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Empty Negations and Existential Import in Aristotle

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Abstract: Aristotle draws what are, by our lights, two unusual relationships between predication and existence. First, true universal affirmations carry existential import. If ‘All humans are mortal’ is true, for example, then at least one human exists. And secondly, although affirmations with empty terms in subject position are all false, empty negations are all true: if ‘Socrates’ lacks a referent, then both ‘Socrates is well’ and ‘Socrates is ill’ are false but both ‘Socrates is not well’ and ‘Socrates is not ill’ are true. In this paper, I conjecture that for Aristotle predications have mereological truth conditions: for example, ‘Socrates is pale’ is true just in case Socrates is a part of the mereological sum of pale things. The existential import of universal affirmations and the semantic profile of empty negations follow from this mereological semantics.

Keywords: Aristotle, existential import, negation

Aristotle draws what are, by our lights, two unusual relationships between predication and existence. First, true universal affirmations carry existential import. If ‘All humans are mortal’ is true, for example, then at least one human exists. And secondly, although affirmations with empty terms in subject position are all false, empty negations are all true: if ‘Socrates’ lacks a referent, then both ‘Socrates is well’ and ‘Socrates is ill’ are false but both ‘Socrates is not well’ and ‘Socrates is not ill’ are true. In this paper, I will examine Aristotle’s general semantic views so to motivate these surprising relationships between predication and existence. In Corkum (2015) I argue that predications have mereological truth conditions for Aristotle: for example, ‘Socrates is pale’ is true just in case Socrates is a part of the mereological sum of pale things. The existential import of universal affirmations and the semantic profile of predications with empty terms follow from this mereological semantics. And so this paper offers additional support for the mereological interpretation.

A brief outline of the paper may be helpful to the reader. I will begin by discussing the interpretations which have been proposed so to explain these

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relationships between predication and existence (§1). I will then examine the passages where Aristotle discusses empty negations and the existential import of universal affirmations. Here I will argue that none of the interpretations surveyed in the first section adequately explains both passages (§§2–3). I will then rehearse the reading that Aristotle believes that propositions express truths under mereological conditions (§4). Finally, I will argue that the existential import of universal affirmations and the semantic profile of predications provide support for this semantics (§5).

I

It is a commonplace today to note that expressions such as ‘to be’, *einai* and their cognates in English and Greek respectively are ambiguous among different meanings in various sentential contexts. These contexts include predications such as ‘Socrates is pale’ and existential claims such as ‘There is a Santa Claus’, as well as identity claims such as ‘Superman is Clark Kent’, veridical claims such as ‘That is so’ and generic claims such as ‘Man is mortal’. These different kinds of sentences are represented as having distinct logical forms, despite all having occurrences of ‘is’. Many ancient writers seem not to distinguish among these distinct meanings but freely move from one use to another. Rather than charging these authors with a fallacy of equivocation, recent scholars have sought to characterize a single uniform sense of *einai* which would license these inferences.

Some assimilate the existential use to the predicative sense. For example, Hintikka (1986) holds that apparent existential claims are uses, but not senses, of *einai* distinct from predication. And, in his later work, Kahn (2009) emphasizes the primacy of the predicative sense. In ordinary contexts of predication, the speaker purports to assert a truth about an existing object. So the predicative sense of *einai* implicitly connotes existential and veridical claims, and these connotations can be made explicit through certain grammatical transformations. As such, Kahn holds that, although the Greeks can express existential claims, they lack a notion of existence as entirely distinct from predication.¹ In another influential article, Owen (1965) holds that to be, for the Greeks, is to be something definite. One might conclude that existential claims are, in logical form, predications with the predicate left unspecified. Kahn (2009, 113) also canvasses the similar suggestion that ‘X is’ is short for ‘X is Y’ for some substituent for ‘Y’. On this view, existential claims are abbreviated or elliptical predications.

¹ For Kahn’s early view, see Kahn (2009, Ch. 1); for his mature view, Kahn (2009, Ch. 5). See Kahn (2009, 126) for the variety of existential claims among Ancient Greek authors.

Where these authors assimilate the existential use to the predicative sense, others assimilate the predicative use to an existential sense. For example, Kahn (2009, 113) canvasses such a proposal: “positing the subject as something to talk about is an essential element of subject-predicate assertions, so that some claim of existence for the subject is implicit in all affirmative subject-predicate sentences.” In an innovative concrete proposal along these lines, Bäck (1990) holds that predications in Aristotle are adverbially modified existential claims. On this view, a predication is true just in case the existence of the subject is appropriately qualified. For example, ‘Socrates is pale’ is true just in case Socrates exists palely. I will discuss Bäck’s proposal in more detail below. A feature which is common to both of these interpretative strategies is that *einai* is taken to have a unitary sense. And so inferences from what are by our lights predicative senses to what are by our lights existential claims are not fallacious.

These two strategies do not exhaust the options. Some, such as Kirk, Raven, and Schofield (1984), ascribe a sense to *einai* in ancient authors which is simultaneously existential and predicative without specifying this sense further. Others aim to explain existential and predicative uses by appeal to a third sense. For example, in his early pioneering work, Kahn emphasizes the primacy of a veridical sense of *einai* as ‘to be true’ or ‘to be the case’. However, I will largely restrict my attention to the representative interpretative proposals canvassed above. I will argue that none of these interpretations provide a satisfying explanation of both the existential import of universal affirmations and the semantics of empty negations.

