y exists, then x ontologically depends on y. I will now turn to the difficult question of what sort of alternative reading we might substitute for an existential construal of ontological dependence.[22]

5.3 Varieties of Essential Dependence

5.3.1 Essential Identity Dependence

Among the various existential construals of ontological dependence we encountered in the previous section, several were formulated in terms of a non-modal conception of essence, viz., in particular, E. J. Lowe's notion (ED1), "Rigid Existential Essential Dependence," and (ED2), "Generic Existential Essential Dependence." Lowe agrees that, among his defined notions, even (ED1) and (ED2) do not yet suffice to establish a genuine contrast between those entities which, in his view, are highly deserving of substance status or substances simpliciter and other entities which ontologically depend on them. To establish such a contrast, Lowe introduces a further species of essential dependence, viz., "Essential Identity Dependence":

> (ED3) *Essential Identity Dependence*:
> x is essentially identity dependent on y $\equiv_{def}$ There is some function φ such that it is part of the essence of x that x = φ(y).[23]

(p.151) As a paradigmatic instance of (ED3) Lowe cites, for example, the relation between a married couple and the individual members of the married couple, or the relation between a set and its members:[24] in the first of these cases, according to Lowe, there is some function, φ, viz., the "marriage function," such that it is part of the essence of the particular married couple in question that it is the result of applying the "marriage function" to the two individual members of the married couple; and, in the second, there is some function, ψ, viz., the "set-formation" function, such that it is part of the essence of Socrates' singleton set that it is the result of applying the "set-formation function" to Socrates. Thus, married couples and sets, according to Lowe, are essentially identity dependent on their individual members. Since (ED3) entails (ED1) and (ED2), sets and married couples are also rigidly existentially essentially dependent on their members and, a fortiori, generically existentially essentially dependent on having some members or other.

The first thing to note about (ED3) is that it does in fact take us beyond a purely existential construal of ontological dependence. (ED3) does not set a condition involving an entity, y, which must be met in order for an entity, x, to exist; rather, (ED3) sets a condition involving an entity, y, that is required for x's identity, which presumably is not to be conflated with x's existence. The substantive content of (ED3) concerns whether or not it is part of the essence of an entity

that it is the result of applying a certain function (whose existence we can presumably uncontroversially presuppose) to another entity or entities. With (ED3), we have therefore moved beyond a purely existential construal of ontological dependence and thus squarely into the realm of essential dependence.

To have a good grasp of what it takes for the condition set by (ED3) to be met or to fail to be met by a given entity would require that we know what Lowe means by "function" in this context and under what circumstances it is or is not part of the essence of an entity to be the result of applying a certain function to another entity or entities. Although Lowe is less explicit on these issues than we might have wanted him to be, he appears to be construing (ED3) with the notion of a *criterion of identity* in mind.[25] In Lowe (1989), we are offered the following general schema for a criterion of identity, where "Φ" stands for a sortal term of some kind (e.g., "set") and "R" stands for a **(p.152)** relation in terms of which the criterion of identity in question is formulated (e.g., the relation of having the same members):

(CI)

$$(\forall \mathrm{x})(\forall \mathrm{y})\left((\Phi \mathrm{x} \& \Phi \mathrm{y}) \rightarrow (\mathrm{x} = \mathrm{y} \leftrightarrow \mathrm{Rxy})\right)$$

Lowe takes an instance of (CI) to be given, for example, by the Axiom of Extensionality for sets: if x and y are sets, then x and y are the same set just in case x and y have the same members; or, as Lowe would put it, *which* set is a certain set is fixed by *which* members the set in question has. For entities that exist in time, we are to construe (CI) for present purposes as yielding a *synchronic* criterion of identity or what may also be called a "principle of individuation," i.e., a criterion that specifies what it takes for an entity to be the very entity that it is *at* a time, rather than a *diachronic* criterion of identity, i.e., a criterion that specifies what it takes for an entity to persist *over* time.

With this in mind, we may now approach (ED3) as follows: an entity, x, is essentially identity dependent (or, for short, "(ED3)-dependent") on an entity, y, when x's relationship to y at a time, t, fixes *which* entity x is at t.[26] In contrast, an entity would count as essentially identity *in*dependent of other entities according to (ED3) (or, for short, "(ED3)-independent") when its synchronic identity at each time at which it exists is *not* fixed by its relationship to any other entities numerically distinct from itself. In this way, no synchronic criterion of identity or principle of individuation which appeals to numerically distinct entities will be available at all for (ED3)-independent entities: that they are the very entities they are at each time at which they exist is simply to be taken as a non-derivative fact about these entities. Thus, if Socrates is in fact to qualify as an (ED3)-independent entity, then it must be the case that he does not owe his individuation or synchronic identity, i.e., his being the very entity that he is at

each time at which he exists, to his relationship to any other entity numerically distinct from himself.[27]

(p.153) A brief preliminary evaluation of (ED3) with respect to the first and second criteria for explanatory success cited in Section 5.1 (“Classification of Phenomena”; “Criterion of Substancehood”) yields the following results. Firstly, the classification of entities to which (ED3) gives rise seems to run into trouble with the essentiality of origins. For if it were part of Socrates’ essence, for example, to have originated from a particular zygote, then it might seem that a criterion of individuation or synchronic identity could be found for an allegedly (ED3)-independent entity such as Socrates, viz., one which appeals to Socrates’ origins.[28] In this case, however, Lowe can avail himself of the option of rejecting the essentiality of origins, which he finds implausible in any case.

Secondly, the classification of entities resulting from (ED3) also appears to conflict with a hylomorphic analysis of concrete particular objects as compounds of matter and form. For if it were part of the essence of an allegedly (ED3)-independent concrete particular object, such as Socrates, to be a compound of matter and form, then it might appear again that Socrates can be individuated by appeal to his form or matter. In this case, Lowe avoids the apparent conflict in question by arguing that hylomorphic “compounds” should be *identified* with their form and therefore are not strictly speaking *compounds* of matter and form at all (see Lowe (1999)).

