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## On the Overlap Between Everything and Nothing

**Abstract.** Graham Priest has recently proposed a solution to the problem of *the One and the Many* which involves inconsistent objects and a non-transitive identity relation. We show that his solution entails either that the object **everything** is identical with the object **nothing** or that they are mutual parts; depending on whether Priest goes for an extensional or a non-extensional mereology.

**Keywords:** mereology; Graham Priest; everything; nothing; paraconsistency

### Introduction

It all starts with the problem of *the One and the Many*: what turns a collection of objects into a unity? Take an object with parts (i.e., a ‘partite’ object). It is one, since it is an object and you can individually refer to it. But it is also many, since it is composed by a collection of other objects – its parts. Then, here is the problem: how do the parts form a whole? What accounts for the *unity* of the whole?

Various solutions have been proposed but, according to Priest, all these solutions run into the vicious Bradley regress. To make clear what this regress is, let us call that which constitutes the parts as a single unit ‘*collante*’. Suppose we have a unity made up of *a* and *b*. Then, there is something, the *collante*, which binds them together. But now, what binds *a*, *b*, and the *collante* together? This must be some other *collante*, or *super-collante*. And now we are off to a vicious infinite regress:

Our original problem was how a unity of parts is possible. We need an explanation. Given a bunch of parts, simply invoking another object does not do this. [Priest, 2014b, p. 11]

Priest's solution abandons two key assumptions of the debate, namely that any solution has to be consistent and that identity is transitive. The first assumption is abandoned by the introduction of gluons, which are inconsistent objects. This forces Priest to accept a non-transitive notion of identity. Besides this, Priest also uses a non-well-founded mereology. However, as we will show, a consequence of Priest's solution is that every object is inconsistent. This in turn implies that the objects **everything** and **nothing** are either parts of each other or identical.

We explain Priest's theory of gluons and his non-standard notion of identity in Section 1, and focus on his mereology in Section 2. In Section 3 we explain why gluon theory entails that every object is inconsistent. Section 4 is then concerned with the consequences for the mereological structure of **everything** and **nothing**. If Priest's mereology is extensional, then **everything** and **nothing** are identical. If it is not extensional, but strongly supplemented, then **everything** and **nothing** are mutual parts. We conclude that **everything** and **nothing** are more intimately related in Priest's theory than one might have thought.

## 1. Gluon theory

According to Priest, what constitutes the unity of an object is its gluon. Gluons are conceived to be identical to all and only the parts of the unified object. Therefore, there is no metaphysical space between the gluon and the parts of the objects. There is no need to ask how it is possible that the gluon and the parts of the object are joined together, because the gluon *is* the parts. Hence, Bradley's regress is stopped. Here we give a brief introduction of gluon theory and explain how gluons solve the unity problem. Gluon theory can be built in six steps.

Step one: noneism. Noneism [Priest, 2016] is the view that some objects do not exist. Fictional characters and failed objects of scientific postulation are some examples of non-existent objects. For Priest, to be an object is to be identical to something, hence being a possible object of reference, or having at least one property, is sufficient for being an object.

The domain of objects includes both existent and non-existent objects. We can quantify over objects by using the particular and the

universal quantifiers, ‘ $\mathfrak{S}$ ’ and ‘ $\mathfrak{A}$ ’ respectively. ‘ $\mathfrak{S}xPx$ ’ has to be read as ‘some  $x$  is such that  $Px$ ’, in contrast to the now standard reading of ‘ $\exists xPx$ ’ as ‘there exists an  $x$  such that  $Px$ ’. In addition to this, we have an existence predicate, ‘ $E$ ’, to signify that the object exists — which, for the record, Priest takes to be equivalent with having the potentiality to enter into causal relations [Priest, 2014b, p. xxii]. Thus, if we want to say that there exists something that is  $P$ , we should write ‘ $\mathfrak{S}x(Ex \wedge Px)$ ’. Moreover, we use the same symbols for second-order universal and particular quantifiers, which range over properties. Thus ‘ $\mathfrak{S}X Xa$ ’ and ‘ $\mathfrak{A}Y Yb$ ’ are read as ‘some property  $X$  is had by object  $a$ ’ and ‘all properties  $Y$  are had by object  $b$ ’, respectively.

Step two: dialetheism. Dialetheism [Priest et al., 2018] is the view that some contradictions are true, i.e., some sentences are both true and false. Given dialetheism one has to endorse a paraconsistent logic — like  $LP$  [Priest, 2002, 2006] — in order to avoid triviality.

