CAN SEMANTICS GUIDE ONTOLOGY?

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Abstract: Since the linguistic turn, many have taken semantics to guide ontology. Here, I argue that semantics can, at best, serve as a partial guide to ontological commitment. If semantics were to be our guide, semantic data and semantic treatments would need to be taken seriously. Through an examination of plurals and their treatments, I argue that there can be multiple equally semantically adequate treatments of a natural language theory. Further, such treatments can attribute different ontological commitments to a theory. Given this I argue that semantics can fail to deliver determinate ontological commitments and determinate answers to ontological questions more generally.

Key Words: Ontology, Ontological Commitments, Semantics, Indeterminacy, Plurals

Since the linguistic turn with the work of Frege and Russell, many philosophers have argued that semantics should guide ontology.[1] Even those who ultimately divorce ontology from semantics often hold that sentences carry ontological commitments in virtue of their semantics. For example, Fictionalists hold that certain claims about morality, modality or Sherlock Holmes are literally false as they carry ontological commitments to things that do not exist. Presentism has been objected to on the grounds that it cannot capture the truth of sentences like 'Socrates was born before Plato' given that such sentences carry commitments to the existence of non-present things. Semantics has been widely used to argue for views in ontology. Examining the extent to which semantics can operate prior to appeals to metaphysical and ontological considerations will allow us to better understand the strengths

[1] Many philosophers have expressed this view. It is expressed in Quine's view that 'to be is to be the value of a variable' [1948]. Davidson states that 'in making manifest the large features of our language, we make manifest the large features of reality. One way of pursuing metaphysics is therefore to study the general structure of our language' [1977: 244]. Lewis [1986] makes arguments that appeal to the semantics of modal claims to deliver answers to ontological questions. Eklund states 'It is not uncommon in contemporary metaphysics to do ontology via a semantic analysis of (what is believed to be) our best theory of the world and say that what we should be committed to is what the semantic analysis reveals the best theory to be committed to' [2007: 128]. Wilson recently called it a dogma of metaphysics that 'the best way to approach metametaphysical issues is by attention to semantics' [2013: 156]. Most of the articles in the recent the metametaphysics anthology [Chalmers, Manley and Wasserman 2009] involve discussions of using semantics as a way to address metaphysical and more particularly ontological questions. Putnam states that 'the "ontology" of a given natural language, ignoring the optional sublanguages that we sometimes add to it, is for the most part obligatory for speakers of that language' [2004: 49].

and weaknesses of methodologies that rely on semantics. Here I examine the extent to which taking semantic data and treatments seriously might serve to answer ontological questions.

Semantics might guide ontology in three ways. First, the semantics of a set of natural language sentences, what I'll call a 'theory', determines the ontological commitments it carries. Second, an agent incurs ontological commitments by accepting theories that carry ontological commitments. So, in a mediated way semantics determines an agent's ontological commitments. Finally, questions of what entities exist are settled by the semantics of the true total theory of the world.[2] I challenge the first and seemingly strongest step in this picture. I argue that looking to our best semantic treatments of natural language will not always deliver determinate answers to questions about the ontological commitments of theories. So, semantics can, at best, serve as a partial guide to ontological commitment and an even more partial guide to ontology in general.[3]

I argue for this conclusion by presenting a challenge based on a multiplicity of candidate semantic treatments. Multiplicities have been used in three sorts of arguments—*reductio ad absurdums*, arguments for relativization and arguments for indeterminism.[4] I argue that semantics will not always deliver determinate ontological commitments for natural language theories.

It is worth noting how my argument departs from other arguments for indeterminism before we set out. Here I am concerned with the possibility of a natural

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[2] Of course the truth of the theory will not be settled by semantics, but (likely) by how things really are in the world.

[3] One might argue that many interesting metaphysical questions cannot be answered by semantics. For example, Schaffer [2009] argues that semantics cannot answer questions of what grounds what. Here I argue for the stronger and more surprising conclusion that semantics fails even as a guide to the ontological commitments of theories, and so, as a guide to ontology.

[4] Unger [1980] and Benacerraf [1965] use multiplicities in *reductio* arguments to argue that there are no composite objects and that numbers cannot be identified with sets, respectively. Moral relativists rely on the multiplicity of cultures and traditions to argue that morality is relative. Quine [1960, 1968] uses a multiplicity of languages of translation to argue for the indeterminacy of translation. Lewis [1982] understood vagueness as linguistic indecision between multiple precise referents or properties.

language theory having indeterminate ontological commitments. In contrast arguments like the 'plus'/'quus' argument involve indeterminacy of meaning. The meaning of 'plus', the argument goes, could be indeterminate between the ordinary addition function and an "unnatural" function like that which returns 5 whenever one of the numbers added is greater than 57 (see Wittgenstein [1953]; Kripke [1982]). While the 'plus'/'quus' worry might deliver indeterminacy of meaning, it is not obvious that it delivers indeterminate ontological commitments. For example if one adopts the Quinean view of ontological commitment, the difference between functions will not elicit a difference in the ontological commitments of the theory. For, in both cases the same entities are referred to and quantified over (e.g. numbers). Here I argue for indeterminacy of ontological commitment. Given the prominence semantics has in metaontology, indeterminacy of ontological commitments is relevant to contemporary discussions and importantly different from (mere) indeterminacy of meaning.