Thirdly, if an allegedly (ED3)-independent concrete particular object, such as Socrates, can have essential tropes (e.g., Socrates’ particular instance of humanity), then it will have to turn out that even though it is part of the essence of the tropes in question that they are the result of applying some function to their bearer (e.g., the “abstraction” function), it is not similarly part of the essence of the concrete particular object which is the bearer of these essential tropes that it is the result of applying some function (e.g., the “construction” function) to its essential tropes, presumably because such allegedly (ED3)-independent concrete particular objects are not taken to be bundles of tropes, on Lowe’s conception.[29]

(p.154) 5.3.2 Constitutive Essential Dependence

Fine (1995a) defines the following essentialist notion of ontological dependence, which I will call “Constitutive Essential Dependence”:

(ED4) *Constitutive Essential Dependence*:
x is constitutively essentially dependent on y $\equiv_{def}$ y is a constituent of x’s essence (narrowly construed).

Smiles, for example, on this account, ontologically depend on mouths in the sense that mouths are constituents of the essences of smiles; but the reverse is not the case, i.e., smiles are not also constituents of the essences of mouths.[30],[31]

Essence, on this construal, cannot be understood in the traditional modal way, for reasons laid out in Fine (1994a). Such a construal of essence would not capture the asymmetric manner in which, for example, singleton sets ontologically depend on their sole members, while their sole members do not in turn ontologically depend on the singleton sets of which they are the sole members. Rather, in Fine's view, the being, nature, or essence of an object, x, is the collection of propositions that are true in virtue of x's identity, where "it is true in virtue of the identity of x that …," for Fine, denotes an unanalyzed relation between an object and a proposition. The collection of propositions which are true in virtue of x's identity can also be considered a real definition of x. (Real definitions contrast with nominal definitions and concern objects themselves, rather than the linguistic expressions we use to refer to objects or the concepts we use to conceive of them; see Koslicki (2012a), Sections 7.4–7.5, for further discussion.)

Fine's approach to ontological dependence crucially relies on a distinction between essence, narrowly construed ("constitutive essence"), and essence, more widely construed ("consequential essence"). Unless some such "narrow/wide" distinction for **(p.155)** essences can be drawn, Fine's account of ontological dependence threatens to become vacuous, since everything will turn out to depend ontologically on everything else. This result follows because, in whatever way exactly we draw the constitutive/consequential distinction, the consequential essence of any entity, on Fine's conception, will be closed under logical consequence and all the logical truths will therefore end up in the consequential essence of everything whatsoever. Since, for example, the proposition that the number 2 is self-identical is a logical truth, the number 2 will turn up as a constituent in the consequential essence of every object whatsoever. And because the number 2 here was picked arbitrarily and every object is self-identical, every object will by the same reasoning turn up as a constituent in the consequential essence of every other object. Thus, if an entity were to count as being ontologically dependent on all those objects which figure as constituents in propositions that belong to its consequential essence, then the notion of ontological dependence would have been trivialized and every object would turn out to be ontologically dependent on every other object. It is thus important, at least for the purposes of providing an informative account of ontological dependence in terms of essence, that the approach in question can avail itself of some more restrictive conception of essence than what is given by the notion of consequential essence.

To this end, Fine considers two distinct methods by which to draw the constitutive/consequential distinction for essences.[32] The first proposal for how the constitutive/consequential distinction might be drawn is outlined in the following passage:

> A property belongs to the *constitutive* essence of an object if it is not had in virtue of being a logical consequence of some more basic essential properties; and a property might be said to belong to the *consequential* essence of an object if it is a logical consequence of properties belonging to the constitutive essence (a similar account could be given for the case in which the essence is conceived in terms of propositions rather than properties).
>
> (Fine (1995a), p. 276; his emphasis)

Since the "more basic essential properties" in question presumably just are the ones that figure in the constitutive essence of an object, the method outlined here amounts to taking as basic the notion of constitutive essence and defining that of consequential essence in terms of it by way of logical closure. A proposition then belongs to the consequential essence of an object, according to this first approach, if it is a logical consequence of a proposition that belongs to the object's constitutive essence (which is not itself to be taken as closed under logical consequence). For example, if the proposition that Socrates' singleton set contains Socrates as its sole member belongs to the constitutive essence of Socrates' singleton set, then the proposition that Socrates' singleton set contains some member or other is admitted into the consequential essence of Socrates' singleton set by logical closure. Since the logical truths are logically entailed **(p.156)** by any proposition whatsoever, these propositions will end up in the consequential essence of any object whatsoever by this procedure.

In case the idea of taking the notion of constitutive essence as basic is found to be objectionable in a context in which our aim is to give an account of ontological dependence, Fine also considers a second approach to the constitutive/consequential distinction:

> It is therefore preferable, in the interest of conceptual economy, to see if the notion of dependence can be explained in consequential terms, without appeal to an underlying constitutive conception. To this end, we need an independent way of distinguishing between those objects that enter into the consequential essence as a result of the logical closure and those that enter in "their own right", i.e., by way of the constitutive essence. But this is readily done. For when an object enters through logical closure, it can be "generalized away".
>
> (Fine (1995a), p. 277)

According to Fine's second proposed method of drawing the constitutive/consequential distinction, we are to take as basic the notion of consequential essence and define that of constitutive essence in terms of it. The central idea underlying this second procedure is this: if an object enters as a constituent into a proposition belonging to the consequential essence of another object only

through logical closure, then such an object can be “generalized away.” For example, the proposition that the number 2 is self-identical belongs to the consequential essence of Socrates’ singleton set; but so does, for every object whatsoever, the proposition that that object is self-identical. In this way, the number 2 can be “generalized out” of the proposition that the number 2 is self-identical, which belongs to the consequential essence of Socrates’ singleton set. Following this second method of drawing the constitutive/consequential distinction, then, only those objects which function as constituents of propositions belonging to the consequential essence of a given entity and which cannot be “generalized out” of these propositions make it into the constitutive essence of the entity in question as constituents of propositions belonging to its constitutive essence. In this way, it seems that Fine can avoid the result that Socrates’ singleton set ontologically depends on the number 2 (and, more generally, on any object whatsoever).[33]