Step three: inconsistent objects. An object  $x$  is inconsistent ( $Ix$ ) iff it has at least one contradictory property,  $Y$ , i.e., iff  $x$  is in the extension and anti-extension of at least one predicate  $Y$ . Formally:

$$(IO) \quad Ix \text{ iff } \mathfrak{S}Y(Yx \wedge \neg Yx)$$

As we will show, an inconsistent object both is and is not an object because it is identical to something while it is also not identical to anything.

Step four: identity. Priest uses the standard Leibnizian definition of identity:

$$(ID) \quad a = b \text{ iff } \mathfrak{A}X(Xa \equiv Xb)$$

The material biconditional  $Xa \equiv Xb$  that is used in this definition is understood as defined as  $(\neg Xa \vee Xb) \wedge (\neg Xb \vee Xa)$  and since the underlying logic is  $LP$ , the biconditional is reflexive, symmetric and non-transitive. Identity inherits all these properties from the biconditional. To get a feeling for  $LP$  and to show that transitivity really does not follow, consider the property of being identical with  $c$ , i.e., ‘ $x = c$ ’. Here is an example showing that although  $a = b$  and  $b = c$ , we do not have  $a = c$ . The crucial assumption is that we also have  $b \neq c$  (so  $b$  is an inconsistent object). Applying the definition of identity to  $a$  and  $b$ , we have  $(a \neq c \vee b = c) \wedge (b \neq c \vee a = c)$ . Since the first disjunct of the second conjunct is true, the second conjunct is true. This means we do not have to conclude that  $a = c$  in order for the second conjunct to be

true. Hence there is an interpretation according to which  $a \neq c$  even though  $a = b$  and  $b = c$  are both true. (Of course, if  $a$ ,  $b$ , and  $c$  are all consistent objects, then identity *is* transitive.)

Step five: properties. Under an abundant conception of property, any condition containing a single variable expresses a property. However, for Priest this conception is problematic since he thinks that there are many examples of such conditions that do not specify a property. For example, ‘being red and Paris is in France’ or ‘ $x = x$  or Caesar was a frog’ [Priest, 2014b, p. 24]. Therefore, Priest operates with a sparser notion of property, although he admits being unable to give necessary and sufficient conditions for determining whether a predicate expresses a property or not. But he does give some useful constraints. A condition with a free variable does not determine a property if its truth conditions at an index of evaluation (world, time, etc.) make reference to another index of evaluation. (This means, roughly, that open sentences containing intensional operators do not specify a property.) The reason is that in intensional contexts truth is not preserved by the material conditional — not even in consistent cases. For example, ‘Giorgio believes that  $x$  is happy’ does not express a property because Giorgio can believe this of Clark Kent without believing it of Superman. Other conditions may or may not express a property. So much for properties.

Step six: gluons. Let ‘ $<$ ’ express the parthood relation. For now we follow Priest in staying neutral on whether this is parthood or proper parthood [Priest, 2014b, p. 20, fn. 7]. Given any composite or ‘partite’ object  $u$ , Priest defines its gluon,  $g(u)$ , written also as  $g_u$ , as an object which is identical to all and only the parts of  $u$ . Formally:

$$(G) \quad y = g_u \text{ iff } \forall x(x < u \leftrightarrow y = x)^1$$

This tells us about the gluon of a partite object. What about the gluon of a simple object? In that case the gluon is the simple object itself. We may call it an ‘improper gluon’ to distinguish it from the proper gluon of a partite object. And what about the unity of gluons themselves? Priest takes gluons to be simples, i.e., non-partite objects. Thus, the gluon is its own gluon and thus does not have any proper part.

Besides the distinction between proper and improper gluon, Priest also distinguishes between prime and non-prime gluons. A prime gluon

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<sup>1</sup> We take  $A \leftrightarrow B$  as defined by  $(A \rightarrow B) \wedge (B \rightarrow A)$  and we assume that  $\rightarrow$  is the conditional of BX or some stronger relevant logic, in line with what Priest says in [2014a].

is a gluon which has all the properties of every part of the object that it unites. A non-prime gluon is a gluon that is not prime.

Let us now note some important facts about gluons, which also show that gluons are contradictory entities.

- (F1) Every gluon is self-identical.
- (F2) Every object has its gluon as a part.
- (F3) For every object, its gluon is unique.
- (F4) Every gluon of a partite object is not self-identical.
- (F5) Every gluon of a partite object is inconsistent.
- (F6) For every partite object, the gluon of the object is numerically distinct from each of the object's parts.
- (F7) The gluon of a partite object is and is not an object.
- (F8) For every partite object, the gluon of the object is not part of the object.