II

I will first discuss the existential import of universal affirmations, and I will begin by showing that Aristotle holds that a true universal affirmation entails a true particular affirmation.

The four categorical propositions – *B belongs to all A*, *B belongs to no A*, *B belongs to some A* and *B belongs to not every A*, which I will represent by ‘AaB’, ‘AeB’, ‘AiB’ and ‘AoB’ respectively – bear several semantic interrelationships. Two propositions are *contradictories* just in case they can neither both be true nor both be false. Two propositions are *contraries* just in case they cannot both be true (although they both can be false). Two propositions are *subcontraries* just in case they cannot just in case they cannot both be false (although they both can be true). And one proposition is the *subaltern* of another proposition, its *superaltern*, just in case the subaltern is entailed by the superaltern: that is, the

subaltern must be true, if the superaltern is true; and the superaltern must be false, if the subaltern is false. Universal propositions, AaB and AeB , are contraries. Particular propositions, AiB and AoB , are subcontraries. Any affirmative particular proposition is a subaltern to some affirmative universal proposition, and any negative particular proposition is a subaltern to some negative universal proposition. These interrelations among the categorical propositions are traditionally represented diagrammatically in a square.

In Figure 1 the diagonal lines link contradictories, the vertical lines link the upper superaltern to the lower subaltern, the upper horizontal line links contraries and the lower horizontal line links subcontraries. I will call this the Traditional Square.

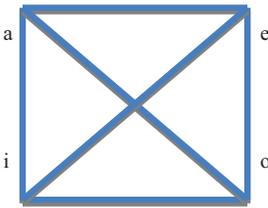


Figure 1: Traditional Square.

Aristotle does not explicitly state the Traditional Square in its entirety. But he says enough to entail the entire Traditional Square. He explicitly defines contradictoriness and contrariety at 17^b16–20 and 17^b20–26, respectively. Although Aristotle notes at 17^b24–6 that particular affirmations and negations can be both true, he does not say they cannot both be false. However, this is easily derivable from $a-e$ contrariety and $a-o/e-i$ contradictoriness: for example, suppose that AiB is false; then AeB is true, by $e-i$ contradictoriness, and AaB false, by $a-e$ contrariety, and so AoB is true, by $a-o$ contradictoriness; and similarly for the other case with the assumption that AoB is false.

Also, Aristotle does not explicitly state $a-i/e-o$ subalternation, although Top. 2.1, 109^a1–6 suggests that AaB entails AiB . However, this is easily derivable. Suppose that AeB is true; then AaB is false by $a-e$ contrariety; and AoB is true by $a-o$ contradictoriness; similarly for the $a-i$ case.² So Aristotle is committed to the Traditional Square.

² Notice that, under $a-o/e-i$ contradictoriness, $a-e$ contrariety, $i-o$ subcontrariety and $a-i/e-o$ subalternation are equivalent and inter-derivable: to give just one example, if we assume $a-o/e-i$ contradictoriness and $i-o$ subcontrariety, we can derive $a-e$ contrariety: for suppose that AaB is true, then AoB is false by $a-o$ contradictoriness, AiB is true by $i-o$ subcontrariety, and AeB is false by $e-i$ contradictoriness; similarly for the AeB case.

Aristotle's universal and particular quantifiers differ from the standard quantifiers of modern predicate logic, \forall and \exists . The customary logical forms of the categorical propositions, under this interpretation of quantifiers, might be given as follows

Every A is B: $\forall x (Ax \supset Bx)$

No A is B: $\forall x (Ax \supset \neg Bx)$

Some A is B: $\exists x (Ax \ \& \ Bx)$

Some A is not B: $\exists x (Ax \ \& \ \neg Bx)$

Notice that these propositions are strikingly different from the traditional categorical propositions. The modern particular propositions are existentially generalized conjunctions. The universal propositions are universally generalized material conditionals. So all propositions are general claims about the entire universe and not restricted claims about the things which satisfy the term in subject position. Moreover, since universal propositions are generalized conditionals which are material, they are true when the subject position is occupied with an empty term.

The interrelationships holding among these quantifiers can also be represented diagrammatically in a square.

In Figure 2 the diagonal lines link contradictories. Call this the Modern Square.³ A striking difference between the Traditional and Modern Square is

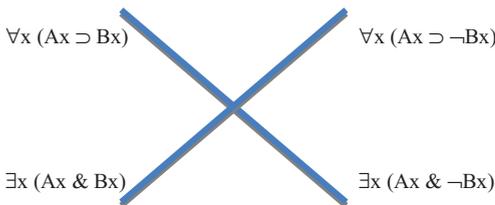


Figure 2: Modern Square.