There is a long tradition of arguments in philosophy of science about underdetermination of scientific theory by evidence (see, e.g., Duhem [1914]; van Fraassen [1980]). Such arguments might be used to argue that the ontological commitments of some evidence base are indeterminate. Many philosophers of science have argued, however, that the mere logical possibility of distinct theories fails to give reason for one to be agnostic about the truth of one's preferred theory. And so, would fail to give reason to hold that the ontological commitments of the evidence base are indeterminate. Instead, they have argued that specific theories with distinct explanations need to be constructed for one's credence in a particular theory to be threatened (see Kitcher [1993]; Achinstein [2002]). Here I use a case study involving specific semantic treatments, thereby meeting one potential response that

has been given to underdetermination arguments in philosophy of science. My argument diverges from underdetermination arguments in two other important ways.

First, it focuses on semantic theories and ontological commitments. Given the many appeals to semantics in discussions of ontology and metaontology, an indeterminacy argument explicitly formulated in these terms can directly engage with metametaphysical debates in ways arguments in philosophy of science do not. Second, my aim is to show that a theory, rather than an evidence base, can have indeterminate ontological commitments. To the extent that the arguments in the philosophy of science apply to ontological commitments they show that an evidence base has indeterminate (or perhaps relative) ontological commitments. They fail to show that theories themselves have indeterminate commitments.

My indeterminacy argument is most closely related to inscrutability arguments like those involving referents of a particular term (e.g. 'gavagai') and those involving massive indeterminacy of reference. I postpone discussing how my argument differs from these until the last section of the paper when the specifics of my argument have been made clear.

The paper is structured as follows. Section 1 gives arguments against classical views of the regimentation of natural language. Section 2 develops a methodology which takes semantics seriously in answering questions of the form 'Does theory T carry a commitment to Fs?'. The methodology is then applied to a case study involving plural expressions. In Section 3 I argue for a principle that delivers unrelativized, but possibly indeterminate ontological commitments of a theory. Finally, in Section 4 we return to other linguistic indeterminacy arguments. I argue that my argument departs from and improves upon them in important ways.

1. Against Descriptivism for Natural Language

There are two classical views on the regimentation of natural language—revisionary and descriptive. Revisionists including Frege, Tarski, Russell and Quine, take natural language to be corrupt, messy and defective. As Stanley [2000: 391] puts it, on the revisionary view 'appeals to logical form are appeals to a kind of linguistic representation which is intended to replace natural language.'

Here we are concerned with the extent to which the semantics of natural language can serve as a guide to determining the ontological commitments of theories. Proponents of the revisionary approach paraphrase away apparent commitments in language to accord with their metaphysical views. In so doing, they take metaphysical and ontological views to guide semantics, thereby rejecting our starting point. Given this, the revisionary approach will not serve us in our inquiry.

On the descriptive view the unique logical form of a sentence is taken to be really there "hidden beneath" its surface form. Proponents of the descriptive view, including Davidson, Harman and Stanley, take logical forms to be discovered through empirical enterprise. Since Davidson is the *locus classicus* of the view, I focus on his formulation if the view. In contrast to Revisionists, Descriptivists take formal regimented languages to be part of a theory of natural language, rather than, as Davidson [1977: 246] put it, 'an improvement on natural language.'

Davidson takes first-order logic to be the formal language that underlies natural language. He [1977: 251] argues that 'ontology is forced into the open only where the theory finds quantificational structure,' thereby endorsing what is often called Quine's Criterion of Ontological Commitment. It can be formulated as:

> Quine's Criterion of Ontological Commitment: A theory has Fs in its ontology if, and only if, it includes or entails a sentence that says that there are Fs.[5]

One way to understand when a theory formulated in first-order logic says or entails that there are Fs is to check whether Fs are the values of bound variables in sentences of or entailed by a theory.[6] To allow for the possibility of a semantic treatment attributing ontological commitments without first-order quantifiers or without appeal to any quantificational devices, here I use the version of Quine's Criterion given above.[7]

Davidson [1967] applies the methodology of translating sentences of natural language into first-order logic and using Quine's Criterion to discover the ontological commitments of action sentences. To illustrate his methodology consider 1 and 2.

1. Bert walked quickly.
2. Bert walked.

If sentence 1 is true, 2 must be as well. To account for inferential patterns like this, Davidson argues that the logical forms underlying action sentences include quantifiers ranging over events. He takes the logical forms of 1 and 2 to be 3 and 4, respectively (where the values for 'e' are restricted to events):

3. ∃e(walk(e, b) & quick(e))
4. ∃e(walk(e, b))

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[5] 'When I inquire into the ontological commitments of a given doctrine or body of theory, I am merely asking what, according to that theory, there is' Quine [1976: 203-4]. Quine's Criterion has spurred an enormous literature. For examples of authors sympathetic with the Criterion, see van Inwagen [1998], Burgess and Rosen [1997] and Burgess [2008]. For examples of some critics of Quine's Criterion see footnote 7 below.

[6] For example, Quine says 'We can very easily involve ourselves in ontological commitments by saying, for example, that there is something (bound variable) which red houses and sunsets have in common; or that there is something which is a prime number larger than a million. But this is, essentially, the only way we can involve ourselves in ontological commitments: by our use of bound variables' [1948: 31].

