

# Ontological Dependence

Fabrice Correia\*

*University of Geneva*

## Abstract

‘Ontological dependence’ is a term of philosophical jargon which stands for a rich family of properties and relations, often taken to be among the most fundamental ontological properties and relations. Notions of ontological dependence are usually thought of as ‘carving reality at its ontological joints’, and as marking certain forms of ontological ‘non-self-sufficiency’. The use of notions of dependence goes back as far as Aristotle’s characterization of substances, and these notions are still widely used to characterize other concepts and to formulate metaphysical claims. This paper first gives an overview of the varieties of these notions, and then discusses some of their main applications.

‘Ontological dependence’ is a term of philosophical jargon which stands for a non-well delineated, rich family of properties and relations which are usually taken to be among the most fundamental ontological properties and relations – along with part-whole, exemplification, or again existence.

Most if not all of those who countenance notions of dependence<sup>1</sup> take them to carve reality at its ontological joints. In this connection, ontological dependence is sometimes thought of as marking a certain form of ontological ‘non-self-sufficiency’. A dependent object, so the thought goes, is an object whose ontological profile, e.g. its existence or its being the object that it is, is somehow derivative upon facts of certain sorts – be they facts about other particular objects or not.

The use of notions of dependence goes back as far as Aristotle’s four-fold classification of beings, where the distinction between (primary and secondary) substances and non-substances is indeed characterized by means of a concept of ontological (in)dependence. These notions have been widely used in philosophy since then, up to the present day. It has recently been claimed, for instance, that events ontologically depend (in one sense or another) upon their participants (if any) and their temporal parts (if any), non-empty sets upon their members, tropes upon their bearers, genuine wholes upon their parts, organisms upon their biological origins, boundaries upon the corresponding extended objects, or again holes upon their hosts.

This paper is divided into two parts. In the first, I present some of the main notions of dependence which have been introduced, studied and used in the literature. In the second, I focus on some important philosophical topics in which notions of ontological dependence have been used.<sup>2</sup>

### 1. *The Varieties of Ontological Dependence*

There is a familiar metaphysical distinction between *existence* and *essence*. Correspondingly, one may distinguish between two families of notions of dependence, the notions of *existential dependence* and those of *essential dependence*. An existentially dependent object is one whose existence requires that a condition of a certain sort be met. Essential dependence, in contrast, involves requirements for identity or essence: an essentially dependent object is one which, as it were, would not be the object that it is had a condition of a certain sort not been met.

On some views, requirements for identity and requirements for existence are one and the same thing, and accordingly essential dependence and existential dependence collapse into one another. On other views, these requirements are of different sorts, and there is in principle room for cases of existential dependence which are not cases of essential dependence or *vice versa*. On such views, still, existential dependence and essential dependence overlap: there are notions of dependence which involve both requirements for existence and requirements for identity.

Section 1.1 presents certain simple and widely used notions of existential dependence, leaving questions of essence, and therefore essential dependence, aside. Section 1.2 brings essential dependence into the picture. Section 1.3 focuses on notions of (as I will call them) explanatory dependence, of both the existential and the essential sort. Finally, section 1.4 discusses the issue of ontological non-self-sufficiency.

#### 1.1. EXISTENTIAL DEPENDENCE – SOME BASIC NOTIONS

An existentially dependent object is one whose existence requires that a condition of a certain sort be met. Various sorts of conditions give rise to various concepts of existential dependence. In this section I focus on certain simple conditions which are involved in some of the most familiar among those concepts.<sup>3</sup>

Many claims of existential dependence take the following form:

- (1)  $x$  cannot exist unless  $y$  does.

Given the intended force of ontological dependency ties, the modal locution in (1) is to be understood as expressing a form of *metaphysical* modality, as opposed to, say, logical, conceptual or natural modality. Let us use the sentential operator ‘ $\Box$ ’ for metaphysical necessity, the one-place predicate ‘ $E$ ’ for existence, and the two-place sentential operator ‘ $\rightarrow$ ’ for

material implication. On one of its simplest interpretations,<sup>4</sup> (1) can be rendered as:

$$(2) \quad \Box(Ex \rightarrow Ey).$$

Read (2) as ‘ $x$  rigidly necessitates  $y$ ’.<sup>5</sup>

Examples of claims to the effect (or intended to imply) that certain objects rigidly necessitate certain objects abound in the philosophical literature. Here is a list of *prima facie* plausible cases of rigid necessitation ties of various degrees of generality:<sup>6</sup>

<i>Dependent object</i>	<i>Dependee</i>
1. An event or process which has participants	The participants
2. A trope (particularized property)	Its bearer(s)
3. The boundary of a body	Its body
4. A hole	Its host
5. A non-empty set	Its member(s)
6. A quantity or piece of matter	Its parts
7. A temporally extended object	Its temporal parts
8. A human being	Her/his biological origins
9. A table	Its constituting piece of matter
10. A veridical intentional state	Its object(s)

Rigid necessitation captures a notion of an object’s existence requiring the existence of a *specific* object. *Generic* necessitation, in contrast, captures a notion of an object’s existence requiring the existence of an object *of a certain sort*. Where ‘ $F$ ’ is a general term, ‘ $x$  generically necessitates an  $F$ ’ is defined as:

$$(3) \quad \Box(Ex \rightarrow \exists yFy)$$

( $x$  cannot exist unless something is an  $F$ ).<sup>7</sup>

While rigid necessitation is a binary relation, generic necessitation of an  $F$  (for each particular ‘ $F$ ’) is a property.

Suppose an object  $x$  generically necessitates objects of a given sort  $F$ . There are two possible cases:

- (a) There is an object  $y$  such that (i)  $x$  rigidly necessitates  $y$ , and (ii) necessarily, if  $y$  exists, then  $y$  is of sort  $F$ ;
- (b) There is no such object.