³ Parsons (2008) views this square as impoverished, having too little structure to be useful. Peters and Westerståhl (2008) disagree, noting that there is a distinction between inner and outer negation, lending the Modern Square more structure. Outer negation is the negation of the entire proposition, and is the relationship of contradictoriness. For example, the outer negation of the universal affirmative proposition, $\neg \forall x (Ax \supset Bx)$, is equivalent to the particular negative proposition, $\exists x (Ax \ \& \ \neg Bx)$. Inner negation is the negation of an internal component of a proposition, and is a relationship distinct from contrariety or subcontrariety. For example, the inner negation of the universal affirmative proposition is $\forall x (Ax \supset \neg Bx)$, the universal negative proposition.

the lack of alternation in the latter. As we have seen, Aristotle holds that a true universal affirmation entails a true particular affirmation: for example, the truth of ‘B belongs to every A’ entails that ‘B belongs to some A’ is also true.⁴ By contemporary lights, this is a surprising thesis. For it is uncontroversial that true particular affirmations carry existential import: that is to say, that the truth of ‘B belongs to some A’ entails that there is an A. And yet it is also widely held that true universal affirmations do not carry existential import: that is to say, ‘B belongs to all A’ may be true even when there is no A. Universal affirmations lack existential import since ‘All S are P’ is represented as $\forall x(Sx \supset Px)$ which of course is vacuously true if $\neg \exists x Sx$.⁵ So it seems that we cannot ascribe to Aristotle both of these plausible intuitions: namely, that true universal affirmations lack existential import and that true particular affirmations carry existential import.

The unitary semantic theories canvassed in the first section may provide plausible explanations for the shift between predicative and existential uses of *einai* in some ancient authors. However, in the case of Aristotle, and his commitment to the existential import of universal affirmations, many of these unitary theories provide implausible explanations. For example, consider views that assimilate existential claims to predications. The view inspired by Owen, that existential claims are unspecified or elliptical predications, fails to adequately explain existential import. For the modern intuition is that a universal affirmation may be true even if the subject term is empty. Simply holding that existential claims are unspecified predications does no work in motivating an alternative intuition. The later Kahn view, that in making a predication one normally purports to assert a truth about an existing object, also fails to adequately explain existential import. Universal affirmations with empty subject terms do not strike the contemporary logician as abnormal.

Views that assimilate predications to existential claims are more successful in motivating the existential import of universal affirmations. For example, the view canvassed by Kahn, that affirmations presuppose a subject as something to talk about, does well to explain why true affirmations entail that there is an

⁴ Aristotle is sometimes charged with a similar alleged fallacy of existential import in connection with the square of opposition. As Parsons (2008) has shown, Aristotle is not vulnerable to this charge, for he holds that particular negations have the form, ‘A belongs to not every B’, which lacks existential import, and not the form, ‘A does not belong to some B’, which arguably does have existential import.

⁵ One might question whether \forall is a correct representation of natural language universal quantifiers. But logic and science requires that we can express generalizations which lack instances. So \forall , with its lack of existential import of universal affirmations, is well suited for representing a universal quantifier within at least a fragment of a natural language.

existing subject. However, these views are less successful in explaining empty negations, which I will discuss in the next section.

III

I turn to the second of Aristotle's views on the relation between predication and existence which I will discuss in this paper. At *Categories* 10 (13^b14–33) Aristotle contrasts the truth conditions for sentences with empty terms in subject position and contrary predicates with the truth conditions for sentences with empty terms in subject position and negative quality.

T1 'Socrates is ill' is the contrary of 'Socrates is well', but not even of such composite expressions is it true to say that one of the pair must always be true and the other false. For if Socrates exists, one will be true and the other false, but if he does not exist, both will be false; for neither 'Socrates is ill' nor 'Socrates is well' is true, if Socrates does not exist at all.... But in the case of affirmation and negation, whether the subject exists or not, one is always false and the other true. For manifestly, if Socrates exists, one of the two propositions 'Socrates is ill', 'Socrates is not ill', is true, and the other false. This is likewise the case if he does not exist; for if he does not exist, to say that he is ill is false, to say that he is not ill is true.⁶

τὸ γὰρ ὑγιαίνειν Σωκράτη τῷ νοσεῖν Σωκράτη ἐναντίον ἐστίν, – ἀλλ' οὐδ' ἐπὶ τούτων ἀναγκαῖον αἰεὶ θάτερον μὲν ἀληθές θάτερον δὲ ψεῦδος εἶναι· ὄντος μὲν γὰρ Σωκράτους ἔσται τὸ μὲν ἀληθές τὸ δὲ ψεῦδος, μὴ ὄντος δὲ ἀμφοτέρω ψευδῆ· οὔτε γὰρ τὸ νοσεῖν Σωκράτη οὔτε τὸ ὑγιαίνειν ἀληθές αὐτοῦ μὴ ὄντος ὅλως τοῦ Σωκράτους.... ἐπὶ δέ γε τῆς καταφάσεως καὶ τῆς ἀποφάσεως αἰεὶ, εἴαν τε ἢ εἴαν τε μὴ ἢ, τὸ μὲν ἕτερον ἔσται ψεῦδος τὸ δὲ ἕτερον ἀληθές· τὸ γὰρ νοσεῖν Σωκράτη καὶ τὸ μὴ νοσεῖν Σωκράτη, ὄντος τε αὐτοῦ φανερόν ὅτι τὸ ἕτερον αὐτῶν ἀληθές ἢ ψεῦδος, καὶ μὴ ὄντος ὁμοίως· τὸ μὲν γὰρ νοσεῖν μὴ ὄντος ψεῦδος, τὸ δὲ μὴ νοσεῖν ἀληθές·

Suppose that 'Socrates' is an empty term which fails to pick out an existing referent. Then 'Socrates is well' is false but 'Socrates is not ill' is true. The interpretative challenge is to explain why Aristotle holds that a true affirmation entails the existence of the subject where a true negation does not.