[7] In section 2 plural first-order quantification is considered. A semantic treatment might also include directly referential terms, but no quantifiers. Such a treatment could be understood to attribute a commitment through referential terms, but not through the use of bound variables. Further, many have argued against the view that uses of quantifiers bring ontological commitment. See for example Sellars [1960], Prior [1971], van Cleve [1994], and Rayo and Yablo [2001]. By formulating Quine's Criterion without direct appeal to quantifiers, this issue can be (at least momentarily) sidestepped.

Sentence 3 straightforwardly entails 4. Further both 3 and 4 entail 'there is an event', so both carry a commitment to events. If 3 and 4 are the logical forms underlying 1 and 2, 1 entails 2 and both carry a commitment to events. This will suffice for an explication of Davidson's version of the descriptivist view of logical form and his methodology for determining the ontological commitments of natural language theories.

I argue that Descriptivism fails in two ways. First, there can be distinct logical forms within a formal language that are equally good candidates for the most perspicuous logical form of a sentence. Second, there can be multiple formal languages that are equally viable languages of translation.

Let's begin by assuming, along with Davidson, that natural language sentences are to be translated into first-order logic. We saw that one way to translate 1 into first-order logic was as 3. Alternatively, following Quine [1948] one might eschew using a constant to represent Bert and instead appeal to the predicate 'Bertize.' Then 1 could represented as 5.

5. ∃e∃y(walking(e, y) & Bertize(y) & quick(e))

Both 3 and 5 are sentences of first-order logic. While there may be philosophical or semantic reasons to prefer 3 or 5, without further argument both are candidates for the most perspicuous logical form of 'Bert walked quickly.' Whenever there are multiple candidate translations, the Descriptivist must give an argument as to why one is the most thorough and perspicuous, even if they ultimately attribute the same ontological commitments. Further, if the Descriptivist is to follow our aim in seeking the extent to which semantics can guide ontology, the privileging of one form over another cannot rely on metaphysical views. Next I turn to the case of plurals in natural language to exemplify the possibility of there being multiple formal languages that are equally good candidates for the language of translation.

Semantic treatments of plural expressions have gone in two general directions. Singularist treatments take plural expressions to denote sums, sets or fusions (see, e.g., Link [1983, 1987, 1991]; Landman [1989]; Schwarzschild [1996]).[8] Pluralists treat plural expressions as referring to many individuals rather than to a single collection of individuals (see, e.g., Boolos [1984]; Oliver and Smiley [2001, 2005, 2013]; Yi [2005]; McKay [2006]). Take the following sentence:

6. The firefighters surrounded the property and prevented the fire from spreading.

According to a Singularist treatment 'the firefighters' picks out a sum or set; according to a Pluralist treatment it picks out many individuals. The logical forms assigned by the Singularist and the Pluralist are different. Further, given Quine's Criterion, the logical forms attribute different ontological commitments. The Singularist takes 6 to say or entail that there is a set or sum of firefighters; the Pluralist does not. If it can be shown that both treatments are equally semantically adequate, we will have reason to hold that the semantics of some sentences can be captured equally well by multiple treatments and that this can affect the ontological commitments delivered. In the next section, I sketch an argument for the semantic adequacy of Singularist and Pluralist treatments. Given this, we should reject Descriptivism and the view that the ontological commitments of natural language are determinate.

2. Adequacy and Ontological Revelation

To argue that there are equally semantically adequate treatments of natural language, the conditions for semantic adequacy must be determined. I propose that to be semantically adequate a treatment must:

[8] They are so-called as they treat plural expressions as denoting a single collective entity.

(i) Capture patterns in the semantic data,
(ii) Satisfy (i) without positing gratuitous primitives or mechanisms,
(iii) Be extendable to a larger set of data,
(iv) Be justifiable by the semantic data and patterns, not merely ontological or metaphysical views,
(v) Capture (i)-(iv) at least as well as any other candidate semantic treatment.

Further comments are required. To meet (i) a semantic treatment must be able to account for, for example, varieties of predication, anaphora and agreement patterns instanced in semantic data. Semantic data include, for example, instances of use, natural language inference judgments[9], truth-value judgments, and felicity judgments.[10] Criterion (ii) requires treating similar expressions, sentences and other data in similar ways. For example, to meet (ii) a semantic treatment should not posit a separate mechanism for anaphora between 'the boys' and 'they' and 'the girls' and 'they' in 7 and 8:

7. The boys are tall. They are also smart.
8. The girls are tall. They are also smart.

Third, a semantically adequate treatment must be extendable. It must be able to handle new expressions and novel sentences.[11] Further, to meet (iii) a treatment must be able to treat arbitrary grammatical strings.[12] Fourth, an adequate semantic treatment must be justifiable by semantic data and patterns, not merely ontological or metaphysical views. For example, if one has a preference for desert ontologies, one might propose a semantic treatment of 9 that fails to appeal to tables.

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[9] By 'natural language inference judgments' I mean inference judgments that do not rely on knowledge of semantic treatments. These inferences will be like that between 1 and 2 above. Judgments that 'There is an event' can be inferred from 'John buttered the toast' incorporate semantic theorizing, and are not to be counted among natural language inference judgments.