Most of these facts are proven by Priest.<sup>2</sup> (F8) is novel; it follows from (G) and either (F4) or (F6) using *modus tollens*. Note also that (F7) iff (F5). Consider left-to-right first. Assume (F7), then given the definition of being an object we have  $\mathfrak{S}x(x = g_u) \wedge \mathfrak{A}x(x \neq g_u)$ ; hence (F5) follows if you take the property expressed by “is identical to something”. The other direction is equal to the proof of (F7). So talking about inconsistent objects is the same as talking about objects that are also non-objects,

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<sup>2</sup> (F1) follows immediately from the reflexivity of identity.

(F2) follows from (F1) and (G).

For (F3): Suppose that  $g_u$  and  $g'_u$  are gluons of the same object. Then, we get  $g_u < u$  and  $g'_u < u$  from (F2). Therefore, from (G) it follows that  $g_u = g'_u$ .

For (F4): Let  $u$  be a partite object. Then, it has at least two distinct proper parts,  $p_1$  and  $p_2$ . Since  $p_1 \neq p_2$ , there must be at least one property  $X$  such that  $Xp_1 \wedge \neg Xp_2$  (or *vice versa*). From (G) we get  $g_u = p_1$  and  $g_u = p_2$ . Then, from (ID) it follows that  $\mathfrak{S}X(Xg_u \wedge \neg Xg_u)$ , therefore  $\neg \mathfrak{A}X(Xg_u \equiv Xg_u)$ , therefore  $g_u \neq g_u$ . (The proof is from [Zolghadr, 2019, p. 72].)

For (F5): Consider the property expressed by “to be identical to something”, which according to Priest expresses the property of being an object. Then, as Priest [2014b, pp. 20–21] notes, from (F1), (F4) and (IO) it follows that  $g_u$  is inconsistent.

For (F6): Let  $u$  be a partite object with only two proper parts,  $p_1$  and  $p_2$  (the proof immediately extends to objects with an arbitrary number of proper parts). As we know, since  $p_1 \neq p_2$  there must be at least one property  $X$  such that  $Xp_1 \wedge \neg Xp_2$  (or *vice versa*). Thus,  $Xg_u \wedge \neg Xg_u$  and hence  $\neg(Xp_1 \equiv Xg_u)$  and  $\neg(Xp_2 \equiv Xg_u)$ . Therefore,  $p_1 \neq g_u$  and  $p_2 \neq g_u$  [Priest, 2014b, p. 22].

(F7) follows immediately from (F1) and (F4) given that Priest takes the property of being an object to be equivalent to the property of being self-identical.

which in turn is the same as talking about objects that are not self-identical.

Finally, we focus on two peculiar objects of gluong theory: **everything** (i.e., **e**) and **nothing** (i.e., **n**). We can think of **e** as “the totality of every object” [Priest, 2014b, p. 54], i.e., the object that every object is a part of. As Priest notes, it is an inconsistent object. For, since every gluong of a partite object is an object, it is part of **e**; but since every such gluong is not an object, it is not part of **e**. Then, **e** both has and does not have every such gluong as a part. Therefore, **e** is inconsistent. Moreover, given Priest’s mereological perspective, **e** is the fusion of every object. Given noneism, he embraces a version of *Unrestricted Composition* according to which any collection of objects has a fusion. Bear in mind, though, that such a fusion need not *exist*, since existence is a predicate of only some objects. Priest uses ‘ $\bigoplus \Sigma$ ’ for a fusion of all and only the members of a set  $\Sigma$ . Since “ $\bigoplus \Sigma$ ” is a noun phrase, Priest takes it to refer to something. Thus, for any  $\Sigma$ ,  $\bigoplus \Sigma$  is an object. Instead of using sets, we will officially use plural variables and use ‘ $\bigoplus yy$ ’ for the fusion of the *yys*. Plural logic extends first-order logic with plural variables, plural terms, and the is-one-of relation ( $\prec$ ) which takes a singular term on its left-hand-side and a plural term on its right-hand-side. (However, for readability we will sometimes follow Priest in using set theory instead of plural logic.)

**Nothing** is “the absence of every thing” [Priest, 2014b, p. 55]. As for **e**, **n** is an object since we can refer to it.<sup>3</sup> Besides, **n** is an inconsistent object. For since it is an object it is something, but it is the absence of all things too. So **n** is nothing, i.e., **n** is not something. Therefore, **n** is inconsistent. Priest defines **n** as the fusion of the empty set,  $\bigoplus \emptyset$ .<sup>4</sup> (Actually, as will become clear, the definite article ‘the’ needs to be replaced by the indefinite article ‘a.’) It has no parts for it is nothing. Since **n** has no parts it is simple and it is thus its own gluong. **n** is an improper part of itself,  $\mathbf{n} \leq \mathbf{n}$ , but it is also not identical with itself and

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<sup>3</sup> **Nothing**’s objecthood is controversial. ‘Nothing’ is often not regarded as a (referring) term but rather as a quantifier. For discussion of Priest’s argument that ‘nothing’ is a term [see Sgaravatti and Spolaore, 2018]. Here we simply follow Priest, for sake of the argument, in taking ‘nothing’ to refer to the object **nothing**.