(p.157) The trouble is that Fine’s second method of drawing the constitutive/consequential distinction for essences (viz., taking for granted consequential essence and defining constitutive essence in terms of it), as it stands, cannot be assumed to take us all the way to an object’s constitutive essence. The second proposed method of drawing the constitutive/consequential distinction is based on the idea that those constituents that are intuitively irrelevant to the essential nature of the entity under consideration can be “generalized out” of propositions belonging to an object’s consequential essence. But Fine’s “generalizing out” procedure is really effective only in removing the logical truths from the consequential essence of an object, since this procedure takes advantage of a special feature of logical truths, viz., that they remain true under all re-interpretations of the non-logical vocabulary. The “generalizing out” procedure thereby leaves us with a *restricted* conception of consequential essence, viz., the collection of propositions consisting of an object’s unrestricted consequential essence minus the logical truths. But this restricted notion of consequential essence cannot in general be expected to deliver the suitably narrow conception of essence that is needed for an account of ontological dependence along the lines of (ED4). For, unless the narrow notion of constitutive essence is already implicitly presupposed (as is done by the first method of drawing the constitutive/consequential contrast), the entities on which an object depends ontologically need not match exactly those which figure as constituents in propositions that belong to an object’s restricted consequential essence.

Consider, for example, the proposition that the number 2 is not a member of Socrates’ singleton set. If this proposition belongs to the unrestricted consequential essence of Socrates’ singleton set, then, in accordance with the second method of drawing the constitutive/consequential distinction just considered, the “generalizing out” procedure will pass it on into the constitutive essence of Socrates’ singleton set as well. Since this proposition is not a logically necessary truth, it does not remain true under all reinterpretations of the non-

logical vocabulary. For it is not true in general for every object, v, that v is not a member of Socrates' singleton set, since Socrates, after all, is a member of Socrates' singleton set. The number 2 therefore will not "generalize out" of the proposition that 2 is not a member of Socrates' singleton set and it seems the proposition in question, by the second method of drawing the constitutive/consequential distinction, will therefore wrongly end up in the constitutive essence of Socrates' singleton set with the result that Socrates' singleton set will again turn out to depend ontologically on the number 2 (and, by the same reasoning, on every object whatsoever), on the assumption that an entity ontologically depends on just those objects that appear as constituents in propositions belonging to its constitutive essence.

Suppose, on the other hand, that the proposition that the number 2 is not a member of Socrates' singleton set is excluded from the unrestricted consequential essence of Socrates' singleton set. Now, it seems, the second method of drawing the constitutive/ **(p.158)** consequential distinction has really collapsed into the first. For it is difficult to see on what grounds the proposition that the number 2 is not a member of Socrates' singleton set could be excluded from the unrestricted consequential essence of Socrates' singleton set, unless it is excluded on the grounds that this proposition does not pertain to the essential nature of Socrates' singleton set either directly or indirectly, by being logically entailed solely by those propositions that directly pertain to the essential nature of Socrates' singleton set. But if these are, in fact, at least implicitly the grounds on the basis of which the proposition in question is to be excluded from the unrestricted consequential essence of Socrates' singleton set, then the procedure for determining whether a proposition belongs in an object's unrestricted consequential essence is tacitly defined by reference to an object's constitutive essence. And this is just the way in which the first method of drawing the constitutive/consequential distinction proceeds, viz., by taking as basic constitutive essence and defining unrestricted consequential essence in terms of it by way of logical closure.

In light of these considerations, it thus seems that there is really only one method by which to approach the constitutive/consequential distinction, namely, the first one: to take as basic constitutive essence and define consequential essence in terms of it by means of logical closure, restrictedly or unrestrictedly.[34] And while there is nothing wrong in principle with taking as basic constitutive essence, we should note that, in the context of giving an account of ontological dependence in terms of constitutive essence, Fine's first proposed procedure for drawing the constitutive/consequential contrast does not really give us an independent handle on the notion of ontological dependence. Fine himself is well aware of this feature of his account:

> It is, of course, no surprise that dependence can be defined in terms of the objectually constrained form of essential truth; for the notion of dependence is already built into the constraints by which the relevant notion of essential truth is understood. But even without the constraints, a definition could still be given. For we may say that x depends upon y just in case, for some property φ not involving y, it is true in virtue of the nature of x that y φ's and yet not true in virtue of the nature of x that every object φ's; the dependees are the objects which cannot be "generalized out". Thus we do not have, in the notion of dependence, an idea that is genuinely new.
>
> (Fine (1995c), p. 243)

Thus, although nothing prevents us from defining a notion of ontological dependence in terms of constitutive essence as proposed here, we should be conscious of the fact that we have not thereby accomplished more than to state what is at bottom a single ontological relationship in two different, but interdefinable, ways, viz., either by means of a suitably restricted notion of essential truth or by means of a suitably restricted notion of ontological dependence. To illustrate, it helps to return once more to the proposed asymmetry in the relation between Socrates and Socrates' singleton set. Thus, to say that it is a properly constitutive essential truth about Socrates' singleton set **(p.159)** that it has Socrates as its sole member (while it is not also a properly constitutive essential truth about Socrates to be the sole member of Socrates' singleton set) is really just another way of saying that Socrates' singleton set ontologically depends on Socrates (while Socrates does not also ontologically depend on Socrates' singleton set); and vice versa. As Fine puts it in the passage just cited: " … the notion of dependence is already built into the constraints by which the relevant notion of essential truth is understood"; and, given (ED4), a suitably narrow conception of essence is also already built into the constraints by which the relevant notion of ontological dependence is understood.[35]

5.3.3 Constitutive Definitional Dependence

Fine assumes that, for the purposes at hand, essences can be identified with collections of propositions that are true in virtue of the identity of the particular object or objects whose essences they are. Such collections of propositions that are true in virtue of the identity of an object or objects, in Fine's view, can also simultaneously be thought of as real definitions for the object or objects in question. There is not, then, on this approach, much of a distinction between essences and real definitions.