⁶ A note on the translations in the block quotations: **T1** is from the Edghill translation in Aristotle (1928); **T2**, **T3**, **T6** and **T7** are from Ackrill (1963); and **T4** and **T5** are mine own.

On many interpretations of predication in Aristotle, the rationale for distinguishing the semantic profiles between contrary predicates and negation is obscure. Consider, for example, views that assimilate predications to existential claims. Recall, Bäck (1990) proposes an adverbial analysis of predication in Aristotle: ‘S is P’ is true just in case S exists P-ly. This proposal seems to be a conjecture without direct textual support. Bäck does support through textual evidence the *conjunctive* claim that ‘S is P’ is true just in case S exists and S is P. For example, Bäck reads Aristotle’s characterization at 19^b19–22 of ‘is’ as being ‘additionally’ predicated to support the conjunctive claim. Of course, the conjunction is not an *analysis* of predication: predication is used in the truth condition. Indeed, the conjunctive claim merely *asserts* the existential import of ordinary predications in Aristotle; it does not explain it. Moreover, an adverbial claim is not generally equivalent to a conjunction: for example, even slaves can speak freely. So any evidence for the conjunctive claim is not in itself support for the adverbial claim.

Although Bäck’s proposal is intriguing, I am afraid that I find it to be implausible that predication is the qualification of an existential claim. My reasons for doubt are several. First, the fact that I am pale reflects a property I have, not a manner in which I exist. If I am pale, it is not my *existence* which is thereby modified. Secondly, the analysis is no more plausible for universal categorical propositions. On an adverbial analysis, ‘Man is mortal’ is true just in case the existence of the universal humanity is qualified by mortality. It is unclear to me what this would mean. Humanity is *subsumed* under the genus, mortality; neither humanity nor its existence is so *characterized*.

Finally, the situation is no more promising for empty negations. Just as Bäck assimilates affirmations to existence claims, he assimilates negations to denials of existence. Kahn (2009, 113) canvasses a similar suggestion, writing that “we may think of the negation as potentially nullifying any claim of existence for the subject.” So for example ‘Socrates is well’ entails the existential claim that Socrates exists, but ‘Socrates is not ill’ entails that Socrates fails to exist. Being well, on this view, is a qualification or adverbial modification of existence in the first case and being ill is a qualification of non-existence in the second. It is implausible that ‘Socrates is not ill’ expresses a way in which Socrates fails to exist.

None of the views we have considered provides a plausible explanation for both of our two semantic phenomena. Although these considerations do not refute a unitary theory of predication and existence claims, they do shift the burden of proof to those who would continue to hold the unitary view. And, although positing a unitary sense to *einai* avoids the ascription of fallacy, one need not claim that there is a unitary sense to avoid the ascription of fallacy. One might

instead argue, for example, that predications and existential claims are distinct senses of *einai*, but that predications legitimately entail existential claims. I will take this tack and explain how predication, according to the account offered in this paper, is distinct from, but entails, certain existential claims.

IV

To develop an explanation of our two semantic phenomena, I will offer an interpretation of Aristotle's semantics. Aristotle holds that propositions have mereological truth conditions. For example, truth conditions for affirmations can be given in terms of mereological inclusion: 'Socrates is mortal' is true just in case Socrates is a part of the sum of mortal things. As I will explain below, similar truth conditions can be given for the categorical propositions.

The reader may find ascribing truth conditions to categorical propositions an anachronism. Later in this section I claim that the relevant mereological notion which Aristotle associates with predications exhibits weak supplementation, a feature of formal mereologies. And again, the reader might view the use of modern mereological theories as an historically inaccurate imposition. So let me begin by addressing this objection. I do not claim that Aristotle is engaged in a contemporary project of providing a truth theory in terms of truth conditions. But Aristotle discusses the conditions under which categorical sentences express true thoughts. We can articulate these conditions without ascribing to Aristotle the intention of developing a truth theory. Indeed, specifying certain conditions under which categorical propositions are true is a weak and non-committal claim. For example, I do not claim that 'All humans are mortal' *means* that the sum of humans is a part of the sum of mortal things. Nor am I claiming here that universals are themselves mereological sums of individuals. Similarly, I do not claim that Aristotle is interested in mereology as a formal system. However, Aristotle makes use of a part-whole relation in discussing categorical propositions and we can ask if there is any textual evidence that this relation is extensional, a partial ordering, weakly supplementary and so on.

A mereological reading of categorical propositions is suggested in Tweedale (1987), developed by Mignucci (1996) and discussed at length in Corkum (2015).⁷ It would suffice for my present purposes to take this reading as a conjecture.