The truth of (a) entails that  $x$  generically necessitates objects of sort  $F$ . Let us reserve the label ‘genuine generic necessitation’ for cases where an object  $x$  generically necessitates objects of sort  $F$  and where (b) holds. We may use item from the previous table to illustrate non-genuine cases. For instance, consider the trope which is the particular whiteness of a

certain enamel surface. It is plausible to say that it rigidly necessitates the surface, and also that the surface is essentially an enamel surface, so that it cannot exist without being so. If both views are correct, then the trope generically necessitates enamel surfaces, and non-genuinely so. For genuine cases, assume there is such a thing as the universal *redness*. On a widely accepted view about universals,<sup>8</sup> *redness* generically necessitates red things. On a reasonable, compatible view, there is no particular essentially red object such that *redness* rigidly necessitates it. If both views are correct, then *redness* genuinely generically necessitates red things. Or again, on a very plausible view about human beings, I genuinely generically necessitate carbon atoms, water molecules and many other sorts of things. *Prima facie* plausible cases of genuine generic necessitation are quite easy to find.

Rigid necessitation and its generic mates are important members of the family of existential dependence. All are defined by means of open sentences obtained by filling in the blank in ' $\Box(E_x \rightarrow \dots)$ ' with some condition, and choosing other conditions yields further properties and relations. We will meet other notions of that sort later on.

The notions of existential dependence which have been presented so far involve requirements for existence taken in a *timeless* sense. Now given that (we may assume) talk of objects existing or failing to exist at a moment of time or during a time interval makes sense, it is also possible to define properties and relations which express requirements for temporal existence. Two important relations of that kind are *permanent existential necessitation*, i.e. the relation expressed by:

$$(4) \quad \Box \forall t (E_t x \rightarrow E_t y)$$

(*x* cannot exist at a time unless *y* exists at that time),

and *past existential necessitation*, i.e. the relation expressed by:

$$(5) \quad \Box \forall t (E_t x \rightarrow \exists u (u < t \ \& \ E_u y))$$

(*x* cannot exist at a time unless *y* existed before that time).

Some of the putative cases of rigid necessitation ties listed in the previous table provide us with putative cases of objects exemplifying these two relations. For instance, a process such as the present blooming of this plant may with some plausibility be said to permanently existentially necessitate the plant. Or again, certain Krikpean intuitions about human beings tell us that they pastly existentially necessitate their parents. Examples can be multiplied.

## 1.2. ESSENTIAL DEPENDENCE – SOME BASIC NOTIONS

While existential dependence involves requirements for existence, essential dependence involves requirements for identity or essence: an essentially dependent thing is one which, as it were, would not be the object that it is had a condition of a certain sort not been met. As in the case of

existential dependence, various sorts of conditions yield various sorts of properties and relations of essential dependence. In this section I focus on some of the simplest amongst them.

Following Fine ('Logic of Essence'), let us use the indexed sentential operator ' $\Box_x$ ' for ' $x$  is essentially such that'.<sup>9</sup> Among the important relations of essential dependence stand the relation of *rigid essential involvement* (Fine, 'Ontological Dependence'; Lowe, *Possibility of Metaphysics* ch. 6<sup>10</sup>) expressed by:

- (6) For some  $R$ ,  $\Box_x Rxy$   
(for some relation,  $x$  is essentially related by that relation to  $y$ ),

the stronger<sup>11</sup> relation of *rigid essential necessitation* (Mulligan, Simons & Smith 1984, Fine 1995a, Fine 1995b) expressed by:

- (7)  $\Box_x (Ex \rightarrow Ey)$   
( $x$  is essentially such that it exists only if  $y$  does),

and the generic mates of these two relations (Fine, 'Ontological Dependence'), namely, for each appropriate ' $F$ ' the property expressed by:

- (8) For some  $R$ ,  $\Box_x \exists y (Fy \& Rxy)$   
(for some relation,  $x$  is essentially related by that relation to something which is an  $F$ ),

and the property expressed by:

- (9)  $\Box_x (Ex \rightarrow \exists y Fy)$   
( $x$  is essentially such that it exists only if something is an  $F$ ).

Rigid essential necessitation is *both* a notion of essential dependence and a notion of existential dependence, and the same is true of the corresponding generic notions. All these notions are defined in terms of timeless predication, in particular, (7) and (8) involve only timeless predications of existence. One may define in an obvious way cognate notions by taking time-relative predication into account.

On a very widespread conception of essence I will call *Reductionism*, for an object to be essentially so and so is nothing but for it to be the case that necessarily, if the object exists, then it is so and so.<sup>12</sup> Reductionism entails two conditionals: 'if an object is essentially so and so, then necessarily, if the object exists, then it is so and so', and its converse. The first conditional is widely accepted and will be taken for granted.<sup>13</sup> Reductionism has recently been challenged, most forcefully by Kit Fine ('Essence and Modality'), on the grounds that the second conditional entailed by the view is subject to very plausible counterexamples.<sup>14</sup>

Fine presents several counterexamples to the conditional. For lack of space, let me mention just one. (It is actually one of the most convincing, and is particularly relevant to discussions about ontological dependence.) Consider Socrates and the set whose sole member is Socrates himself,

namely the singleton  $\{\text{Socrates}\}$ . Fine argues that given plausible general principles of modal set theory, one will accept both:

( $\alpha$ ) Necessarily, if Socrates exists, then  $\text{Socrates} \in \{\text{Socrates}\}$

and:

( $\beta$ ) Necessarily, if  $\{\text{Socrates}\}$  exists, then  $\text{Socrates} \in \{\text{Socrates}\}$ .

In addition, Fine goes on, the view that:

( $\gamma$ )  $\{\text{Socrates}\}$  is essentially such that  $\text{Socrates} \in \{\text{Socrates}\}$

is true while:

( $\delta$ ) Socrates is essentially such that  $\text{Socrates} \in \{\text{Socrates}\}$ .

is false is plausible: ( $\gamma$ ) follows from the plausible view that sets essentially have the members that they have, and ( $\delta$ ) from the plausible, compatible view that no fact of set-membership pertains to the nature of any person. Finally, Fine holds, the combination of ( $\alpha$ ) and ( $\beta$ ) on one hand, and the combination of ( $\gamma$ ) and the negation of ( $\delta$ ) on the other hand, are jointly plausible, and, at any rate, jointly consistent. But according to Reductionism, they are not, since on that view, ( $\alpha$ ) entails ( $\delta$ ).