But we may wish to proceed somewhat differently and leave room for a less propositional conception of essences, such as that endorsed by Aristotle, for example. As was noted in Chapter 3, the essence of a thing for Aristotle includes at least its form. (Whether the essence of a thing also includes additional components besides the form, e.g., the matter, is a controversial question which

was briefly discussed in Section 3.4.2.) For example, the essence of a living being, in Aristotle's view, encompasses at least its soul, i.e., the form of the living being. But, given Aristotle's association of the soul with **(p.160)** certain kinds of capacities [*dunameis*], e.g., the capacity for nourishment, perception, and thought, it would be strange to think of the soul of a living being as a collection of propositions. It is perhaps more natural to take real definitions, which Aristotle regards as linguistic entities [*logoi*] of some sort, viz., formulae or statements of the essence, as collections of propositions or perhaps as only a single proposition, if there is only a single canonical way of stating the essence of a thing. The basic idea underlying Fine's essentialist approach to ontological dependence can then be reformulated in terms of real definitions as follows:

(ED5) *Constitutive Definitional Dependence*:
x is constitutively definitionally dependent on y $\equiv_{\text{def}}$ y is a constituent of a real definition of x.[36]

5.3.4 A Potential Difficulty

I will end by mentioning a potential trouble case for the essentialist accounts of ontological dependence proposed by Lowe and Fine. (ED3), (ED4), and (ED5) have the following odd consequence. Assuming that it is in fact the case, following the Axiom of Extensionality, that sets are essentially dependent on their members, in the sense of (ED3)–(ED5), then no non-empty set would be classified as an ontologically independent entity or as deserving of substance status, which is perhaps a welcome result.[37] But what about the empty set? Its identity cannot in any meaningful sense be regarded as fixed by the identity of its members, since it has none; nor, for the same reason, can its members appear as constituents in its constitutive essence or real definition. Rather, it seems that the identity of the empty set must simply be taken for granted and that its essence must be regarded as simple and non-relational, in the sense that no entities numerically distinct from itself figure as constituents in its constitutive essence or real definition. In that case, however, it seems that, by (ED3)–(ED5), the empty set qualifies as an ontologically independent entity and (assuming an essentialist independence criterion of substancehood) as deserving of substance status, even though no other set does. I take it that this would be an unfortunate consequence for an essentialist account of ontological dependence, since, given a certain taxonomic category of entities, presumably either all or none of the entities belonging to the category in question should count as ontologically independent and as deserving of substance status. It strikes me as strange to think that the empty set alone qualifies for substance status or deserves to be counted as ontologically independent, while none of the other sets do.[38]

(p.161) A similar difficulty arises when we consider the relation between the number 0 and all the other natural numbers. If we think of the natural numbers as in some sense constructed from the number 0, together with the successor relation, then it seems that which number the number 1 is fixed by its relation to

the number 0, viz., by its being the immediate successor of the number 0. The number 1, on this conception, is therefore naturally taken as having the number 0 as a constituent in its constitutive essence or real definition. But we cannot similarly conceive of the number 0 as being constructed from other natural numbers, together with the successor relation, since the number 0 is not the successor of any other natural number. Rather, in analogy with the set-theoretic case, the identity of the number 0 must be taken as fixed independently of its relationship to the other natural numbers and its constitutive essence again appears to be similarly simple and non-relational, in the sense that what it is to be that very number is not defined in terms of its relation to any other natural number. But it would be similarly puzzling if a criterion of substancehood classified the number 0 alone, and no other natural number, as ontologically independent or as deserving of substance status. An essentialist account of ontological dependence, along the lines of (ED3)–(ED5), ideally should have something to say in response to these considerations.[39],[40]

(p.162) 5.4 Conclusion

In this chapter, I considered both existential and non-existential essentialist construals of ontological dependence. The main goal of Section 5.2 was to bring out why existential construals of ontological dependence, whether modal or non-modal, do not adequately reflect all that is encompassed by this notion. And while there is nothing wrong in principle with defining whatever technical concept one wishes, the question arises, in the face of the plethora of relations that go under the name of “ontological dependence,” what explanatory tasks these notions are designed to accomplish, and how well they in fact meet the desiderata that are set for them. Throughout this chapter, I evaluated particular definitions of ontological dependence by means of four potential measures of explanatory success: firstly, how well they do in classifying certain paradigmatic cases of ontological dependence in a particular desired way; secondly, whether the definitions in question contribute to the formulation of a plausible criterion of substancehood; thirdly, whether they make room for the possibility of substantive non-existential disagreements in ontology over questions of fundamentality; and, finally, whether they are sufficiently fine-grained to illuminate the nature of the connections at issue in putative cases of ontological dependence. Relative to these four measures, we found that existential construals of ontological dependence are open to persuasive counterexamples.

In Section 5.3, I considered several essentialist construals of ontological dependence: the notion of essential identity dependence, proposed by E. J. Lowe; constitutive essential dependence, due to Kit Fine; and constitutive definitional dependence, a variant of Fine’s proposal. When evaluated relative to the four explanatory goals identified above, non-existential essentialist construals of ontological dependence have a more impressive track record than their existential counterparts. Nevertheless, various questions still remain to be addressed by essentialist approaches as well, in particular the question of

whether and how hylomorphic compounds can be designated as substances *simpliciter* or as more deserving of substance status than other entities which are thought to be ontologically dependent on them. The alleged substance status of hylomorphic compounds will be our focus in Chapter 6.

Notes:

([1]) Sections 5.1–5.3 are drawn from Koslicki (2012a) and Koslicki (2013a), with minor revisions.