⁷ Malink (2009, 2013) offers an interpretation of categorical propositions drawn in terms of a preorder, a relation weaker than the part-whole relation. I discuss this interpretation in Corkum (2015).

The support offered in this paper for the claim is the ease with which the interpretation makes sense of Aristotle's views on the existential import of true universal affirmations and the semantics of empty negatives. I will make the case for these observations in the next section. But there is also good independent textual support for the reading. And it will be useful to sketch this evidence, since the sketch will also flesh out the proposed reading in just a little more detail. The rest of this section draws on the presentation of Corkum (2015).

Aristotle associates combinatorial notions with the truth and falsity of both sentences and the thoughts sentences express. For example, at *Categories* 2 (1^a16–19) Aristotle contrasts terms with predications by a combinatorial distinction:

T2 Of things that are said, some involve combination while others are said without combination. Examples of those involving combination are 'man runs', 'man wins' and of those without combination 'man', 'ox', 'runs', 'wins'.

Τῶν λεγομένων τὰ μὲν κατὰ συμπλοκὴν λέγεται, τὰ δὲ ἄνευ συμπλοκῆς. τὰ μὲν οὖν κατὰ συμπλοκὴν, οἷον ἄνθρωπος τρέχει, ἄνθρωπος νικᾷ· τὰ δὲ ἄνευ συμπλοκῆς, οἷον ἄνθρωπος, βούς, τρέχει, νικᾷ.

Thoughts are also complex. See, for example, *De Interpretatione* 1 (16^a9–16):

T3 Just as some thoughts in the soul are neither true nor false while some are necessarily one or the other, so also with spoken sounds. For falsity and truth have to do with combination and separation. Thus names and verbs by themselves – for instance 'man' or 'white' when nothing further is added – are like the thoughts that are without combination and separation; for so far they are neither true nor false.

ἔστι δέ, ὡς περ ἐν τῇ ψυχῇ ὅτε μὲν νόημα ἄνευ τοῦ ἀληθεύειν ἢ ψευδεσθαι ὅτε δὲ ἤδη ᾧ ἀνάγκη τούτων ὑπάρχειν θάτερον, οὕτω καὶ ἐν τῇ φωνῇ· περὶ γὰρ σύνθεσιν καὶ διαίρεσιν ἔστι τὸ ψεῦδος τε καὶ τὸ ἀληθές. τὰ μὲν οὖν ὀνόματα αὐτὰ καὶ τὰ ῥήματα ἔοικε τῷ ἄνευ συνθέσεως καὶ διαίρεσεως νοήματι, οἷον τὸ ἄνθρωπος ἢ λευκόν, ὅταν μὴ προστεθῇ τι· οὔτε γὰρ ψεῦδος οὔτε ἀληθές πω.

The reader might suspect that these are claims about the composition of a sentence or thought: sentences are partly composed of terms and thoughts of concepts. But Aristotle cannot mean by combination here merely the syntactic composition of a sentence or the composition of a thought. For the association of falsity with separation is unintelligible on this reading: false sentences are composed of terms no less than true sentences. Rather, I suggest that it is the constituents of the conditions, under which a thought is true, that bear relations

of combination and separation. These constituents are individuals and universals, and Aristotle associates individuals and universals with parts and wholes.

Aristotle's terminology for an universal (*katholou*: according to the whole) etymologically suggests a connection to mereological notions. His terminology for individuals in terms of indivisibility – for example, he characterizes individuals as indivisible (*ta atoma*) at 1^b6 and an individual as indivisible (*atomon*) at 3^b12 – might also suggest such a connection. And Aristotle provides the following explicit semantic profile for universal categorical propositions in the *Prior Analytics* 1.1 (24^b26–28):

T4 'One thing is wholly in another' is the same (*tauton*) as 'one thing is predicated universally of another'.

τὸ δὲ ἐν ὅλῳ εἶναι ἕτερον ἐτέρῳ καὶ τὸ κατὰ παντὸς κατηγορεῖσθαι θατέρου θάτερον ταῦτόν ἐστιν.

I take *tauton* here to indicate equivalence of the expressions (as opposed, say, to synonymy). Under this reading, the conditions under which a universal affirmation such as 'All humans are mortal' expresses a true thought are given by a relation of mereological inclusion. Although Aristotle only explicitly provides a semantics for universal affirmations in **T4**, the extension to universal negations, particular affirmations and particular negations ought to be clear: these express true thoughts when relations obtain of mereological exclusion, overlap and non-overlap, respectively.

It would be natural to unpack this suggestion as follows. 'A is B' or 'B belongs to A' is true just in case A is a part of B. 'A is not B' or 'B does not belong to A' is true just in case A is not a part of B. 'B belongs to every A' is true just in case every part of A is a part of B. 'B belongs to no A' is true just in case no part of A is a part of B. 'B belongs to some A' is true just in case some part of A is a part of B. And 'B belongs to not every A' is true just in case not every part of A is a part of B. Notice that the relationships of the Traditional Square obtain under this interpretation. For example, it can neither both be true nor both false that every part and no part of A is a part of B.