The conception of essence Fine has in mind is a traditional conception according to which what is essential to an object *pertains to what the object is, or defines the object* (at least in part). Let us call ‘Genuine Essentialism’ such a conception – leaving aside the issue of how exactly it should be spelt out.

The Reductionism/Genuine Essentialism distinction has a deep impact on the theory of essential dependence and its applications. According to Reductionism, essential dependence *just is* modal requirement for existence. In particular, by Reductionism every instance of ‘ $\Box_x p$ ’ is equivalent to the corresponding instance of ‘ $\Box(\text{Ex} \rightarrow p)$ ’, and consequently (6) to (9) above are equivalent to:

(6\*) For some  $R$ ,  $\Box(\text{Ex} \rightarrow Rxy)$ ,

(7\*)  $\Box(\text{Ex} \rightarrow Ey)$ ,

(8\*) For some  $R$ ,  $\Box(\text{Ex} \rightarrow \exists y(Fy \ \& \ Rxy))$ , and

(9\*)  $\Box(\text{Ex} \rightarrow \exists yFy)$ ,

respectively. In contrast, Genuine Essentialists will plausibly deny these equivalences, and they will do so by rejecting the view that (6\*) to (9\*) entail the respective corresponding unstarred items. As an illustration, let me here just focus on (7) (which expresses rigid essential necessitation) and (7\*) (which expresses rigid necessitation).

In order to argue against the view that rigid necessitation entails rigid essential necessitation, Genuine Essentialists can invoke necessary existents. The argument can be put as follows:

Although it is open to a philosopher to deny the existence of necessary beings, many think there are such things – that pure sets, or numbers, or propositions necessarily exist. Now suppose, say, that the empty set is a necessary existent. Then trivially, everything whatsoever rigidly necessitates it. Yet George W. Bush does not rigidly essentially necessitate it, because facts about the empty set do not pertain to what Bush is – at any rate, this can be maintained consistently with the view that the empty set necessarily exists.

Notice that this argument delivers a conclusion which is stronger than the initial target: if sound, it establishes that rigid necessitation does not entail rigid essential involvement.

Genuine Essentialists can invoke counterexamples of a significantly different sort. Here are three of them:

- *Singletons* (Fine, ‘Ontological Dependence’). It is a plausible principle of modal set-theory that given any objects  $a_1, a_2, \dots$ , if  $s$  is the set whose members are just these objects, then necessarily,  $s$  exists iff ( $a_1$  exists, and  $a_2$  exists,  $\dots$ ). Suppose the principle is true. Then necessarily, singleton {Socrates} exists iff Socrates does, and consequently Socrates rigidly necessitates {Socrates} (and *vice versa*). Yet Socrates does not rigidly essentially necessitate {Socrates}, because facts about the singleton do not pertain to the nature of the philosopher – at any rate, this can be maintained consistently with the set-theoretic principle.
- *Types* (Fine, ‘Ontological Dependence’). Consider Socrates and the type *human being*. Plausibly, Socrates cannot exist without being of the type *human being*. Equally plausibly, the type *human being* cannot have a token without existing. Suppose all this is true. Then Socrates rigidly necessitates the type *human being*. Now assume a view about types according to which they are mere abstractions from their tokens so that facts about a type do not pertain to what its tokens are. That view is compatible with the previous one about Socrates and the type *human being*, and it entails that Socrates does not rigidly essentially necessitate that type.
- *Lives* (Lowe, *Possibility of Metaphysics* ch. 6). In every possible world where Socrates exists, let us assume, there exists something (a long event) that is his life. On a certain view, all the lives Socrates has in these various worlds are numerically one and the same object, they are at most qualitatively different. If such a view is correct, then Socrates rigidly necessitates his life. Now that view appears to be compatible with the claim that facts about Socrates’s life do not pertain to the nature of Socrates himself, and so with the claim that Socrates does not rigidly essentially necessitate his life.

Just like the previous argument involving necessary existents, these arguments, if sound, establish that rigid necessitation does not entail rigid essential involvement.

Whenever a Reductionist sees a case of modal requirement for existence, she thereby sees a case of essential dependence. This, of course, is because

for her essential dependence is nothing but modal requirement for existence. For Genuine Essentialists, in contrast, even though every case of essential dependence is *eo ipso* a case modal requirement for existence, the converse may be denied – and we just saw how. Nevertheless, in many cases where a Genuine Essentialist thinks there is modal requirement for existence – e.g. in cases such as those presented in the previous section – she may hold that the requirement has its source in some fact of essential dependence.

Before leaving this section it is worth saying a word about Edmund Husserl's third *Logical Investigation* on modal mereology, which, thanks to the work Kevin Mulligan, Peter Simons and Barry Smith (see in particular 'Truth Makers'), is actually the main source of the contemporary interest in ontological dependence. In the third investigation, Husserl is mainly concerned with the distinction between dependent parts or 'moments' (tropes, to use a now widely popular term) and independent parts or 'pieces' (what we nowadays properly call 'parts'). Husserl's view is that the distinction is to be understood in terms of the more fundamental notion of *foundation*, a relation of essential dependence which connects, not *individual* objects, but rather *species* of objects. Husserl's relation of foundation is quite different from the relations of ontological dependence we met so far, and it is not altogether clear how it should be characterized, nor, more generally, how the third investigation is to be understood. Simons ('Formalisation of Hesserl's Theory'), Fine ('Part-Whole'), Casari, and Correia ('Husserl on Foundation'), each attempts at clarifying Husserl's thought on parts and wholes.