<sup>4</sup> It is worth noting that there are other possible definitions of **nothing**. For example, Casati and Fujikawa [2019] define it as the mereological complement of **everything**, which brings about different features compared to those displayed within Priest’s account.

hence not an improper part of itself,  $\neg \mathbf{n} \leq \mathbf{n}$  [Priest, 2014a, p. 154]. Such claims about parthood bring us to mereology.

## 2. Mereology for gluon theory

Mereology is the study of the parthood relation.<sup>5</sup> It is common to distinguish between two senses of parthood: improper parthood and proper parthood. The first is the limiting case of the second: every object is an improper part of itself. From hereon, we explicitly use ‘ $<$ ’ for the proper parthood relation and ‘ $\leq$ ’ for improper parthood.

Priest wants to allow for parthood loops, because prime gluons can be proper parts of themselves.<sup>6</sup> This means that proper parthood is not asymmetric and improper parthood is not antisymmetric. So his mereology is not well-founded.

Priest’s axiomatisation takes proper parthood as primitive and defines (improper) parthood and overlap thus:

$$\begin{aligned} \text{Parthood: } x \leq y &\text{ iff } x < y \vee x = y \\ \text{Overlap: } x \circ y &\text{ iff } \exists z(z \leq x \wedge z \leq y) \end{aligned}$$

Priest takes proper parthood to be transitive and accepts an extensionality principle according to which overlapping all the same objects is sufficient for identity:

$$\begin{aligned} \text{Transitivity: } (x < y \wedge y < z) &\rightarrow x < z \\ \text{Extensionality: } \forall z(z \circ x \leftrightarrow z \circ y) &\rightarrow x = y \end{aligned}$$

Using overlap and the epsilon operator, ‘ $\varepsilon y$ ’ (to be read as ‘an object  $y$  such that’) one can define the notion of mereological sum,  $\bigoplus zz$ , as

$$\varepsilon y \forall x(x \circ y \leftrightarrow \exists z(z < zz \leftrightarrow x \circ z))$$

The mereological sum operation is taken by Priest to be unique and unrestricted – the caveat here is that just because any two or more objects have a unique sum does not mean that this sum *exists*, for being a noneist Priest takes existence to be different from being an object.

<sup>5</sup> For more on mereology, see for a start [Lando, 2017; Varzi, 2019].

<sup>6</sup> Consider a situation where a prime gluon  $g$  of  $y$  is also part of some part of  $y$ , say  $x$ . Then,  $x$  has the property *having  $g$  as a proper part*. Thus,  $g$  also has the property *having  $g$  as a proper part*, i.e.,  $g < g$  [Priest, 2014b, p. 89].

In the previous section we saw that the gluon of an object is identical with all the parts of the object. This is a kind of one–many identity that might remind some readers of the Composition as Identity debate [see for a survey [Carrara and Lando, 2021](#)]. According to the strong version of Composition as Identity (CAI), a whole is literally identical to all its parts (taken collectively), i.e.:

$$(CAI) \quad x = \bigoplus yy \rightarrow x = yy$$

Note that some might consider the consequent ill-formed, but defenders of CAI commonly hold that identity can be flanked by both singular and plural terms. A central result in that debate is that CAI results in a collapse of the parthood relation onto the is-one-of relation ( $\prec$ ) of plural logic [[Sider, 2007](#), pp.57–58]:

$$x = \bigoplus yy \rightarrow (z \leq x \leftrightarrow z \prec yy)$$

This has various consequences that many are unwilling to swallow [see, e.g., [Calosi, 2016](#); [Loss, 2018](#); [Sider, 2014](#)]. Fortunately for Priest, his mereology does not result in Collapse (or its set-theoretic analogue), as we will now show.

One derivation from CAI to Collapse uses the following intuitive principle:

$$(\text{Plural Covering}) \quad z \leq x \rightarrow \exists yy(x = \bigoplus yy \wedge z \prec yy)$$

(This says that if  $z$  is part of  $x$  then  $x$  is the fusion of some  $yy$  and  $z$  is one of  $yy$ .) The argument from CAI and Plural Covering to Collapse then goes as follows. Suppose  $x$  is the fusion of the  $yy$ . Then, from right-to-left is easy: let  $z$  be one of  $yy$ , then by the definition of sum,  $z$  is part of  $x$ . For the left-to-right direction, suppose  $z$  is part of  $x$ . Then by Covering, there are some  $ww$  such that  $x$  is the sum of  $ww$  and  $z$  is one of  $ww$ . By CAI,  $x = yy$  and  $x = ww$ . Thus by the transitivity of identity,  $yy = ww$ . Hence, since  $z$  is one of  $ww$ ,  $z$  is one of  $yy$ .