I will address an objection. One might worry that this reading is uninformative. For example, one might well object that providing truth conditions for negations by means of disjointedness fails to provide an analysis of negation. For I hold that 'A is not B' expresses a true thought just in case A and B are disjoint, and this is just to say that it is not the case that A is contained in B. To articulate the condition, under which a negation expresses a true thought, we employ a negation. Similarly, the truth conditions of universal affirmations employ universal quantification over parts. However, although there is evidence

that Aristotle aims to provide an informative semantics for categorical propositions, it is not obvious that Aristotle aims to provide an analysis of quality. If Aristotle's intention is merely to shed light on predication by appeal to certain mereological relationships – and as we will see, the mereology does work for us downstream – then the objection lapses.

Nonetheless, it may strike the reader as an unusual interpretation. The difficulty of interpretation here is partly that Aristotle is employing mereological notions which are foreign to us. Among various senses of 'whole', Aristotle distinguishes at *Metaphysics* 5.26 (1023^b26–33) between what became known as quantitative wholes and integral wholes.⁸

T5 We call a whole ... that which so contains the things it contains that they form a certain unity; and this in two senses – either as each part being one, or as a unity made up out of the parts. For what is universal and what is said wholly, since it is a certain whole, is universal in the sense that it contains many things by being predicated of each and by being all those and each of them one, as for instance man, horse, god are one because they are all living things. But the continuous and limited is also a whole, whenever there is a certain unity from the many.

ὅλον λέγεται ... καὶ τὸ περιέχον τὰ περιεχόμενα ὥστε ἓν τι εἶναι ἐκεῖνα: τοῦτο δὲ διχῶς: ἢ γὰρ ὡς ἕκαστον ἓν ἢ ὡς ἐκ τούτων τὸ ἓν. τὸ μὲν γὰρ καθόλου, καὶ τὸ ὅλως λεγόμενον ὡς ὅλον τι ὄν, οὕτως ἐστὶ καθόλου ὡς πολλὰ περιέχον τῷ κατηγορεῖσθαι καθ' ἑκάστου καὶ ἓν ἅπαντα εἶναι ὡς ἕκαστον, οἷον ἄνθρωπον ἵππον θεόν, διότι ἅπαντα ζῶα: τὸ δὲ συνεχὲς καὶ πεπερασμένον, ὅταν ἓν τι ἐκ πλειόνων ἢ.

Aristotle draws the contrast between quantitative and integral wholes by appealing to two distinct kinds of constitution relations. A quantitative whole is homoiomerous: the sum of animals, for example, is composed of parts each of which is itself an animal. An integral whole, by contrast, is heteromerous. A house, for example, is not a quantitative whole: its parts – the roof or the door, say – are not themselves houses; and not all of what can be said of a house – that its final cause is to provide shelter, say – can be said of the parts of a house.

If this is the relevant sense of division, then the claim that individuals are indivisible is the claim that individuals cannot be divided into distinct entities which are homoiomerous parts of that individual, and so that of which the individual is said. Genera, by contrast, are said of species and species are said of

⁸ For discussion of this distinction, see for example Arlig (2015).

individuals. So Aristotle holds that a genus can be correlated to a collection of the various species falling under that genus. A species likewise can be split into subspecies and so on. But individuals provide the limit case, as items which cannot be further divided into parts of the same kind. Aristotle is not as explicit on the mereological relation holding between universals and individuals as we might hope: in his example in **T5** he only claims that a genus is associated with a whole of which species are parts; in the passages 1^b6 and 3^b12, mentioned above, he only claims that individuals are indivisible, not that they are themselves parts of species. However, I conjecture that all universals correlate to sums of which individuals are parts.

The association of universals with quantitative wholes in **T5** suggests (although of course it does not irrefutably establish) that the relevant sense of ‘wholly’ in **T4** is quantitative and so the conditions under which a universal predication expresses a true thought are given by quantitative mereological inclusion. And, by extension, the conditions under which any categorical predication expresses a true thought are given by quantitative mereological relations. I do not expect that these comments will entirely dispel for the reader the foreignness of Aristotle’s mereological views. I cannot discuss in detail the relevant metaphysics. However, it suffices for my present purposes to bring out that Aristotle appeals to a notion that he *characterizes* as mereological, so to formulate the conditions under which ordinary predications express true thoughts.

The reader might find talk of parts and wholes in this context metaphorical. For example, one might think that Aristotle is groping towards a semantics drawn in set-theoretic terms. On this line of interpretation, ‘All humans are mortal’ is true just in case the extension of *human* is a subset of the extension of *mortal*. But, since Aristotle lacks the relevant set-theoretic terminology, he must use this misleading talk of parts and wholes. In a similar objection, Ackrill (1963, 76) and Kirwan (1993, 174) charge Aristotle with conflating the relation between an individual and its species with the relation between a species and its genus, for the former is set membership and the latter, set inclusion. This deflationary reading of Aristotle’s talk of parts and wholes is unattractive. As a general hermeneutic guideline, there is surely a *prima facie* or default interpretative position to take Aristotle’s terminology seriously, unless such an interpretation is impossible or inconsistent with Aristotle’s other commitments.