[10] What counts as semantic data depends on where one draws the line between semantics and pragmatics. Here I remain neutral on exactly where to draw the distinction and include a fairly broad range of data. One could, however, adopt the methodology argued for here in conjunction with one's favored view of semantic data.

[11] Here we can suppose that the lexicon and associated meaning postulates are available to the theory, so a theory could handle additional sentences merely through appeal to additional meaning postulates that are already available to it.

[12] We are interested in semantic treatments for natural language. Natural languages allow, at least in principle, for a denumerable infinity of sentences. So, adequate semantic treatments for natural language must be able to treat a denumerable infinity of sentences.

9. There is a table.

Given criterion (iv) such a treatment is semantically inadequate unless it is justifiable by semantic data or patterns. The study of language should be carried out as one carries out study in the sciences. Data and patterns in data are not just "paraphrased away" in physics or chemistry. Likewise, without semantic justification, semantic data and phenomena should not be paraphrased away. Criterion (iv) can be further justified by our aim to determine the extent to which semantics can guide ontology. If one takes ontological or metaphysical views as conditions on the adequacy of a semantic treatment, semantics is no longer our guide.

Next I sketch an argument that there are non-trivial[13] equally adequate semantic treatments using the treatments of plurals. While a comprehensive inquiry showing that there are multiple equally semantically adequate treatments is beyond the scope of this paper, the sketch gives defeasible evidence that there are such cases.

2.1 A Plural-Involving Case Study

Plural expressions can be predicated in two ways—distributively and collectively. For example take the following:

10. The astronauts are young.
11. The astronauts met in 1960.

The predication in 10 is distributive, that in 11 is collective. A distributive predicate applies to a plural expression just in case it applies to each of the things that make up the denotation of the plural expression. In 10, youngness truly applies to *the astronauts* if and only if it truly applies to each individual astronaut.[14] Collective predicates apply to plural expressions

[13] Trivially there will be equally adequate treatments due to the existence of notational variants of any treatment.

[14] Distributive predication might allow for exceptions. For example, sentence 10 might be judged to be true if 19 of 20 astronauts are young. If this is the case, distributive predication could be redefined accordingly.

without applying to each of the individuals denoted. The truth of 11 does not require that each astronaut met in 1960. Distributive and collective predication are two patterns that any adequate treatment of plurals must handle.

Both Singularist and Pluralist treatments can capture distributive and collective predication. Here I sketch how a Singularist lattice-theoretic treatment and a Pluralist plural quantificational treatment capture the semantics of conjunctive plural constructions predicated distributively and collectively.

Lattice-theoretic treatments of plurals employ domains of objects structured by the sum operator and the individual-part relation. The sum formation operation, symbolized as '+', takes two individuals and yields an individual sum or plural object. It can take singular individuals (i.e. atoms) or plural individuals (i.e. sums). For example, if there are three atomic individuals—Sam, Bob and Mary—the domain closed under sum formation will include seven objects.[15] The individual part (or i-part) relation, symbolized as '$\leq$', satisfies the following biconditional:

$$a \leq b \text{ iff } a + b = b.$$

So, Sam is an i-part of Sam+Bob+Mary if, and only if, Sam+Sam+Bob+Mary is identical to Sam+Bob+Mary. Proponents of the lattice-theoretic treatment of plurals follow set-theoretic practice in holding that the addition of an element that is already included in an object does not yield a new object. So, Sam is an i-part of Sam+Bob+Mary.

In the Singularist language predicates are differentiated according to whether they take both atoms and non-atomic sums or only non-atomic sums. The first accords with distributive predication, the second with collective predication. Take the following examples:

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[15] In addition to Sam, Bob and Mary, the domain includes Sam+Bob, Sam+Mary, Bob+Mary and Sam+Bob+Mary.

12. Sam, Bob, and Mary are tall.
13. Sam, Bob, and Mary gathered in the hall.[16]

In 12 the plural subject is predicated distributively. In 13 it is predicated collectively. The lattice-theoretic treatment of plurals differentiates between distributive and collective predicates by marking the former with a '*'. 'Sam, Bob, and Mary' is taken to denote a non-atomic sum represented as 's+b+m'. So 12 and 13 are formalized as 14 and 15.

14. *T(s+b+m)
15. G(s+b+m)

Since *T applies to atomic and non-atomic individuals, it applies to Sam and to Bob and to Mary as well as to the sums they compose. So, the entailment from 12 to 'Sam is tall' holds. G fails to apply to any atomic individuals, so the truth of 13 fails to entail that Sam gathered in the hall. The lattice-theoretic treatment of plurals is able to capture the predication phenomena associated with plural expressions. Next, I turn to how a Pluralist treatment captures distributive and collective predication of expressions like 'Sam, Bob, and Mary.'

A Pluralist treatment adds a plural existential and a plural universal quantifier to first-order logic. These can be symbolized as $\exists xx$ and $\forall xx$, respectively. The first is read as 'some things are such that,' the second as 'all things are such that.' They quantify over the same objects as ordinary singular first-order quantifiers. They are plural not because they quantify over additional plural objects, but because they can take multiple individuals as arguments. The Pluralist relies on the 'among'-relation. It allows one to say that some thing or things are among some things. For example, 'the *xx*s are among the *yy*s' is formalized as '*xx*A*yy*'.