The left-to-right direction does not go through in Priest’s account, for two reasons. One, gluon theory does not entail that  $x$ , or the gluon of  $x$ , is one–many identical to all the parts of  $x$  taken collectively, instead the gluon is identical to each part. Second, even if it were to entail that, we would still need the transitivity of plural identity to conclude that  $yy = ww$  (or, equivalently, that the set of  $yy$  has the same members as the set of  $ww$ ). But if singular identity is not transitive, there is no reason why plural identity would be transitive.



A reason we bring this up is that Takashi Yagisawa's [2017] alternative gluon theory *does* fall prey to Collapse because in this case the gluon of  $x$  is one-many identical to all the proper parts of  $x$ .<sup>7</sup> However, there is nonetheless a problem with Priest's mereology. As Aaron Cotnoir [2018] explains, Priest's rejection of anti-symmetry of parthood means that he has to give up Extensionality or Transitivity (because the latter two entail anti-symmetry: if  $x$  and  $y$  are parts of each other, then they overlap the same objects, hence, by Extensionality, they are identical). The solution Cotnoir suggests is to replace Extensionality with the following:

$$\text{(Strong Supplementation)} \quad \mathfrak{A}z(z \circ x \rightarrow z \circ y) \rightarrow x \leq y$$

Instead of giving up Extensionality, Priest could give up Transitivity. But we think this would make mereology redundant given that Priest accepts a paraconsistent non-well-founded set theory according to which sets are extensional and set formation is unrestricted [Priest, 2006, Ch. 3]. So if we take parthood to be non-transitive while leaving the fusion operation as both unrestricted and extensional, then the parthood relation will exhibit the exact same formal features as the membership relation in Priest's set theory. So calling an object a set or a fusion, or saying that it has a part or an element, will then be merely a verbal difference.

In Section 4 we will see that there is another good reason for Priest to follow Cotnoir's advice which has everything to do with **nothing**.

### 3. Every object is inconsistent

In this section we will show that gluon theory entails that every object is inconsistent. As far as we know, the first to point this out were Filippo Casati and Naoya Fujikawa in their review of *One* [Casati and Fujikawa, 2014]. We reconstruct their argument here. Casati and Fujikawa mention both **everything** and a version of unrestricted mereological composition. Actually, one can use either to get the conclusion that every object is inconsistent.

Casati and Fujikawa [2014, p. 503] note that "according to gluon theory and the unrestricted mereological sum operation, almost every object

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<sup>7</sup> For a more elaborate comparison of the two gluon theories, see also Priest's [2017] reply to Yagisawa.

is contradictory.” We take their argument to be as follows. Consider the object **e**, i.e., **everything**. By definition:

$$(CF1) \quad \mathcal{A}x(x < \mathbf{e} \vee x = \mathbf{e})$$

Now, according to Priest [2014b, p. 55], **e** is inconsistent object:

$$(CF2) \quad I\mathbf{e}$$

Moreover, **e** is a partite object, so it has a gluon [Priest, 2014b, p. 55],  $g_e$ , which — as shown in Section 1 — is identical and not identical to each of **e**’s proper parts:

$$(CF3) \quad \mathcal{A}x(x < \mathbf{e} \rightarrow (x = g_e \wedge x \neq g_e))$$

So,  $x$  is in the extension and in the anti-extension of the property of being identical with  $g_e$ . Thus, by the definition of inconsistent object:

$$(CF4) \quad \mathcal{A}x(x < \mathbf{e} \rightarrow Ix)$$

Hence, from CF1, CF2, and CF4:

$$(CF5) \quad \mathcal{A}xIx$$

Thus, every object is inconsistent. However, Casati and Fujikawa write that “*almost every object is contradictory*” (our italics). We were unsure which objects would lie outside the scope of their argument. But a reviewer for this journal noted that if monism is true and there is only one object, then this object is simple (it is its own gluon) and then it does not follow that this lonely object is inconsistent, i.e., (CF2) would be false. However, if **everything** is the only object there is, it follows that either **nothing** does not exist — otherwise there are two objects — or that **everything** and **nothing** are one and the same object. Note that monism and noneism make strange bed partners. According to noneism, there are non-existing objects. According to monism there is only one object. Hence, unless noneism is only vacuously true, this combination of views entails that the only thing there is, is a non-existing object. One way out of this particular problem would be to define monism as the view according to which only one object *exists*, while allowing for various non-existing objects. But in that case, **everything** is again a partite object which has one proper part that exists — the only existing object — and various non-existing proper parts. In that case, Casati and Fujikawa’s argument goes through as before.