Furthermore, there is good evidence that Aristotle’s talk of parts and wholes references genuinely mereological notions. A commonly held intuition is that for a relation to be a genuinely part-whole relation, that relation must exhibit *weak supplementation*: whenever an object has a proper part, it has more than one proper part. That is to say, there is always a mereological difference between a

whole and a proper part. Aristotle claims that a universal term is predicated of many subjects at *De Interpretatione* 7 (17^a39–^b1):

T6 I call a universal that which is by its nature predicated of many things, and individual that which is not; man, for instance, is a universal, Callias an individual.

λέγω δὲ καθόλου μὲν ὃ ἐπὶ πλειόνων πέφυκε κατηγορεῖσθαι, καθ' ἕκαστον δὲ ὃ μὴ, οἷον ἄνθρωπος μὲν τῶν καθόλου Καλλίας δὲ τῶν καθ' ἕκαστον.

Multiple predicability is part of what it is to be a universal predicate. Given, as we have seen, that Aristotle associates universals with wholes, and universal predication is equivalent to the obtaining of a mereological relationship, **T6** gives us reason to think that the relevant relationship exhibits weak supplementation. That a relation is weakly supplementary is of course not sufficient for that relation to be a part-whole relation. But the weak supplementation of the relation lends some support to my claim that the relation is genuinely mereological.

That the relevant relation is genuinely mereological, and Aristotle's talk of parts and wholes in this context is not merely an obtuse way of referencing set-theoretic notions, will do work for us in the next section. Compare mereologies with set theory. Where set theories typically have an empty set, a set which is a member of every set, mereologies typically lack a corresponding null individual, an object which is a part of everything.⁹ An empty set is a technical convenience. For example, it allows us to provide a referent for the intersection of otherwise disjoint sets. But it is a mere theoretical choice which allows for this convenience. Arguably nothing about the notion of membership rules out a set lacking members. By contrast, the absence of a null individual in mereologies is a point of some significance and not merely a technical observation. Where the notion of a set arguably allows for there to be memberless sets, there are by contrast no empty fusions. To be a whole is to be constituted by parts. A complex entity composed of nothing is arguably incoherent. This will prove significant for our discussion in the next section on the existential import of universal propositions.

Let us sum up. I have argued that the conditions under which categorical propositions express true thoughts are given by part-whole relationships. The discussion in this section has been limited in two ways. First, I have merely indicated some *prima facie* reasons for the mereological reading. More would need to be said to base the mereological interpretation *solely* on passages such

⁹ Some take the empty set to have an arbitrary referent: see, for example, Lewis (1991, 13).

as **T2**, **T4** and **T6**. So the reader may be so far unconvinced. No matter. For even were there no further independent evidence for the reading, Aristotle's views on the existential import of true universal affirmations and the semantics of empty negatives provides good evidence for the mereological reading, as I will argue in the next section. And second, the discussion of this section has ignored many aspects of Aristotle's mereological views. For my present purposes, it suffices to note that a mereology, unlike a set theory, typically lacks a null individual.

V

I will now return to our two semantic phenomena, the existential import of true universal affirmations and the semantics of empty negatives. I will begin with the former issue.

Recall, most commentators attempt to explain the existential import of true universal affirmations by ascribing a unitary sense for *einai* in both existential and predicative contexts. However, explaining existential import does not require such an approach. Were there a unitary sense of *einai* in Aristotle, this would suffice to deflect a charge of equivocation. But positing a unitary meaning for *einai* is unnecessary. All we need to show is that affirmations entail existential claims.

We have seen that there is an underlying intuition driving these unitary interpretations of Aristotle on predication. To affirm is both to posit a subject as something to talk about and to assert that is so-and-so. Some develop this intuition by assimilating predications to existential claims and others, by assimilating existential claims to predications. Surely, something akin to the intuition driving these interpretations is correct. However, an adequate interpretation is unlikely to be had by simply reducing one of predication and existence to the other. Rather, I have aimed to provide an underlying semantic theory that *motivates* the intuition. The core notion of predication is, for Aristotle, collection. To affirm is to gather the subject within a collection expressed by the predicate.

I noted in the previous section that Aristotle's appeal to talk of parts and wholes is not a mere stylistic variant for set theory. As we have seen, there are several differences between set theory and mereology. In particular, set theories typically employ an empty set; but mereologies do not require a corresponding null individual. I have argued that this is not merely a technical point. There are no empty fusions. This interpretation meets the first of our conditions of adequacy for any interpretation of predication in Aristotle. The mereological view of predication I ascribe to Aristotle explains why true affirmations would have

existential import. For example, ‘Mortality belongs to all humans’ is true just in case the quantitative sum of humans is included in the quantitative sum of mortals; and ‘Mortality belongs to some human’ is true just in case an individual human is a quantitative part of the mereological sum of mortals. The existential import of universal affirmations follows from this interpretation. Subalternation, the entailment from a universal affirmation to a particular affirmation, follows from the mereological principle that, if one sum is contained in a second, then the two overlap. And the intuition that particular affirmations are existential, that if ‘Mortality belongs to some human’ expresses a truth, then there is a human, follows from the absence of a null individual in a genuine mereology.