### 1.3. EXPLANATORY DEPENDENCE

A couple of authors (Fine, 'Dependent Objects'; Lowe, *Possibility of Metaphysics* ch. 6, Correia, *Existential Dependence*; Schnieder) have discussed notions of *explanatory dependence*, i.e. notions ontological dependence which are defined in terms of some concepts of explanation.<sup>15</sup> Examples of members of that family are relations which can be expressed by:

(10)  $\Box(Ex \rightarrow Ex \text{ in virtue of the fact that } Ey)$

(Necessarily, if  $x$  exists, then this is in virtue of the existence of  $y$ )

and:

(11)  $\Box(Ex \rightarrow \exists G(Ex \text{ in virtue of the fact that } Gy))$

(Necessarily, if  $x$  exists, then this is in virtue of some feature of  $y$ ),

and, for every appropriate ' $F$ ', properties which can be expressed by:

(12)  $\Box(Ex \rightarrow \exists \gamma(F\gamma \ \& \ Ex \text{ in virtue of the fact that } E\gamma))$

(Necessarily, if  $x$  exists, then this is in virtue of the existence of some  $F$ )

and:

(13)  $\Box(Ex \rightarrow \exists G\exists y(Fy \ \& \ Ex \text{ in virtue of the fact that } Gy))$

(Necessarily, if  $x$  exists, then this is in virtue of some feature of some  $F$ ).

Reformulating (10) to (13) by substituting ‘. . . because —’ or ‘the fact that . . . is explained by the fact that —’ for ‘. . . in virtue of the fact that —’ yields forms which can express properties and relations of the same family. These three binary sentential connectives may indeed be taken to be interchangeable in the present context.

It can be argued (Correia, *Existential Dependence* ch. 3) that explanatory links (of certain kinds at least) can be many-one: several facts may together explain a given fact, without there being one of the former facts explaining the latter. (Think about the view that several events may jointly cause a given event without there being a single of the former events doing the whole job.) If such a view is correct, then starting from a given one-many notion of explanation, one can define in the obvious way a one-one notion of *partial* explanation: a fact partly explains another fact in case the former together with other facts explain the latter. Correia (*Existential Dependence*) makes extensive use of partial explanation in order to define dependence properties and relations.

The family of explanatory dependence properties and relations is very rich. (10) to (13) express concepts of *existential* dependence, where the requirements for existence are conditions involving a concept of *full* explanation. One can define further concepts by changing the conditions, in particular by invoking conditions which involve a concept of partial explanation. And one can define notions of explanatory dependence which are also notions of essential dependence.

Expressions like ‘in virtue of’, ‘because’ and ‘explains’ can be understood in many different ways. Importantly, the way they are used in the present context is intended to comply with the following two conditions (I here just focus on ‘because’):<sup>16</sup>

- (I) A sentence of type ‘ $p$  because  $q$ ’ is truth-apt (i.e. can be used to say something true or false) provided that its two sentential components are;
- (II) If a claim of type ‘ $p$  because  $q$ ’ has a truth-value, then its truth-value does not depend on the epistemic states of a subject or group of subjects – in particular it depends neither on the epistemic states of the subject who makes the claim, nor on those of a community of subjects the latter belongs to, nor on those of a subject who evaluates the claim.<sup>17</sup>

By (I), the sentences under consideration, with ‘because’ appropriately understood, are to be contrasted with sentences of type ‘if  $p$ , then do  $A$ ’ or ‘ $q$ , therefore  $p$ ’ (at least given a plausible conception of the latter). And by (II), certain forms of contextualism and of relativism about the because-claims of the sort in question are ruled out. I will use the expression

‘objective explanation’ and grammatical variants thereof for the kind of notion expressed by ‘because’ (and other expressions which can be used in its place) understood that way.<sup>18</sup>

It is customary to distinguish between various kinds of alethic modalities, e.g. between logical, conceptual, metaphysical and natural necessity.<sup>19</sup> It can be argued that similar distinctions can be drawn in the realm of objective explanation. Here are some putative kinds of objective explanatory links, together with some putative examples (some of the latter are taken from Correia, *Existential Dependence* ch. 3, and Schnieder):

*Logical*

- Sam is ill or  $2=5$  because Sam is ill;
- Sam is ill or  $2=2$  because Sam is ill, and also because  $2=2$ ;
- Something is human because Sam am human, and also because Kevin is human, etc.

*Conceptual*

- Thorsten is Benjamin’s brother-in-law, because he is married to Benjamin’s sister;
- This vase is coloured because it is red.

*Metaphysical*

- This ham sandwich exists because the slice of ham is between the two pieces of bread;
- Sam is experiencing pain because his brain is in a physical state which is [here an appropriate description];
- The event that was Sam’s walking yesterday exists because Sam was walking yesterday;
- The redness of this apple exists because the apple is red;
- The set {Socrates} exists because Socrates does.

*Natural*

- Sam died because John stabbed him in the heart;
- The particle changed direction because another particle repelled it.

It is tempting to think that logical necessity entails conceptual necessity, that the latter entails metaphysical necessity, and that the latter entails natural necessity. Likewise, one may think that the kinds of objective explanatory links listed above exhibit the same order of strength. Of course, it is controversial whether there are all these kinds of objective explanatory links, as well as whether their relative strengths is as I suggested they may be taken to be, and finally also whether the examples I mentioned are of relevant kind. (Compare with the case of modality.)

Granted that there are various kinds of objective explanatory links, the question arises which kind(s) can be invoked in definitions of notions of ontological dependence of the sort we are dealing with here. Lowe

(*Possibility of Metaphysics*) is silent on the issue. Both Fine ('Dependent Objects') and Correia (*Existential Dependence*) favour explanatory links of a metaphysical kind. Schnieder invokes links of a conceptual sort, but he considers some of the putative examples of metaphysical links mentioned above as cases conceptual explanation, and he would perhaps say the same of the remaining ones.