Casati and Fujikawa's argument depends on there being an object that is the mereological sum of every object. But the same conclusion can be derived without using  $e$ , at least if there are two distinct objects. Take two distinct objects,  $x$  and  $y$ . By unrestricted composition, they have a fusion,  $z$ . Now,  $z$  has a gluon,  $g_z$ , such that  $x = g_z$  and  $y = g_z$ . But, since the gluon of  $z$  is also not an object,  $x \neq g_z$  and  $y \neq g_z$ . Hence,  $x$  is and is not identical to  $g_z$  and  $x$  is thus an inconsistent object. (And similarly for  $y$ .) But this still leaves it open whether  $z$  is an inconsistent object. Note that the gluon of  $z$  both is and is not a part of  $z$ . Hence,  $z$  both has and does not have  $g_z$  as a part, and  $z$  is thus also inconsistent. Now, by generalising the argument we get that every object is inconsistent.

We think this result comes as a surprise to many. Priest seems to think that some objects are consistent. For example, he writes that the transitivity of identity holds for consistent objects [Priest, 2014b, p. 20] and he writes that the non-identity of gluons "should hardly be the case for everything" [Priest, 2014b, p. 24]. We do not, however, see an obvious way to block this argument. The only way, it seems, to resist the argument is to object that mereological relations and (non-)identity relations do not express legitimate properties – for whatever reason. Indeed, Priest seems to suggest this at some places [Priest, 2014b, p. 24 fn. 15].

However, such properties are often invoked in *One*. For example, Priest explicitly notes that *being identical with something* is usually ruled out as a property in a Leibnizian definition of identity because of triviality but that he need not rule this out, he explains, because the biconditional is non-detachable in *LP* [Priest, 2014b, p. 20, fn. 4]. As another example, Priest characterizes 'being an object' as *being identical to something*:

What I take *being* to mean here is *being an object* – that is [...], being identical to something. Something is an object iff it has properties. For if it has properties, it is certainly an object; and if it is an object, it has properties – at least the property of being an object.

[Priest, 2014b, p. 49]

Similarly, his argument against the asymmetry of proper parthood uses the property of *having a gluon as a proper part* [Priest, 2014b, p. 89]. More generally, Priest is committed to a characterization principle according to which for any condition  $Px$  there is some object at some

(possible or impossible) world which satisfies  $Px$  [2014b, p. xxii–xxiii]. A very sparse notion of property would run counter to this. If mereological predicates fail to express properties, then it is unclear how Priest would characterize, for example, the object  $\mathbf{e}$ , since this object is defined as the object that has every thing as a part. For these reasons we will not try to resist the argument. Instead we want to see where the conclusion leads: what follows from the claim that every object is inconsistent?

#### 4. Everything and nothing are mutual parts

The fact that every object is inconsistent has far-reaching consequences for the part–whole structure of objects because, if Extensionality holds, it follows that **everything** is identical to **nothing**, i.e.,  $\mathbf{e} = \mathbf{n}$ . Remember,  $\mathbf{e}$  is defined as the fusion of every object, whereas  $\mathbf{n}$  is the fusion of the empty set. Given the definition of the empty set, an equivalent definition of  $\mathbf{n}$  is that it is a fusion of all non-objects [Priest, 2014a, p. 156]. Thus,  $\mathbf{n} = \bigoplus\{x : x \neq x\}$  and  $\mathbf{e} = \bigoplus\{x : x = x\}$ .<sup>8</sup> Now, from Section 3 we know that every object is inconsistent, which, as we know from Section 1, means that every object is both self-identical and not self-identical:  $\mathfrak{A}x(x = x \wedge x \neq x)$ . Thus, every object is a part of  $\mathbf{e}$  and every object is a part of  $\mathbf{n}$ , i.e.,  $\mathbf{e}$  and  $\mathbf{n}$  have the same parts. That is to say that every object that overlaps  $\mathbf{e}$  overlaps with  $\mathbf{n}$  and *vice versa*. So, by the definition of fusion and the fact that fusions are, for Priest [2014b, p. 90], unique,  $\mathbf{e} = \mathbf{n}$ .