The semantics of empty negations also follow from the mereological interpretation. Recall that Aristotle holds that, if ‘Socrates’ is an empty term, then ‘Socrates is well’ and ‘Socrates is ill’ are both false but ‘Socrates is not well’ and ‘Socrates is not ill’ are both true. ‘Socrates is well’ expresses a truth just in case the mereological sum of well individuals contains the individual picked out by the name ‘Socrates’: since there is no such individual, this truth condition does not obtain, and ‘Socrates is well’ is false. On the other hand, ‘Socrates is not ill’ expresses a truth just in the mereological sum of ill individuals does not contain the individual picked out by the name ‘Socrates’. Since there is no such individual, this condition is satisfied vacuously. It is a not implausible assumption that relations such as that of mereological disjointedness is vacuously satisfied when one of the terms is empty. If this is correct, then this truth condition does indeed obtain when there is no existing Socrates, and so ‘Socrates is not ill’ is true.

Notice that the semantic profile of empty negations flows from a feature of the mereological interpretation which distinguishes it from certain non-mereological interpretations. Consider how we might articulate truth conditions in set-theoretic terms. The empty set is a member of any other set. And one might well view the empty set to stand in proxy for empty terms within truth conditions. If so, then the set-theoretic truth conditions must be handled somewhat differently. ‘Socrates is well’ expresses a truth just in case the set of well individuals contains as a member *other than the empty set* the item picked out by the name ‘Socrates’. If we do not exclude the empty set, ‘Socrates is well’ cannot fail to be true, regardless of whether ‘Socrates’ is an empty term – and indeed, regardless of Socrates’ state of health. And similarly, ‘Socrates is not ill’ expresses a truth just in the set of ill individuals does not contain as a member *other than the empty set* the item picked out by the name ‘Socrates’. Of course, one can simply add these provisos, so to gerrymander accurate truth conditions. But such provisos are *ad hoc* additions which are independent of the underlying notions of set membership. By contrast, the mereological truth conditions flow from the notions of mereological constitution.

I will address an objection. *De Interpretatione* 11 (21^a25–28) is often taken to be inconsistent with **T1**.

T7 For example, Homer is something (say, a poet). Does it follow that he is? No, for the ‘is’ is predicated accidentally of Homer; for it is because he is a poet, not in its own right, that the ‘is’ is predicated of Homer.

ὡσπερ Ὅμηρός ἐστί τι, οἷον ποιητής· ἄρ’ οὖν καὶ ἔστιν, ἢ οὐ; κατὰ συμβεβηκός γὰρ κατηγορεῖται τὸ ἔστιν τοῦ Ὅμηρου· ὅτι γὰρ ποιητής ἐστιν, ἀλλ’ οὐ καθ’ αὐτό, κατηγορεῖται κατὰ τοῦ Ὅμηρου τὸ ἔστιν.

The worry is that Aristotle seems to be claiming that ‘Homer is a poet’ is true, despite ‘Homer’ being presently a non-denoting term. For the charge of inconsistency between **T1** and **T7**, see for example Ackrill (1963, 110–11). Many commentators have attempted to allow that Aristotle holds that ‘Homer is a poet’ entails that ‘Homer is’ by denying that the passage concerns an existential claim at all. Some of these authors hold that Aristotle merely claims that the truth of ‘Homer is a poet’ fails to entail, for example, that Homer is a substance (Thompson 1953) or that Homer is a man (Dancy 1975). Jacobs (1979) takes an unorthodox reading under which the *to estin tou Homērou* clause in the passage is a genitive absolute referring not to Homer’s existence but his essence. On Jacobs’s reading, the passage is merely claiming that since Homer’s being a poet is not a part of his essence, ‘Homer is a poet’ is a contingent truth.

T7 is a controversial and difficult passage which I cannot discuss in detail here. However, it suffices for my present purposes to note that **T7** is not *obviously* inconsistent with **T1**. Here is a reading which I find attractive. Aristotle neither explicitly claims that ‘Homer is a poet’ is true nor denies that, were it the case that ‘Homer is a poet’ expresses a truth, that it would entail that Homer exists. But moreover, Aristotle’s concern is not with the existential import of true affirmations. The context of the passage is a discussion of when distinct predicates entail a single predication. For example, if a given man is both an animal and bipedal, then we may say that the man is a bipedal animal. However, if a man is both good and a cobbler, we cannot thereby say that he is a good cobbler. Aristotle’s observation is that ‘Homer is a poet’ is not composed of two predications, ‘Homer is a poet’ and ‘Homer is’. Aristotle’s point is that the copula *estin* is used here predicatively and not existentially: it is merely accidental that the same word is used for both purposes. This is consistent with the belief that true affirmations entail existential claims.¹⁰

¹⁰ For readings not dissimilar from this, see Wedin (1978) and Carson (2000).

I will bring the paper to a conclusion. I have canvassed the interpretation that for Aristotle the contribution a predicate makes to the conditions, under which any sentence expresses a true thought, is a mereological sum. This observation is sufficient to offer an account of predication as distinct from existential claims and which nonetheless can explain the existential import of universal affirmations and the semantic profile of predications with empty terms.

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