([2]) For other useful discussion and surveys of the literature on ontological dependence, see also Correia (2008), Mulligan (1998), Smith (1982), Smith and Mulligan (1982), and Tahko and Lowe (2015).

([3]) In addition to the remarks concerning ontological dependence and substancehood in this chapter, I will also take up this topic again in Chapter 6, where a number of proposed independence criteria of substancehood will be examined in more detail.

([4]) For a more detailed discussion of non-existential disputes in ontology over questions of fundamentality, see also Koslicki (2016a). I examine ground-theoretic approaches to fundamentality in Koslicki (2015a, 2016b).

([5]) For more discussion on ontological dependence in Aristotle, see also Corkum (2013).

([6]) Translation by J. L. Ackrill (see Barnes (1984)).

([7]) Although Aristotle does not overtly speak of dependence in the passage just cited, I nevertheless interpret his two relations, *being said of a subject* and *being in a subject*, as indicating two ways in which all the other entities depend ontologically on the primary substances, while the primary substances do not in turn ontologically depend on anything else in either of these two ways. The following passage from *Met*. Γ.2 does contain a Greek term which is rendered by W. D. Ross into English as “depend” (“*ἤρτηται*” from “*ἀρτάω,*” “to fasten to,” “to hang one thing upon another;” hence, in the passive voice, “to be fastened to,” “to be hung upon another thing,” i.e., “to depend”):

> But everywhere science deals chiefly with that which is primary, and on which the other things depend [*ērtētai*], and in virtue of which they get their names. If, then, this is substance, it will be of substances that the philosophers must grasp the principles and the causes.
>
> (*Met*. Γ.2, 1003b16–19; trans. W. D. Ross)

According to *Met*. Z.1, substance is primary in three senses, viz., in formula [*logō(i)*], in order of knowledge [*gnōsei*], and in time [*chronō(i)*]. (See also *Met*. Θ.8, where the actual is said to be prior to the potential in three senses of

"priority," viz., in definition [*logō(i)*]; in time [*chronō(i)*]; and in substance [*ousia(i)*].) For further discussion, see Koslicki (2014, 2015b).

([8]) Aristotle's dependence claim in the *Categories*, when read in an exclusively existential way, gives rise to the following definition: "x existentially depends on y $\equiv_{\text{def}}$ If y did not exist, then it would be impossible for x to exist." A non-existential reading of ontological dependence in Aristotle is also defended in Corkum (2008, 2013) and Peramatzis (2008, 2011).

([9]) Corkum (2008, 2013), for example, interprets Aristotle's conception of ontological dependence in the following way: other entities are ontologically dependent on the primary substances because they inherit their ontological status from the primary substances to which they are either accidentally or essentially related, while the primary substances do not in turn inherit their ontological status from other entities. How plausible this proposal is depends on how we understand the key notion of *inheriting one's ontological status* from something; as it stands, this notion is not elaborated in Corkum (2008) to a sufficient degree to get a good handle on it. For further discussion, see Corkum (2013). Michail Peramatzis interprets Aristotle's conception of ontological priority (the flip side of ontological dependence) as the ontological correlate of definitional priority (see Peramatzis (2008, 2011)). The notion on which Peramatzis focuses is thus perhaps more tailored to the views Aristotle espouses in his later work (e.g., the *Metaphysics*), where form seems to take on the status of primary substance, than to those we find in the *Categories*, where certain kinds of concrete particular objects (e.g., organisms) occupy the role of primary substances: for particulars, in Aristotle's view, cannot be defined, but only perceived.

([10]) In contrast, Husserl, in the *Logical Investigations*, really does seem to have in mind existential dependence when he speaks for example of a color moment that is part of a particular more inclusive whole as being founded upon an extension moment that is part of the same whole, and vice versa (see Husserl (1900–1)). A moment, he says, is a non-independent object in the sense that it requires something in addition to itself to exist (a more inclusive whole of which the moment is a part) in order for it to exist. And a moment is founded upon another moment, if the first moment cannot exist unless it is part of a more comprehensive unity which connects it with the second moment. Both Husserl's conception of non-independent object and his conception of foundation thus seem to appeal to a notion of existential dependence. For discussion, see, for example, Mulligan, Simons, and Smith (1984), Correia (2004) and the references found therein.

([11]) See also Simons' notion of "Weak Dependence" (Simons (1998), p. 236). For Lowe's most up-to-date views concerning ontological dependence, see Lowe (2006, 2008, 2012a, 2013); as well as Tahko and Lowe (2015). For discussions of

ontological dependence in Lowe's earlier work, see Lowe (1994a, 1994b, 1998). Also relevant are his views concerning criteria of identity; see, for example, Lowe (1989, 1997, 2009).

([12]) Simons' notion of "Strong Dependence" or "Strong Rigid Dependence" simply rules out this particular group of apparent counterexamples by adding a clause which requires y not to be a proper part of x (see Simons (1987), p. 303; Simons (1998), p. 236). This exclusion of proper parts from a definition of ontological dependence raises tricky methodological issues, especially when the notion of ontological dependence in question is used in the formulation of a criterion of substancehood. For discussion, see, e.g., Toner (2010) and Koslicki (2013b); these issues will also concern us again in more detail in Chapter 6.

([13]) It is difficult to find uncontroversial examples which would illustrate why it might be plausible to think that a certain concrete particular object can exist only if certain of its constituents exist. I, for one, would argue that organisms, for example, provide us with a case in point. For, according to the mereological version of hylomorphism I favor, a particular organism, such as Socrates, is analyzed as a compound of matter and form; moreover, Socrates' form and matter, on this view, are regarded as being literally and strictly speaking proper parts of Socrates. Given the strong correlation between form and essence, such a view quite naturally gives rise to the consequence that Socrates can exist only if his form exists. But nearly all the assumptions used in generating this example are highly controversial and can be (and are) rejected by other philosophers who do not subscribe to this particular version of hylomorphism. Perhaps, it is sufficient for our purposes to keep in mind that even a philosopher like Simons, who is sympathetic to a modal/existential construal of ontological dependence, feels the need to add an exclusion clause for proper parts in his formulation of "Strong Dependence," since he allows for the possibility that entities which are allegedly highly deserving of substance status can ontologically depend on their own proper parts in the sense of (ND1).