Note, however, that it is also still the case that  $\mathbf{e} \neq \mathbf{n}$  since  $\mathbf{n}$  is simple whereas  $\mathbf{e}$  is not simple [Zolghadr, 2019];  $\mathbf{n}$  is simple because it does not have any object as a proper part, while  $\mathbf{e}$  is not simple because every other object is a proper part of it.

The obvious way out of this conclusion is to drop Extensionality — something Priest has to do anyway if he wants a non-well-founded mereology [Cotnoir, 2018] as explained in Section 2. If we replace Extensionality with Strong Supplementation we do not get that  $\mathbf{e} = \mathbf{n}$ , but we do get that  $\mathbf{e}$  and  $\mathbf{n}$  are parts of each other, i.e.,  $\mathbf{e} \leq \mathbf{n}$  and  $\mathbf{n} \leq \mathbf{e}$ . In that case it follows that  $\mathbf{e} < \mathbf{n}$  and  $\mathbf{n} < \mathbf{e}$  (by the definition of improper

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<sup>8</sup> Since we are officially using plural logic instead of set theory as our background logic for mereology, these definitions are inadequate for us. We should define  $\mathbf{n}$  as  $\bigoplus yy \mathfrak{A}y (y < yy \leftrightarrow y \neq y)$ , and similarly for  $\mathbf{e}$ . But for readability we follow Priest’s definition.

parthood and that  $\mathbf{e} \neq \mathbf{n}$  and not also  $\mathbf{e} = \mathbf{n}$ ). Maybe this is a more palatable consequence.

Dropping Extensionality comes at a price though. It means that for any collection  $yy$  there may be more than one fusion of it. A non-extensional mereology does not provide any guidance on the number of fusions that can be formed from a single set of objects. So, in principle, there are infinitely many numerically distinct fusions of the same collection  $yy$ . In particular, there may be infinitely many distinct fusions that are all fusions of the set  $\{x : x = x\}$  and infinitely many distinct fusions that are all fusions of the set  $\{x : x \neq x\}$ , and all these fusions would be parts of each other (by Strong Supplementation and the fact that every object is inconsistent).

As a toy example to illustrate the problem of dropping Extensionality, consider a fusion of the set  $\{x : x = \mathbf{e} \vee x = \mathbf{n}\}$ , i.e., a fusion of  $\mathbf{e}$  and  $\mathbf{n}$ . Is this object identical with  $\mathbf{e}$ , with  $\mathbf{n}$ , with both, or with neither? The mereology no longer tells us because Extensionality does not hold. Neither can we simply apply Priest's Leibnizian definition of identity because even if we would know the properties of  $\mathbf{e}$  and  $\mathbf{n}$ , we would not yet know which of these properties are (not) had by  $\bigoplus\{x : x = \mathbf{e} \vee x = \mathbf{n}\}$ .

Notice also that if  $\mathbf{e}$  and  $\mathbf{n}$  are mutual parts then the gluon of  $\mathbf{e}$  is identical with the gluon of  $\mathbf{n}$ . To see this, note that  $\mathbf{n}$  is part of  $\mathbf{e}$  and hence  $g_{\mathbf{e}} = \mathbf{n}$ . Since  $g_{\mathbf{n}}$  is part of  $\mathbf{n}$  and  $\mathbf{n}$  is part of  $\mathbf{e}$ , by the transitivity of parthood,  $g_{\mathbf{n}}$  is part of  $\mathbf{e}$ . And since  $g_{\mathbf{e}}$  is identical with all of  $\mathbf{e}$ 's parts:  $g_{\mathbf{e}} = g_{\mathbf{n}}$ . Hence, since the gluon of an object is its being [Priest, 2014b, p. 51], the being of **everything** is the same as the being of **nothing**. Moreover, the gluon of **nothing** is also identical with **everything**. The reason is that  $\mathbf{e}$  is a proper part of  $\mathbf{n}$  and since  $g_{\mathbf{n}}$  is identical to each proper part of  $\mathbf{n}$ ,  $g_{\mathbf{n}} = \mathbf{e}$ . (Similar reasoning shows that the gluon of **everything** is identical with **nothing**.) Finally, we also have  $g_{\mathbf{e}} = \mathbf{e}$ , because  $\mathbf{e}$  is a proper part of  $\mathbf{e}$  by the transitivity of proper parthood.

Furthermore, it seems that both  $g_{\mathbf{e}}$  and  $g_{\mathbf{n}}$  are prime. Priest explains the primeness of  $g_{\mathbf{e}}$  on [2014b, p. 55]. The primeness of  $g_{\mathbf{n}}$  follows from the definition of being prime: a gluon of  $x$  is prime if it has all the properties that each of the parts of  $x$  has. Since  $\mathbf{n}$  does not have any parts, its gluon (vacuously) has all the properties of all the parts of  $\mathbf{n}$ .