#### 1.4. ONTOLOGICAL DEPENDENCE AND ONTOLOGICAL NON-SELF-SUFFICIENCY

As I stressed in the introduction, ontological dependence is sometimes thought of as marking a certain form of ontological 'non-self-sufficiency': a dependent object is an object whose ontological profile is, in some sense, ontologically derivative upon certain facts.

It is quite clear that some of the notions of ontological dependence introduced so far fail to have that feature. This is particularly obvious for the purely modal-existential notions introduced in section 1.1. Take rigid necessitation. Can we say that a claim of type '*a* rigidly necessitates *b*' conveys the idea that the existence of *a* is derivative upon, or less fundamental than, the existence of *b*, in some sense of 'derivative' or 'fundamental'? Hardly so. For the intended relation of existential derivativeness must arguably be irreflexive, and even asymmetric, while rigid necessitation is reflexive and (therefore) not asymmetric. What about *one-way rigid necessitation*, i.e. the asymmetric relation an object *x* bears to an object *y* when *x* rigidly necessitates *y* but not *vice versa*? It does not capture the idea of existential derivativeness either. For instance, it is plausible to hold that Socrates is a contingent existent and that the empty set is a necessary existent. But that view implies that Socrates one-way rigidly necessitates the empty set, and we do not want to say that the existence of the former is derivative upon that of the latter. Further arguments for the same conclusion can be formulated by invoking types and lives instead of necessary existents (see section 1.1).<sup>20,21</sup>

These modal-existential notions contrast in this respect with the essentialist notions (assuming Genuine Essentialism) and the notions of explanatory dependence. For good sense can be made of the claim that if the obtaining of a certain fact is essential to a given object, to what the object is, then the identity of the object is derivative upon that fact, as well as of the claim that if the existence of something is objectively explained by a certain fact, then the existence of that thing is less fundamental than that fact.

Because of their lack of (appropriate) connection with the concept of ontological non-self-sufficiency, some would deny that the modal-existential notions in question can properly be said to be notions of ontological *dependence*, on the grounds that the notion of dependence is connected (in the appropriate way) to that concept. Yet, one may reply, 'ontological dependence' is a philosophical term of art whose meaning is not sufficiently determinate for there to be a clear-cut answer to the question

whether for a notion to fall under its extension it must express some form of ontological non-self-sufficiency – insisting on any answer to the question would be pointless.

## 2. *Ontological Dependence at Work*

Notions of ontological dependence have been and can be used in many contexts, in order to characterize certain notions or certain views. Here I briefly run through some important such contexts.<sup>22</sup>

*Mereological essentialism.* It would seem that commonsense views many complex things as capable of existing without some of their actual parts, e.g. that this table could have existed without this carbon atom which is actually part of it, or that Mr. Jones could have existed without what is actually his right hand.<sup>23</sup> Mereological Essentialism, as defended in Chisholm's *Person and Object* (Appendix B), denies it. Mereological Essentialism is indeed the following view:<sup>24</sup>

(ME) Necessarily, if an object  $x$  is part of an object  $y$ , then necessarily, if  $y$  exists, then  $x$  is part of  $y$ .

(ME) entails that every whole rigidly necessitates each of its parts<sup>25</sup> – which is precisely what commonsense seems to deny. Notice that although (ME) may be questioned, corresponding claims of *generic* dependence are more difficult to reject, e.g. the claim that a knife must have a blade or (granted that set-membership is a part-whole relation) the claim that a non-empty set must have members.<sup>26</sup>

Friends of (ME) who are Genuine Essentialists are likely to be tempted by a stronger claim, namely:

(ME\*) Necessarily, if an object  $x$  is part of an object  $y$ , then it is true in virtue of the nature of  $y$  that, if  $y$  exists, then  $x$  is part of  $y$ .

(ME\*) entails that every whole rigidly essentially necessitates each of its parts.

Friends of (ME) may also be tempted by certain claims to the effect that wholes are explanatorily dependent upon their parts. Assume, for instance, that necessarily, any existing whole exists in virtue of the fact that its parts exist and are related in a certain way. If we combine that view and the spirit of Mereological Essentialism, we naturally get:

Necessarily, if some objects  $X$  form a partition of an object  $y$ , then necessarily, if  $y$  exists, then  $X$  all exist, and there is a certain way  $W$  in which  $X$  are related and is such that:  $y$  exists in virtue of the fact that  $X$  exist and are related in way  $W$ .

This is a view to the effect that necessarily, wholes are explanatorily dependent upon their parts. A proponent of such a view who is also a Genuine Essentialist is likely endorse the stronger principle resulting from

substituting ‘it is true in virtue of the nature of  $y$ ’ for the second occurrence of ‘necessarily’.

*The essentiality of origins.* The much discussed Kripkean thesis of the Essentiality of Biological Origins (Kripke 112–14), at any rate a simple version of it, can be formulated as follows:

(EO) Necessarily, if an organism  $y$  originates from some objects  $X$ , then necessarily, if  $y$  exists, then  $y$  originates from  $X$ .<sup>27</sup>

(EO) entails that every organism rigidly necessitates each of its originators (if any).<sup>28</sup> The previous discussion on Mereological Essentialism could be run here again, *mutatis mutandis*. For on one hand, friends of (EO) who are Genuine Essentialists are likely to endorse the claim that the origins of an organism are essential, and not only necessary, to it. And on the other hand, the view that organisms exist in virtue of the fact that their originators are (or were) related in a certain way has some plausibility – on a causal reading of ‘in virtue of’, and perhaps even on a stronger metaphysical reading. The details are left aside.

*The characterization of substances.* Ever since Aristotle, many metaphysicians have placed the category of substance (in the case of Aristotle, of primary substance) at the heart of their worldview. There is a philosophical tradition, going back to Aristotle himself, whose members put forward characterizations of that category in terms of concepts of ontological dependence. Descartes, for instance, proposes the following, particularly clear characterization: ‘By substance we can understand nothing else than a thing which exists in such a way that it needs no other thing in order to exist’ (1:210). This characterization certainly involves a concept of ontological dependence, since the open sentence ‘ $x$  needs  $y$  in order to exist’ does express such a concept – at least on any reasonable understanding of it in the present context.