([14]) See also Simons' notion of "Generic Dependence" (Simons (1987), p. 297).

([15]) Whether Aristotle's counterfactual dependence claim in the *Categories*, when interpreted existentially ("If the primary substances did not exist, it would be impossible for the other entities to exist as well"), also misclassifies these cases depends on how one deals with counterfactuals with impossible antecedents, such as "If the number 8 did not exist, it would be impossible for Socrates to exist as well" or "If numbers in general did not exist, it would be impossible for Socrates to exist as well." Certainly, if counterfactuals with impossible antecedents are treated as trivially true, then this counterfactual/existential construal of ontological dependence will yield the same

counterintuitive results as (ND1) and (ND2) with respect to cases involving necessarily existing entities.

([16]) Schnieder (2006), p. 412. (My statement of (RPED) is slightly different from Schnieder's "(Dep-7)," but only in stylistic ways.) Schnieder states that he prefers an "innocuous" interpretation of the quantifier in "There is an F …," which apparently ranges over properties, along the lines of Rayo and Yablo (2001) (Schnieder (2006), p. 416, n. 26). Correia's notion of "basing" (Correia (2005), pp. 66ff.) and his definition of "simple dependence" in terms of "basing" are similar to Schnieder's "(Dep-7)"; see also Correia (2008).

([17]) The explanatory connective, "because," might be thought to indicate the presence of a grounding connection of some sort. Koslicki (2015a) lays out my reasons for thinking that a ground-theoretic approach to relative fundamentality is unsatisfactory when evaluated against the four measures of explanatory adequacy cited earlier.

([18]) Schnieder does provide some further elucidation concerning the kind of explanatory connection that he takes to be relevant to (RPED). In his view, the explanatory "because" in statements of ontological dependence is to be construed in an objective conceptual way: "In general, statements involving complex or elaborated concepts are explained with recourse to more primitive concepts (which may or may not enter into an analysis of the complex concepts)" (Schnieder (2006), p. 405). For example, for Schnieder, the concept denoted by the phrase, "the rose's redness," is a complex or elaborated concept which is to be explained with recourse to more primitive concepts, e.g., those at play in the statement "The rose is red." But it does not seem plausible to think that facts about ontological dependence in general can be explained by what is or is not classified as primitive or complex relative to a particular conceptual system. In some cases, nothing important may hang on whether one notion or another is taken as primitive by a particular conceptual system (e.g., *point* versus *line* in some systems of geometry). In other cases, one concept can be more complex than another, even though what the first stands for is ontologically more fundamental than what the second stands for (e.g., arguably, the concepts, *water* and H_2O *molecule*, illustrate this possibility).

([19]) But see Schnieder (2010) for a response to this kind of worry. Schnieder argues there that "because" is sensitive not only to the identity of the facts introduced by its clauses, but also to the way in which these facts are presented.

([20]) In addition, (RPED)'s alleged explanatory claims (e.g., "Necessarily, at any time t at which the rose's redness trope exists, the redness trope exists at t because the rose is red at t") also fail to illuminate the nature of the connections at issue and therefore lack the explanatory fine-grainedness required by the fourth criterion of adequacy. The arguments given in Koslicki (2015a)) (see

Section 3.4, pp. 334–5) for ground-theoretic approaches can be adapted to establish this point for (RPED) as well.

([21]) The two examples Fine has in mind here (impossible objects and identity-properties) are as follows. Consider round squares: if it makes sense to say that round squares have natures, i.e., that there is such a thing as what it is to be a round square, then the use of the verb, “to be,” here cannot be construed in an existential way, since it is impossible for round squares to exist. Secondly, consider the property of being identical to Socrates. Suppose (as Fine does for the purposes of this example) that this property exists necessarily and suppose further that the property of being identical to Socrates ontologically depends on Socrates (i.e., it is that very property because it is the identity-property associated with Socrates). It would again be wrong to construe the relationship in question as existential dependence, since (by hypothesis) the identity-property exists necessarily while Socrates exists only contingently. Thus, there are worlds in which the identity-property exists while Socrates does not: in order for the identity-property in question to exist, it therefore cannot be required that Socrates exists as well; but the identity-property may nevertheless depend on Socrates with respect to its being what it is, its nature. I am not endorsing the details of either of Fine’s two examples, which are quite controversial; my purpose here is only to explain what he has in mind in the passage in question. We can agree with Fine’s general point (as I wholeheartedly do), regardless of how we feel about the particular examples he chooses to illustrate this point.

([22]) In order to preserve this entailment from ontological dependence to modal/existential dependence, Fine’s example involving the property of being identical to Socrates would have to be addressed in some fashion. For the entailment from ontological dependence to modal/existential dependence seems to fail in this case.

([23]) (ED3) also has a modal counterpart (ND3), according to which x is necessarily identity dependent on y iff there is some function φ such that necessarily $x = \varphi(y)$. But since (ND3) is still susceptible to the same sorts of apparent counterexamples to modal formulations of ontological dependence as the relations considered in the previous section, I will in what follows leave (ND3) aside and focus instead on the essentialist version of identity dependence, (ED3).

([24]) Strictly speaking, in order for (ED3) to apply to these two examples, the definition of essential identity dependence would have to be modified in something like the following way: “x is essentially identity dependent on a *plurality* of entities, $y_1 \ldots y_n \equiv_{def}$ There is a function φ such that it is part of the essence of x that $x = \varphi(y_1 \ldots y_n)$,” In what follows, I will simply assume that this modified definition is substituted for (ED3), wherever appropriate.