The appendix contains figures and tables showing in what way proper parthood and identity behave given that every object is inconsistent and how this is different from what Priest seems to suggest in *One*.

## 5. Conclusion

We have shown that there are two ways to make Casati and Fujikawa argument for the inconsistency of every object precise. This means that Priest's gluon theory is committed to the claim that every object both is and is not an object. The main consequence of this is, as we have shown, that either **everything** is identical with **nothing** or that **everything** and **nothing** are parts of each other. The first disjunct holds if Priest goes for an extensional mereology, whereas the second disjunct holds if he drops Extensionality and instead accepts Strong Supplementation. We think that Priest would prefer the latter, especially because — as Cotnoir [2018] argued — this is the best way to have a non-well-founded mereology. We ended with a short discussion about the drawbacks of leaving behind the plains of extensionality. The only alternative to avoid the conclusion that every object is inconsistent (and the consequences of this claim), seems to be by going for a very sparse notion of property. However, this runs counter to the account of intentionality that Priest favours, which includes a characterization principle that provides an object (in a possible or impossible world) that has the properties that are used to describe it. Regardless of Priest's preferred mereology, we suspect that even those Meinongians who are sympathetic to dialetheism may find it hard to accept that every object is inconsistent or that **everything** and **nothing** are mutual parts (or even identical).

## Appendix: Figures and Tables

In this appendix we present two figures and two tables. The figures represent the proper parthood relation and the tables represent the identity relation. Both figures presents proper parthood relations. Figure 1 shows how (we think that) Priest takes the proper parthood relation to behave. Square nodes represent consistent objects and round nodes represent inconsistent objects. Arrows represent proper parthood relations and an arrow is dashed if the objects stand both in the extension and anti-extension of the proper parthood relation. Figure 2 represent the situation resulting from the fact that every object is inconsistent and assuming that Extensionality fails but Strong Supplementation holds.

Table 1 shows how Priest takes the identity relation to behave in the case corresponding to the first figure. '+' signals that the objects are

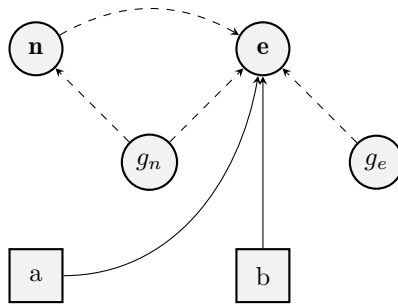
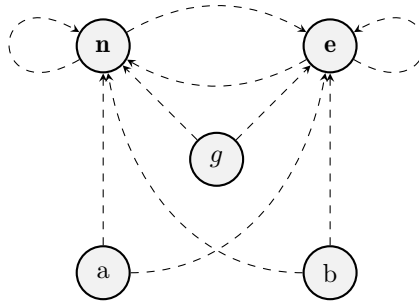


Figure 1. Priest's preferred model for proper parthood

Figure 2. Priest's actual model for proper parthood, where  $e$  and  $n$  have the same gluon,  $g$ 

identical, ‘ $-$ ’ signals that they are not identical, and ‘ $\pm$ ’ signals that they are and are not identical. ‘ $*$ ’ signals that although we know that the objects are in the anti-extension of the identity relation, it is unclear whether the objects also stand in the extension.<sup>9</sup>

Table 2 shows how the identity relation behaves in the case represented by the second figure.

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<sup>9</sup> They are solely in the anti-extension iff a gluon of  $x$  is identical with all and only the *proper* parts of  $x$ . But officially Priest is neutral on the question whether a gluon is identical with the whole of which it is a gluon [Priest, 2014b, p. 20, fn. 7].

=	e	n	a	b	$g_e$	$g_n$
e	$\pm$	-	-	-	-*	-
n	-	$\pm$	-	-	-	$\pm$
a	-	-	+	-	$\pm$	-
b	-	-	-	+	$\pm$	-
$g_e$	-*	-	$\pm$	$\pm$	$\pm$	-
$g_n$	-	$\pm$	-	-	-	$\pm$

Table 1. Priest's preferred model for identity

=	e	n	a	b	$g_e$	$g_n$
e	$\pm$	-	-	-	$\pm$	$\pm$
n	-	$\pm$	-	-	$\pm$	$\pm$
a	-	-	$\pm$	-	$\pm$	$\pm$
b	-	-	-	$\pm$	$\pm$	$\pm$
$g_e$	$\pm$	$\pm$	$\pm$	$\pm$	$\pm$	$\pm$
$g_n$	$\pm$	$\pm$	$\pm$	$\pm$	$\pm$	$\pm$

Table 2. Priest's actual model for identity

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