Aristotelian characterizations of substances are formulated in terms of relations of ontological dependence, and as we saw, the latter are legion. Depending on one’s views about certain ontological matters, certain dependence relations will be better suited than others. Let me illustrate this with Descartes’s characterization as a starting point.

It is natural to render Descartes’s view as follows:

(S1) A substance is something which rigidly necessitates nothing except itself.

Yet, as natural as the suggestion may be, (S1) may be thought to be inadequate for various sorts of reasons. For instance, one may want to count human beings and other organisms among the substances, and at the same time endorse a Kripkean view according to which organisms have their biological origins essentially. That view is obviously incompatible with (S1), and therefore a friend of the view will reject that characterization. One should also reject (S1) if one thinks there are substances which have

certain of their proper parts essentially – say, if one believes that human beings are substances who have their brains essentially. Those who believe that (i) certain substances have essential proper parts and (ii) certain substances have essential origins may reject (S1) in favour of:

(S2) A substance is something which rigidly necessitates nothing except itself, its essential proper parts (if any) and its essential origins (if any).

Those who accept (i) but not (ii) may drop the clause on origins in (S2), and those who accept (ii) but not (i) the clause on proper parts.

There are many potential problems with either of the characterizations which have just been put forward. Some of these problems are due to the nature of rigid necessitation. As we saw, necessary existents, if there are such things, are rigidly necessitated by everything. Consequently, assuming that, say, the empty set or the number 3 exist necessarily, by any of the four characterizations no concrete thing will count as a substance. Or again, granted that everything rigidly necessitates its singleton set, by any of these characterizations *nothing at all* will be counted among the substances. An obvious option to escape such problems is to abandon rigid necessitation in favour of essential dependence (Lowe, *Possibility of Metaphysics* ch. 6) or explanatory dependence (Correia, *Existential Dependence* §5.7; Schnieder).

*Aristotelian vs. Platonist universals.* The debate about universals is commonly said to oppose two different views about their existence, the Aristotelian view and the Platonist view. The divide is often put in the following terms: Aristotelians do not believe in non-exemplified universals, while Platonists do. The opposition may actually be relativized to each particular universal: Aristotelians about, say, the universal *redness* claim that in order to exist, *redness* must be exemplified by something (a red thing for that matter), while Platonists about the same universal just deny it, they say that *redness* can exist without being exemplified by anything. Granted the relativized positions, Aristotelianism *tout court* can be defined as Aristotelianism about every universal, and Platonism *tout court* as Platonism about some.

Perhaps the most straightforward way of precisely characterizing the divide is in terms of generic necessitation. While Aristotelians about *redness* claim that:

Necessarily, if redness exists, then there is something which exemplifies it (i.e. redness generically necessitates objects which exemplify redness),

Platonists about *redness* deny it. Another way of putting it: while Aristotelians about *redness* claim that:

Necessarily, if redness exists, then there is something which is red (i.e. redness generically necessitates red things),

Platonists about *redness* deny it. The first proposal generalizes to any universal, and the second one to any universal for which a corresponding predicate is available.<sup>29</sup>

This characterization of the divide has consequences which may be found surprising, if not unwanted. For instance, assume there is such a thing as the universal *intelligence*. Then supposing, in addition, that God necessarily exists and cannot fail to be intelligent, Aristotelianism about *intelligence* is bound to be true. The trouble here, some would say, is that the divide between Aristotelians and Platonists is supposed to be about the *nature* of universals, while in the story about God, Platonism about *intelligence* is ruled out because of facts which have nothing to do with the nature of the universal.

Those who argue along these lines may be happier with a re-characterization of the divide in terms of essential dependence: while Aristotelians about universal *U* claim that:

It is true in virtue of the nature of *U* that if it exists, then there is something which exemplifies it,

Platonists about *U* deny it. The new characterization is immune from the previous difficulty, at least if Genuine Essentialism is countenanced. For given the new proposal, it can be maintained that even if God is as described in the previous scenario, still the proposition that [if *intelligence* exists, then something exemplifies it], although necessarily true, is not true in virtue of the nature of the universal.

Another kind of complaint against the initial characterization invokes the concept of explanation. The divide is one about *what makes* universals exist, some would say: Aristotelians about a given existing universal claim that the universal exist in virtue of the presence of an exemplifier, while Platonists about that universal deny it. The problem, the complaint goes on, is that, as the story about God shows, the characterization does not capture that aspect of the divide: granted that the story is true, there is still room for the view that *intelligence* exists but not in virtue of God's being intelligent, nor in virtue of the presence of any intelligent thing.

Those who endorse that complaint may opt for a characterization of the divide framed in terms of explanatory dependence, e.g.: while Aristotelians about universal *U* say that:

Necessarily, if *U* exists, then this is because something exemplifies *U*,

Platonists about *U* deny it. And those who both endorse the complaint and think the divide is about the nature of universals may opt for the following mixed characterization: while Aristotelians about universal *U* say that:

It is true in virtue of the nature of *U* that if it exists, then this is because something exemplifies it,

Platonists about *U* deny it. See Correia (*Existential Dependence* §5.2) for more on such approaches.

*Supervenience*.<sup>50</sup> 'Supervenience' is a term for certain relations. In the most familiar cases, supervenience relations are binary relations between

sets or pluralities of monadic properties – a set of properties is said to supervene, or not, on another set of properties. But some of supervenience relations which have been defined by philosophers relate set of entities of other kinds (concrete individuals, states of affairs, sentences, for instance), and some have an arity greater than two. For the sake of simplicity, here I just focus on the familiar cases.