([25]) The model advanced in Lowe (1989) and (1997) for how to think of criteria of identity takes its inspiration from Frege's remarks concerning lines and directions in the *Foundations of Arithmetic*: "The judgement 'line *a* is parallel to line *b*' … can be taken as an identity. If we do this, we obtain the concept of a direction, and say: 'the direction of line *a* is identical with the direction of line *b*'" (Frege (1953), §64). Frege here seems to be offering the following criterion of identity for the directions of lines: if x is a line and y is a line, then the direction of x = the direction of y just in case line x and line y are parallel.

([26]) One complication in applying (CI) to (ED3) is that (CI) is formulated in terms of sortal concepts, whereas (ED3) concerns individual entities. I will assume, however, that we can apply (CI) to (ED3) in the following way: since, for example, the identity of sets in general is fixed by appeal to their members, the identity of every individual set is therefore fixed by appeal to its particular members. For more discussion of Lowe's views concerning the relation between criteria of identity and principles of individuation, see Lowe (2012a).

([27]) In Lowe's view, the unavailability of a criterion of individuation or synchronic identity for (ED3)-independent entities is compatible with the availability of a diachronic criterion of identity for such entities. Thus, for Lowe, composite concrete particular objects persist over time just in case a certain equivalence relation holds that is defined over their actual or possible components (see Lowe (1989), p. 168). But why the asymmetry between identity at a time and identity over time? Why is Socrates' status as an allegedly (ED3)-independent entity not threatened by the fact that he persists over time due to a certain relationship that his proper parts at one time bear to his proper parts at another, while his status as an allegedly (ED3)-independent entity apparently would be jeopardized if something similar were true of his identity at a time? Presumably, the answer to this question, for Lowe, is that diachronic identity presupposes synchronic identity. For suppose that it is possible for Socrates (say) to have existed for only one instant: in that case, his existence at this instant would nevertheless have required that he is the very entity that he is at that instant; but his synchronic identity at that instant does not require that he persists over time. If, on the other hand, Socrates persists over time, his diachronic identity does require that, at each time at which he exists, he is at that time (i.e., synchronically) identical to himself.

([28]) However, it should be noted that it is a controversial question even among those who subscribe to a modal conception of essence whether concrete particular objects can in fact be individuated across worlds by means of their origins. See, for example, Forbes (1985, 1986, 1997, 2002); Mackie (2002, 2009); and the references to be found therein. The question of how hylomorphic compounds are to be individuated across worlds is discussed in more detail in

Section 3.4.3. I argue there that sameness of origins is not sufficient for the cross-world identity of hylomorphic compounds.

([29]) Earlier (see Section 5.2.3.1), I brought up the following apparent counterexamples to (ED1) and (ED2): Socrates' humanity, conceived of either as (1) an essential trope or as (2) a universal that is essentially instantiated by Socrates; (3) Socrates' form (according to a hylomorphic conception of concrete particular objects); (4) Socrates' essential proper parts (if he has any); or (5) Socrates' origin (assuming the essentiality of origins). As noted just now, Lowe has a way of defending (ED3) against (1), (3), (4), and (5). (2) is not a problem for (ED3), since the identity of a particular cannot be parasitic on its being an instance of a universal, even where the universal in question is essential to it, since other particulars may instantiate the same universal. With respect to (4), Lowe would presumably similarly deny that a concrete particular object, such as Socrates, which is (ED3)-independent by Lowe's lights, has any essential proper parts which determine his synchronic identity, since in Lowe's view *no* numerically distinct entity (including proper parts) determines that an (ED3)-independent entity is the very thing that it is at any time at which it exists.

([30]) Fine's account assumes that we may think of essences as propositions or collections of propositions and that these propositions have constituents.

([31]) How does Fine's account fare in the face of the apparent counterexamples considered in Section 5.2.3.1 in connection with (ED1) and (ED2)? Whether Fine's account runs into trouble with respect to (5), the essentiality of origins, or (3), the status of hylomorphic compounds as entities which are allegedly (ED4)-independent from all other numerically distinct entities, depends crucially on whether we find the stipulative exclusion of proper parts in the formulation of an independence criterion of substancehood to be admissible. This strategy would also take care of (4), essential proper parts, more generally. If the ontologically independent entities are just those which are (ED4)-independent from all other numerically distinct entities *except for their own proper parts*, then an entity would be able to qualify as ontologically independent even if its proper parts figure as constituents in its constitutive essence or real definition, so long as no other numerically distinct entities besides its proper parts figure in its constitutive essence or real definition. If, for example, the zygote from which a human being originated at one point was a proper part of it and if the form and matter of which a hylomorphic compound consists are proper parts of it (as Fine holds), then (given the exclusion of proper parts) concrete particular objects could nevertheless qualify as (ED4)-independent even if it is part of their essence to have originated from whatever entity they actually originated from and even if it is part of their essence to be a compound of some particular matter and form. I investigate these questions further in Koslicki (2013b) and in Chapter 6. As far as cases (1) and (2), essential tropes or universals, are

concerned, Fine can avail himself of the same strategy that is open to Lowe as well.

([32]) I am here relying primarily on Fine (1995a), pp. 276–80; but similar thoughts (though presented in a more condensed fashion) are also found in Fine (1995b), Sections 3–4.

([33]) The following is a more precise characterization of the notion of "generalizing out" (see Fine (1995a). pp. 277–8). Consider a proposition P(y), which has an object, y, as a constituent. For example, P(y) might be the proposition that Socrates is identical to Socrates for y = Socrates. Fine's first step is to define the notion of a "generalization" for propositions, rather than objects (i.e., constituents of propositions): the generalization of a proposition, P(y), is the proposition that P(v) holds for all objects, v. Thus, the generalization of the proposition that Socrates is identical to Socrates is the proposition that for all objects, v, that v is identical to v. (To obtain the generalization, P(v), of a proposition, P(y), all occurrences of the constituent, y, must be replaced by occurrences of v.) Given the notion of a generalization, defined for propositions, we can now make sense of the idea that an *object* can be "generalized out" of a collection, C, of propositions in the following way: an object, y, can be generalized out of a collection, C, of propositions if C contains the generalization of a proposition P(y), whenever it contains the proposition P(y) itself. Finally, these defined notions are now applied to the analysis of ontological dependence in the following way: an object, x, depends ontologically on an object, y, according to this method of drawing the constitutive/consequential distinction, just in case y cannot be generalized out of the consequential essence of x, i.e., just in case some proposition P(y) belongs to the consequential essence of x without it being the case that the generalization of P(y) also belongs to the consequential essence of x.