[16] For simplicity, I ignore tense here.

Collective predication[17] is represented by a monadic predicate whose single argument place can be satisfied by multiple individuals. McKay, a proponent of the Pluralist treatment, adopts the following as a representation of 15:

16. $G[s, b, m]$.

Distributive predication is captured using the 'among'-relation and a quantifier. 14 is represented as 17.

17. $[\forall x\colon xA[s, b, m]]Tx$

This is read 'for any x, if x is among Sam, Bob, and Mary, x is tall.' The collective predication in 16 fails to entail that Bob gathered in the hall for it only requires that the individuals together (but not as a single entity!) satisfy the predicate. In contrast, the truth of 17 requires that each of Sam, Bob, and Mary is tall. Singularist and Pluralist treatments of plural expressions can capture distributive and collective predication of conjunctive plural expression. Next I turn to how each treatment meets the conditions on semantic adequacy.

2.2 Applying the Criteria for Semantic Adequacy

Given the limited nature of the case study, one may not be convinced that the treatments both meet the conditions for semantic adequacy. While it is beyond the scope of this (or any) paper to examine all data involving plurals in English, here I address three worries one might have regarding whether both treatments can handle the same range of data. First, one might argue that the Pluralist treatment can and the Singularist treatment cannot handle sentences like 'There are some sets that are all and only the non-self-membered sets.' As long as the Singularist appeals to sums, however, both Pluralist and Singularist treatments can adequately treat the sentence. The Singularist takes 'some sets' to denote a sum of sets; the Pluralist takes it to plurally pick out many sets. No paradox arises on either construal.

[17] McKay [2006] calls this "non-distributive" predication.

Further, since all sums have themselves as individual parts an analogous puzzle for the sentence 'There are some sums that are all and only the sums that are not individual parts of themselves' does not arise. That sentence is unproblematically false. For similar lines of response for the Singularist to avoid paradox, see Rayo [2002] and Nicolas [2007].

Second, it has been argued that Singularists cannot adequately give a semantic treatment of counting and, relatedly, for 'is one of' (see Schein [1993]; Oliver and Smiley [2001, 2013]; McKay [2006]; Yi [2005]. In particular it has been argued that the Singularist cannot correctly capture the semantics of sentences like 'the students/sums are two' and 'this is one of the students/sums'. Oliver and Smiley [2013] press the worry in the following way. According to the Singularist a sentence like 18 should be true whenever the number of atomic entities in the domain is greater than two:

18. The sums of individuals are more numerous than the individuals.

Given the way sum formation is defined by Link [1983] and others, however, the expressions 'the sums of individuals' and 'the individuals' pick out the same sum, namely the maximal element of the lattice. So, regardless of the size of the domain, it appears as if the sums of individuals and the individuals are equinumerous and 18 is often wrongly predicted to be false. There are two ways a Singularist might address the worry.

First, as Frege [1884] argued, something can be counted in different ways relative to different concepts. For example, something can be one deck, 52 cards and four suits. Given this, a sum might be counted as two if it is counted in terms of students and as one if it is counted as a sum. In counting it is most natural to use concepts that are salient to us. Since sums are not often salient, it may be unusual to count using sums. According to the Singularist this is not because sums are not things, but because ordinary notions of things involve cards, decks, etc. If one were to emphasize collections or groups, perhaps by

discussing ways one might put students into groups, counting sums of students would become salient. The semantics of counting must allow for sensitivity to sortals regardless of one's take on the referents of plural expressions. There is no special problem in that regard for the Singularist. See Nicolas [2007] for further discussion of this line of response.

Second, to avoid worries like that presented by Oliver and Smiley, [18] Singularists might follow Nicolas' [2014] proposal that relies on maintaining a distinction between the object language and the metalanguage. The metalanguage involves specialized language (e.g. 'atom', 'sum') that is not part of the object language. In order to capture the semantics of the metalanguage a meta-metalanguage must be used. The Singularist can argue that in giving a semantics for English she is not required to treat sentences that mix object and metalanguage expressions.[19] Next I turn to a third worry regarding whether both treatments meet (i) and (iii).

It has been argued that Singularists cannot account for the semantics of predicates like *overlap*. Suppose that there is a red triangle, a blue triangle, a red square, a blue square, a red circle, and a blue circle drawn on a whiteboard. The blue triangle, blue square, and blue circle overlap. The red shapes do not overlap. Given this the following sentences differ in truth-value:

19. The triangles, the squares, and the circles overlap.
20. The red shapes and the blue shapes overlap.[20]

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[18] Many other arguments against Singularism are similar in involving both object language and metalanguage terminology. For example Schein's [1993] worry that Singularists cannot account for the semantics of sentences like 'the non-atoms are not the atoms'.

[19] Further Nicolas argues that Pluralists cannot take Singularists to be worse off in this regard. For, Rayo [2006] has argued that any Pluralist who aims to quantify over absolutely everything will require a hierarchy of strictly stronger metalanguages.

[20] This example is based on one discussed in Linnebo and Nicolas [2008].