The concept of supervenience involves the notion of ‘covariation’: that which supervenes (the set of *supervenient* properties) ‘covaries’ with that on which it supervenes (the set of *subvenient* properties), i.e. there can be no ‘variation in’ the supervenient properties without some ‘variation in’ the subvenient properties. Supervenience claims are also often taken to involve the idea that the supervenient facts are in some sense ‘ontologically derivative’ upon the subvenient facts.

Ever since Kim’s ‘Concepts of Supervenience’, three notions of supervenience have been widely discussed. Where  $A$  and  $B$  are non-empty sets of monadic properties, these notions are defined as follows:

- *Strong Supervenience.*  $A$  strongly supervenes on  $B$  iff<sub>df</sub> for all worlds  $w$  and  $w'$  and for all objects  $x$  and  $x'$ , if  $x$  in  $w$  is  $B$ -indiscernible from  $x'$  in  $w'$ , then  $x$  in  $w$  is  $A$ -indiscernible from  $x'$  in  $w'$ ;
- *Weak Supervenience.*  $A$  weakly supervenes on  $B$  iff<sub>df</sub> for every world  $w$  and all objects  $x$  and  $x'$ , if  $x$  in  $w$  is  $B$ -indiscernible from  $x'$  in  $w$ , then  $x$  in  $w$  is  $A$ -indiscernible from  $x'$  in  $w$ ;
- *Global Supervenience.*  $A$  globally supervenes on  $B$  iff<sub>df</sub> for all worlds  $w$  and  $w'$ , if  $w$  and  $w'$  are  $B$ -indiscernible, then they are  $A$ -indiscernible.

The indiscernibility notions are in turn defined by Kim as follows:

- $x$  in  $w$  is  $A$ -indiscernible from  $x'$  in  $w'$  iff<sub>df</sub> for every property  $\phi$  in  $A$ ,  $x$  has  $\phi$  in  $w$  iff  $x'$  has  $\phi$  in  $w'$ ;
- $w$  and  $w'$  are  $A$ -indiscernible iff<sub>df</sub> for every object  $x$  and every property  $\phi$  in  $A$ ,  $x$  has  $\phi$  in  $w$  iff  $x$  has  $\phi$  in  $w'$ .

By restricting quantification over worlds in various ways in the *definitia* of strong, weak and global supervenience, one gets various corresponding concepts of supervenience. Recent interest in global supervenience has induced many refined characterizations of the concept (see Paull & Sider; Stalnaker, ‘Varieties of Supervenience’; McLaughlin; Shagrir; Bennett).

Many other notions of supervenience have been characterized and studied (see Bennett and McLaughlin for a good survey). An important source of the proliferation of definitions lies in the desire to capture certain intuitions or beliefs – most commonly about the relationships between the mental and the physical, and about the links between the evaluative and the natural – in a precise way in terms of an appropriate notion of supervenience, and in the dissatisfaction with existing attempts. There is no room here for a detailed discussion, but let me just briefly say something which is relevant to the topic of this paper.

As I previously stressed, supervenience claims are often taken to convey the idea that the supervenient facts are somehow ontologically derivative upon the subvenient facts. Strong, weak and global supervenience as defined above, as well as most of the supervenience relations which have been discussed in the literature, clearly express forms of covariation, but they arguably do not express relations of ontological priority (see Kim, 'Postscripts on Supervenience').

Some of the arguments which may be used to make the point exactly parallel those which have been used to argue that notions of dependence of the sort defined in section 1.1 fail to capture the idea that a dependent object has an ontological profile which is derivative upon certain facts (see section 1.4).

To illustrate the point in the case of strong, weak and global supervenience as defined above, it suffices to realize that any set of necessary properties (properties which are necessarily had by anything) supervene, in any of these three senses, upon any set of properties whatsoever. Or again, define a *cat-singleton* as a singleton whose member is a cat. Then the property of being a cat supervenes, again in any of the three senses, on the property of being a member of a cat-singleton, while it is very implausible to say that facts of whether or not something is a cat are ontologically derivative upon facts of whether or not something belongs to a cat-singleton.

As I emphasized in section 1.4, it can be argued that concepts of dependence capable of capturing appropriate links of ontological derivativeness can be defined in terms of essence or objective explanation or both. Obviously, it can be argued that the same holds of concepts of supervenience. See Correia (*Existential Dependence* ch. 6) for a discussion on that topic.

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### *Short Biography*

Fabrice Correia is Associate Professor of Philosophy at the University of Geneva, Switzerland and in charge (with Kevin Mulligan) of the Genevan *eidos* Metaphysics Centre. He works in the areas of metaphysics, philosophical logic and philosophy of language. He has published a book *Existential Dependence and Cognate Notions* (Munich: Philosophia, 2005), and articles on ontological dependence, essence, modality, and relevance

logic, among other topics, in the journals *Dialectica*, *Noûs*, *Journal of Philosophical Logic*, *Notre Dame Journal of Formal Logic* and *Studia Logica*. He holds a Ph.D. in Philosophy from the University of Geneva.

### Notes

\* Correspondence address: Department of Philosophy, University of Geneva, 2, rue de Candolle, 1211 Geneva 4, Switzerland. Email: Fabrice.correia@lettres.unige.ch.

<sup>1</sup> I will sometimes omit ‘ontological’ before ‘dependence’ and ‘ontologically’ before ‘dependent’.

<sup>2</sup> The reader interested in the topic of ontological dependence may also consult Lowe, ‘Ontological Dependence’.

<sup>3</sup> Simons, *Parts* Part III, is a *locus classicus* for a detailed discussion on the notions I present here.

<sup>4</sup> There are alternative construals. For instance, one may invoke some sort of relevant implication connective instead of material implication, or a representation of modality by means of a predicate modifier instead of a sentential operator. While some of these other construals would arguably make no difference as regards the extension of the defined predicate (this is perhaps the case of the second alternative construal), some of them surely would make a difference (this is the case of the first one). For lack of space, I cannot go into details here, but see Correia, *Existential Dependence* §2.3.

<sup>5</sup> There is no uniform terminology for notions of dependence. Only some of the labels I use in this paper can be found in the literature.