([34]) See also Correia (2013) for discussion.

([35]) As noted earlier (see Section 4.5), Aristotle, like Fine, also recognizes a distinction between what belongs to the essence proper of an object and what merely follows from its essence proper, i.e., the so-called "propria" or "necessary accidents." But Aristotle's "narrow/wide" distinction for essences does not exactly line up with Fine's. For example, for Aristotle, it is part of the essence of planets that they are heavenly bodies that are near; but it is merely a necessary (but non-essential) feature of planets that they do not twinkle. The latter proposition, in Aristotle's view, states a feature which merely follows from, but is not itself included in, the essence of planets. But the relevant notion of "following from" that is operative in this context, for Aristotle, cannot simply be that of logical consequence. The (explanatorily less basic) proposition that planets are heavenly bodies which do not twinkle is logically entailed by the (explanatorily more basic) proposition that planets are heavenly bodies that are

near together with auxiliary premises (e.g., the proposition that heavenly bodies that are near do not twinkle). But the same holds also in the opposite direction: the (explanatorily more basic) proposition that planets are heavenly bodies that are near is also logically entailed by the (explanatorily less basic) proposition that planets are heavenly bodies that do not twinkle together with auxiliary premises (e.g., the proposition that heavenly bodies that do not twinkle are near). Thus, the relation of logical entailment alone (as is brought out in a more contemporary context by Sylvain Bromberger's "flagpole" objection against Hempel's deductive-nomological model of scientific explanation) is not sufficient to capture the asymmetry of scientific explanation. In Aristotle's system, the relevant notion of asymmetric consequence that is operative in his model of scientific explanation is that of *demonstration*, as developed theoretically in his *Posterior Analytics* and (according to my reading of Aristotle) applied practically, for example, in his biological treatises. A scientific explanation is asymmetric, for Aristotle, because (if accurate) it is the theoretical and/or linguistic reflection of an asymmetric real-world relation of *causal* priority, where causation here must be construed along Aristotelian (and not Humean) lines. See Chapter 4 and Koslicki (2012b) for further discussion of these issues.

([36]) The formulation of (ED5) in the text contains "*a* real definition," rather than "*the* real definition," since I want to leave open for the time being whether an entity can have more than one real definition. This possibility would obtain if two different propositions (or collections of propositions) are equally well-suited to stating the essence of the entity in question.

([37]) On the relation between the Axiom of Extensionality and the claim that sets have their members essentially, see, for example, van Cleve (1985) and Forbes (1985).

([38]) Perhaps the culprit here is the innocuous-sounding sortal uniformity principle to which I have just appealed, according to which substance status is to be granted to entities not individually, but by sort. If we substitute "fundamental" for "deserving of substance status," then the result just generated is perhaps less bewildering: (ED3)–(ED5), when construed as yielding a criterion for fundamentality, classify the empty set as fundamental (or as more fundamental than the other sets), while they classify the remaining sets as non-fundamental (or less fundamental than the empty set). Still, metaphysical realists at least will want to leave some room for a distinction between what is taken as primitive by a particular theory or conceptual system and what is ontologically fundamental as a matter of fact. See also my earlier remark (see n. 18) in response to Schnieder's reliance on what is assumed to be primitive or complex relative to a given theory or conceptual system.

([39]) These and similar cases are discussed in Lowe (2012a); see also Schwartzkopff (2011). The following response to the concern raised in this section regarding the apparent inclusion of the empty set among the ontologically independent entities or substances was suggested to me by Allen Hazen (pers. comm.). The worry in question can be avoided by formulating a variant of ZF set theory which postulates only non-empty sets. Such a variant will be recognizable as the kind of theory to which mathematicians appeal under the name of "set theory" and will be structured by something recognizable as "The Iterative Conception of Set." When such a variant is formulated, it is possible to interpret standard versions of set theory which postulate a null-set in terms of the non-null-set-postulating theory. (Here "interpretation" is understood in the standard technical sense according to which one theory is "interpreted" in a second if a "translation" of the language of the first theory is given into the language of the second theory which maps theorems of the first into theorems of the second.) For a supporting conception of the null set, see, for example, Fraenkel, Bar Hillel, and Levy (1973), p. 23. Hazen points out that for pure mathematics, pure sets suffice. For applications of set theory which include sets with independently given individuals as members, a coding is available which designates a certain suitable individual to play the role of the null set. (See Hazen (1991); Lewis (1991) for discussion.) Even if this kind of response is successful in the case of the empty set, however, we are still left to wonder how to proceed in the case of the number 0.

([40]) For further discussion of how essentialist construals of ontological dependence fare when evaluated with respect to the measures of explanatory success singled out in Section 5.1, see Koslicki (2012a) and (2016a). On the downside, as I argue in Koslicki (2012a), even essentialist construals of ontological dependence still lack the necessary level of explanatory fine-grainedness required to meet the fourth criterion, since they do not (at least in their current formulations) distinguish between different varieties of ontological dependence, e.g., what I call their "feature dependence" and "constituent dependence." On the upside, however, as I argue in Koslicki (2016a), essentialist construals of ontological dependence are well-suited to meet the third criterion: for they allow us to make sense of how non-existential disputes in ontology over questions of fundamentality can be substantive. The success of essentialist accounts in meeting the second criterion (Criterion of Substancehood) will be examined again in more detail in Chapter 6.