The sum of the triangles, the squares, and the circles is, however, the same sum as the red shapes and the blue shapes. For an alternative presentation of this worry and related discussion, see McKay [2006: 42].

In order to handle cases like that involving triangles, squares, and circles, Singularists have developed treatments that appeal to higher-order group entities, which are distinct from sums.[21] While positing groups might seem to violate the second criterion for semantic adequacy, Pluralists will also need to complicate their theories to handle cases like 19 and 20. To see why let's examine a Pluralist treatment of the semantics of *overlap*.

McKay [2006: 122] gives the following definition of overlap where '*ZAX*' is read as *Z* is/are among *X*:

$$X \text{ overlap } Y =_{df} \exists Z\,(ZAX \,\&\, ZAY).$$

While this definition can capture the semantics of 20, 19 requires three pluralities to overlap. It does not, for example require the plurality of triangles to overlap the plurality of squares and circles, for then a triangle overlapping a square would be sufficient for the truth of 19. To capture cases like 19 Linnebo and Nicolas [2008: 186] argue that *overlaps* has a superplural use, a use which loosely involves reference to 'several "pluralities" at once, much as an ordinary plural term refers to several objects as once.' To handle the semantics of *overlap* both Singularists and Pluralists will need to appeal to new mechanisms, so neither is better able to meet (ii) on this count.

The case study in 2.1 and the worries assessed here give evidence that both treatments meet (i) and (iii). The similarity in the ways the two treatments function give us further evidence that both meet (iii). Where the Singularist uses a more abundant domain and a part-of relation the Pluralist uses a more parsimonious domain, plural reference and an

[21] See Link [1983], Landman [1989] and Schwarzschild [1996] for semantic treatments to handle cases like 19 and 20 and for similar issues arising with predicates like *are separated* and *were given different foods*.

among-relation. The treatments will have similar resources when handling other plural constructions. For example, they might each add an additional quantifier to treat expressions like 'many of the students'. So, even without fully canvassing data and fully explicating the treatments we have defeasible evidence that both meet (i) and (iii).

Both treatments have general strategies for treating conjunctive plural expressions, distributive predication and collective predication. So we have some evidence that both meet (ii). Further, both theories add one new relation. The Singularist adds the i-part relation; the Pluralist adds the 'among'-relation. These two relations serve the same function of specifying that something(s) is/are part of or among some other thing(s). Both also add one additional mechanism. The Singularist appeals to sum formation; the Pluralist allows for a new sort of plural reference. In this way the two are on a par in adding mechanisms and primitives. Given this we have evidence that both meet (ii).

One might argue that the Pluralist fails to satisfy (iv) as she is motivated by a commitment to ontological parsimony. While a particular theorist's motivations might be (partially) ontological in nature, both treatments are justifiable by semantic phenomena. The Pluralist view can be justified by the existence of distributive predication, while the Singularist is chiefly justified by collective predication. Instances of distributive predication employ plural expressions to say of many things that each one is F. Given this, it is natural to think that no set or sum is denoted, instead *many* individuals are denoted. Then, plural reference and plural satisfaction are employed to handle collective predication. Singularists prioritize cases of collective predication in which some things *together* satisfy a predicate. They take such cases to involve a collective entity satisfying a predicate. Distributive predication is then handled through structuring the domain giving plural subjects a privileged

decomposition into atomic parts. Both treatments are justifiable by semantic data and phenomena.

Finally, since treatments of plural expressions are either Singularist or Pluralist in nature and we have (defeasible) evidence that treatments of both types meet (i)-(iv) equally well, we have evidence that both meet (v). We now have good reason to affirm that there are non-trivial cases of semantically adequate treatments of a theory. Next, I turn from semantic adequacy to ontology.

2.3 From Adequate Treatments to Ontological Commitments

Suppose that we have a theory, T, made up of English sentences some of which contain plural expressions. To determine what T says and entails we look to the semantically adequate treatments of T. These treatments involve regimenting T in the language of the semantic treatment. The semantically adequate Singularist treatment involves a regimentation of T into the Singularist's language, L^{Sing}. Similarly, the Pluralist regiments T in her language, L^{Plur}. The sentential contents and entailments of T are delivered via its regimentation into L^{Sing} and L^{Plur}. T as regimented in the two languages says and entails different things.

Quine's Criterion can be applied to T regimented in L^{Sing} and to T regimented in L^{Plur}. T as regimented by the Singularist carries a commitment to sums just in case it says or entails that there are sums. Singularists take plural expression to denote sums and take sums to be values of bound variables. So, according to Quine's Criterion T regimented in L^{Sing} carries a commitment to sums. In contrast plural-involving theories as regimented in L^{Plur} fail to say or entail that there are sums. Pluralists do not treat plurals as denoting or quantifying over

sums. So, given Quine's Criterion, T regimented in L^{Plur} fails to carry an ontological commitment to sums.[22]

We have arrived at the conclusion that relative to some adequate treatment T's commitments include sums and relative to another adequate treatment T fails to carry a commitment to sums. So, applying Quine's Criterion delivers the ontological commitments of T only relative to a treatment. At this point, one might argue that our inquiry is finished. We have seen that there can be multiplicities of equally semantically adequate treatments of natural language theories and that the treatments can attribute distinct ontological commitments. So, one might argue, natural language theories have ontological commitments only relative to a semantic treatment. Drawing this conclusion would be too hasty.