<sup>6</sup> Here are some references of places where the corresponding claims have been made or discussed: Mulligan, Simons and Smith on 1, 2 and 3; Simons, *Parts* §8.5, on 1 and 2; Chisholm, ‘Boundaries’, and Casati and Varzi, *Holes* 95–7, on 3; Casati and Varzi, *Holes* 18–19 on 4; Wiggins, *Sameness* 114; Fine, ‘First-Order Modal Theories I’ on 5; Wiggins, ‘Mereological Essentialism’ on 6; Simons, *Parts* 281–3, and van Inwagen on 7; Kripke 112–14 on 8 and 9; Mulligan and Smith on 10.

<sup>7</sup> I here understand the existential quantifier ‘ $\exists$ ’ in such a way that ‘ $\exists x(Ex \ \& \ \dots)$ ’ and ‘ $\exists x(\dots)$ ’ are necessarily equivalent. This is a majority view. On a certain understanding of the actualism/possibilism distinction, however, actualists endorse that equivalence but possibilists do not. For the sake of simplicity I ignore such a possibilist stance.

<sup>8</sup> Discussed in section 2.

<sup>9</sup> The operator can also be thought of as short for ‘it is part of the nature of  $x$  that’ or ‘it is true in virtue of the nature of  $x$  that’, which I here take to be both equivalent to ‘ $x$  is essentially such that’. Fine’s box is grammatically akin to the hybrid operators ‘believes that’, ‘knows that’, etc.: it takes a singular term and a sentence to make a sentence. Fine’s operator may be used to formulate essentialist claims we would more naturally express by means of the standard form ‘ $x$  is essentially an  $F$ ’ – in the Finean idiom, the latter form is equivalent to ‘it is true in virtue of the nature of  $x$  that  $x$  is an  $F$ ’ – as well as claims like ‘it is true in virtue of the nature of God that @ is the best of all possible worlds’, in which the sentential complement does not make reference to the subject of essentialist attribution, and which, for that reason, cannot be straightforwardly expressed using the standard form. See Fine, ‘Senses of Essence’ for a discussion on the grammar of essentialist statements.

<sup>10</sup> Lowe actually introduces a relation defined in terms of quantification over functions rather than relations in general.

<sup>11</sup> At least given a liberal but plausible view about the logic of ‘for some  $R$ ’.

<sup>12</sup> There is another, quite popular modal account of essence according to which to have a property essentially is to have it necessarily (full stop). For the sake of simplicity I will ignore that view, but it is obvious how the discussion could be adapted so as to take it into account.

<sup>13</sup> But see Almog 1991.

<sup>14</sup> See also Dunn; Almog.

<sup>15</sup> Lowe just mentions *en passant* such a notion, but quickly dismisses it as insufficiently perspicuous for his purposes.

<sup>16</sup> The authors cited above do not put things exactly that way, but I think it fair to say they would agree with the point. (I for one do!)

<sup>17</sup> Unless, of course, the sentential components of the corresponding because-sentence are themselves about epistemic states and of a suitable nature.

<sup>18</sup> Bernard Bolzano's concept of grounding (*abfolge*) is arguably such a concept of objective explanation. Bolzano gives a detailed account of the concept in *Theory of Science* §§168–77, 198–221.

<sup>19</sup> These distinctions are not universally accepted, though. Against the existence of logical/conceptual forms of possibility broader than metaphysical necessity, see e.g. Chalmers 136–8; Jackson 67–84; Stalnaker, 'Conceptual Truth'. Against the view that some natural necessities fail to be metaphysical necessities, see e.g. Shoemaker, 'Causality and Properties'; 'Causal and Metaphysical Necessity'; Swoyer; Ellis.

<sup>20</sup> Notice that things and their singletons raise another kind of problem. The view that the existence of a singleton is derivative upon the existence of its member has some plausibility. But granted that a singleton and its member rigidly necessitate each other, the relevant notion of existential derivativeness can be spelled out neither in terms of rigid necessitation, nor in terms of one-way rigid necessitation.

<sup>21</sup> For lack of space, the previous sections did not include discussions about the formal properties of the various notions of ontological dependence presented so far. For more on that topic, see Simons, *Parts* ch. 8; Fine, 'Ontological Dependence'; Lowe, *Possibility of Metaphysics* ch. 6; 'Ontological Dependence' §3; Correia, *Existential Dependence* §4.5.

<sup>22</sup> Among the interesting topics I do not discuss here are the metaphysics of fictional discourse (see Thomasson) and mathematical structuralism (see Linnebo).

<sup>23</sup> For the sake of simplicity, here and below temporally qualified existence and temporally qualified parthood are ignored.

<sup>24</sup> Chisholm proposes in addition a view which involves existence and parthood both temporally qualified, but, again, for the sake of simplicity it is left aside here.

<sup>25</sup> On the plausible assumption that being a part of an existing whole is incompatible with not existing.

<sup>26</sup> Notice that (ME) is formally similar to a view involving plural quantification many would find much more plausible, namely the view – call it *plurality membership essentialism* – that necessarily, if an object  $x$  is one of some objects  $X$ , then necessarily, if  $X$  exists, then  $x$  is one of  $X$ . Granted that being a member of an existing plurality is incompatible with failing to exist, plurality membership essentialism entails that pluralities bear a form of many-one rigid necessitation relation to their members: necessarily, if an object  $x$  is one of some objects  $X$ , then necessarily, if  $X$  exists, then so does  $x$  (see Ruffitt).

<sup>27</sup> I deliberately leave unexplained what origination exactly is, and what kind of things organisms are supposed to originate from – their parents, pairs of gametes, etc.

<sup>28</sup> On the plausible assumption that being an originator of an existing organism is incompatible with not existing.

<sup>29</sup> I assume that if a predicate expresses a universal, then necessarily, an object exemplifies the universal iff it satisfies the predicate.

<sup>30</sup> See Leuenberger for a good survey on the topic.

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