Many natural language theories will be adequately treated by a multiplicity of semantic treatments that attribute identical ontological commitments. Holding that in such cases the theory carries an ontological commitment to Fs or fails to carry an ontological commitment to Fs only relative to a treatment is unnatural. Such theories seem to have fixed unrelativized commitments.[23] Appeals to relativity should be avoided unless required. Views that posit global relativity are, other things equal, inferior to views that avoid it. In the next section, I argue for a supervaluationist method that delivers unrelativized, albeit sometimes indeterminate, ontological commitments.

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[22] Many, e.g., MacBride [2003], Nicolas [2007], Rayo [2007], would like to draw a distinction between what a theory uses and what a theory attributes as commitments. For example, one might think that a semantic treatment can use infinite sequences and sets without thereby attributing them as ontological commitments of the theories it treats. MacBride [2003:137] suggests that 'there is a distinction to be drawn between the tools one employs to investigate a given subject matter and the nature of the subject matter itself. One cannot immediately conclude from the fact that one has to employ tools of such and such a sort that the subject matter itself concerns items of that sort.' In order to capture a distinction, perhaps Quine's Criterion could be restricted to assign as ontological commitments only things that the truth of the theory requires are quantified over or referred to. Whether or how to draw this distinction will not be further addressed here.

[23] For example, suppose a theory includes only the following sentences: 'Sam sat at a table' and 'There was a stack of books on the table.' If all adequate treatments attribute a commitment to tables to the theory, it appears to carry a fixed and nonrelative commitment to tables. If no adequate treatment attributes to it a commitment to ghosts the theory appears to fail to have a commitment to ghosts, simpliciter, not just relative to Treatment 1, Treatment 2, … and Treatment n.

3. Unrelativized Ontological Commitments

When there are equally adequate semantic treatments, there are no semantic reasons to privilege one treatment over another. Given this, the following principle should be upheld:

> *Equal Adequacy→Equal Voice:* Equally semantically adequate treatments should have equal voice in determining the ontological commitments carried by a natural language theory.

Equal Adequacy→Equal Voice rules out a prima facie natural view that only the most ontologically parsimonious treatment delivers the commitments of a natural language theory.[24] The view is ruled out as it silences the other equally adequate semantic treatments for non-semantic reasons. In order to deliver unrelativized commitments and give equal voice to all adequate semantic treatments I argue that the following principle should be followed:

> *Principle of Carrying Commitments (PCC):* A theory, T, (a) determinately carries a commitment to Fs iff all of the adequate semantic treatments attribute an ontological commitment to Fs to T; (b) determinately does not carry a commitment to Fs iff all of the adequate semantic treatments fail to attribute an ontological commitment to Fs to T; (c) neither determinately carries nor determinately does not carry a commitment to Fs iff some adequate semantic treatments of T attribute a commitment to Fs to T and some fail to attribute a commitment to Fs to T.

In short, the PCC attributes determinate commitments when treatments agree and indeterminate commitments when treatments disagree.

The PCC delivers unrelativized, albeit potentially indeterminate, commitments. I argued that there are adequate Singularist and Pluralist treatments of plural-involving

[24] Recall that given our goal of examining the extent to which *semantics* can guide ontology, ontological parsimony cannot be a condition on semantic adequacy, for then ontology would be guiding ontology.

theories. Since the former attribute a commitment to summed entities and the latter do not, plural-involving theories carry indeterminate ontological commitments.

While a systematic analysis of data and treatments is required to determine if theories involving other natural language expressions have indeterminate commitments, there are some plausible candidates. Adjectives and verbs have been treated via quantification over events.[25] Such treatments attribute a commitment to events to the theories they treat. Landman [2000] has argued that there are adequate treatments of, for example, anaphora, nominalization and perception verbs that do not require a treatment involving events. If both an event treatment and an event-free treatment are adequate for treating theories involving adjectives and verbs, such theories are indeterminately committed to events.[26] Theories involving tense are indeterminately committed to times and indeterminately committed to events if some adequate treatments appeal to times without events and others appeal to events and not times.[27]

There are also natural language constructions that plausibly have only treatments that attribute the same ontological commitments. For example, if all of the semantically adequate treatments of modal-involving theories attribute a commitment to possible worlds such theories determinately carry a commitment to possible worlds.[28] Theories involving

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[25] Event semantics originates in Davidson [1967]. It has been discussed and developed extensively since then. See, e.g., Carlson [1984], Higginbotham [1983], Kratzer [1995], Krifka [1989, 1992], Larson [1998] and Parsons [1990].

[26] I thank an anonymous reviewer for emphasizing this as an example of another possible case of indeterminate commitments.

[27] For example, Kamp [1979] showed that an event structure can be used to model a temporal ordering. Give this, one could treat tensed language by using an event structure or a time structure. If there are semantically adequate treatments of a tensed theory that use only times and others that use only events, the PCC delivers that that the theory has indeterminate ontological commitments.

[28] Modals have been treated through quantification over possible worlds since C.I. Lewis and Langford's [1932]. Influential arguments for the view that treating modals requires quantification over possible worlds are given in David Lewis [1986]. Modal Fictionalists also support this claim, holding that modal-involving sentences carry commitments to possible worlds so are strictly speaking false. Others argue that modal language can be treated without possible worlds. In part of Forbes [1985], a framework is developed in which modals are treated without quantification over possible worlds. Chihara [1998] also develops an anti-realist

collective nouns (e.g. 'team' and 'committee') might only be adequately handled by treatments that attribute to them a commitment to groups. If so, such theories determinately carry a commitment to groups (see, e.g., Landman [1989]; Barker [1992]).

To summarize, I have argued that to determine the ontological commitments of a natural language theory, one needs to examine its semantically adequate treatments, apply Quine's Criterion to the theory as regimented according to each of the adequate semantic treatments and then apply the PCC to deliver unrelativized commitments. As we have seen, the methodology can deliver indeterminate ontological commitments. Whether the indeterminacy is understood as metaphysical or epistemic, semantics can serve as only a partial guide to answering ontological questions. If the indeterminacy posited by the PCC is metaphysical, semantics fails to fully determine the commitments of a theory and fails to fully determine the commitments of agents and the ontology of the world. If the indeterminacy posited by the PCC is merely epistemic, then semantics can only serve as a partial guide to ontology for us, as the determinate commitments of theories are sometimes epistemically inaccessible.

4. Concluding Remarks

At the beginning of the article I related the argument I have now given to some other indeterminacy arguments. I postponed a discussion of how my argument diverges from inscrutability arguments regarding the reference of particular terms (e.g. 'gavagai') and arguments for massive indeterminacy of reference. We can now turn to these cases and to how the argument that semantics does not always deliver determinate ontological commitments departs from them.

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semantics for modal language. If these treatments can be shown to be semantically adequate (which, recall, requires being justifiable by semantics, not just metaphysics), then modal-involving theories would have indeterminate ontological commitments. It is not clear, however, that such treatments can be justified on semantic grounds.

Quine [1960] argues that the reference of terms like 'gavagi' may be metaphysically indeterminate. 'Gavagi' might refer to a rabbit, a rabbit-stage, an undetached rabbit part or other potential referents. Quine's argument looks similar to that given here, as I've argued that the reference of terms like 'the students' is indeterminate. My argument differs from Quine's in its emphasis on examining general extant semantic treatments and assessing how they can handle natural language data. Quine does not develop full semantic theories that differ in assigning to 'gavagai' the various referents he thinks it might have. In examining whether data can be equally well captured in multiple ways, developing specific treatments is required.[29]

I have argued that semantic adequacy requires, in part, capturing patterns in the data and doing so in a way that is motivated by semantics rather than metaphysics. Evans [1975] and Fodor [1994] have argued that semantic treatments which differ in assigning rabbits, rabbit-stages and undetached rabbit parts as referents will not all be able to handle the same range of data. If these arguments or others like them are successful, the treatments are not equally semantically adequate and are not all relevant in determining ontological commitments.[30] Further, even if the treatments do meet the first condition on semantic adequacy, they may be justifiable only by metaphysical rather than semantic considerations. For example, in developing semantic theories to fit with Quine's proposed referents of 'gavagai' Williams [2008a] appeals to discussions of metaphysical views of persistence. If such treatments can only be justified in this way, they fail to accord with the goal of determining the extent to which *semantics* can guide ontology, an aim that is worth exploring given the prominent role semantics has been given in ontology and metaontology.

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[29] This relates to the responses to arguments from underdetermination of theory by evidence given in the philosophy of science and referenced in the introduction of this article.

[30] Although, see Williams [2008a] for developments of semantic treatments that assign distinct referents to 'gavagai' and arguments that at least some distinct treatments are equally able to capture the data.

My argument for indeterminacy of ontological commitments diverges from radical inscrutability arguments like those given by Davidson [1979] and Putnam [1981].[31] Such arguments involve permutations of the assignments of referents and corresponding changes in the extensions of predicates so that models of a set of sentences can differ radically. While extensions are assigned differently, the domains of the various models are identical. Given this, permutation arguments fail to deliver indeterminacy of ontological commitments even if they do deliver indeterminacy of reference.

Semantics has a place of prominence in metaontological discussions. Understanding the extent to which semantics might take priority in our inquiry informs our understanding of the relation between semantics and ontology. I have argued that when semantic treatments are assessed prior to ontological considerations, ontological questions may not have determinate answers. Given this, semantics can, at best, serve as a partial guide to answering questions of ontology. If ontology is to be determinate, ontology can begin, but cannot end, in semantics.[32]

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[31] See Button [2013] and Williams [2008b] for further discussion of these arguments, their ramifications and their limits.

[32] Versions of this paper were presentend at the Arché Ordinary Language, Philosophy, and Linguistics Conference, the Mathematising Science: Limits and Perspectives Conference and the Triangle Area Philosophy Conference. I thank the audiences for their helpful feedback. I am also grateful to two anonymous reviewers, David Beaver, Nora Berenstain, Sara Bernstein, Dan Bonevac, Alex Grzankowski, Steve James, Hans Kamp, Rob Koons, David Sosa, and especially Josh Dever and Mark Sainsbury for discussion and helpful comments on previous versions of this paper.

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