Ontological Commitment*

Agustín Rayo

web.mit.edu/arayo/www/

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1   The Notion of Ontological Commitment

Think of a sentence's truth-conditions as demands that the truth of the sentence imposes on the world. The notion of ontological commitment can then be characterized as follows. To describe a sentence's ontological commitments is to describe some of the demands that the sentence's truth imposes on the world—those demands that concern ontology. Accordingly, for a sentence to carry commitment to Fs is for the sentence's truth to demand of the world that it contain Fs.

Four observations are in order:

1. *Ontological commitment as an aspect of truth-conditions*

   An immediate consequence of this way of thinking about ontological commitment is that the ontological commitments carried by a sentence are an *aspect* of its truth-conditions. This means, in particular, that one cannot change the ontological commitments carried by a sentence without thereby changing the sentence's truth-conditions. It also means that indeterminacy of truth-conditions may involve indeterminacy of ontological commitments.

(There are other aspects of a sentence's truth-conditions one might be interested in. One could, for example, be concerned with the 'size-conditions' carried by a sentence, and ask about the demands imposed by the sentence's truth as far as the size of the universe is concerned. Or one could be concerned with 'color-of-snow-conditions', and ask about the demands imposed by the sentence's truth as far the color of snow is concerned.)

2. *Demand-talk vs. must-talk*

It would be tendentious to substitute possible-world-talk for demand-talk in the above characterization of ontological commitment. In particular, it would be tendentious to read the characterization as saying that sentence carries commitment to Fs just in case every possible world at which the sentence is true is a world that contains Fs. Among other things, this would yield the result that any sentence whatsoever carries commitment to necessarily existing objects. And one might think that even if numbers exist, and exist necessarily, a sentence like 'Susan runs' doesn't carry commitment to numbers. The truth of 'Susan runs' demands of the world that Susan exist, and that she run—but not that there be numbers.

(If you think that truth-conditions are no more fine-grained than sets of possible worlds, you might also think that demand-talk turns out not to come apart from must-talk. But it is important to be clear that this would constitute a substantial thesis about the nature of truth-conditions—and hence ontological commitment—not a defining feature of the notion of ontological commitment.)

If demand-talk can't be cashed out in terms of possible-world-talk, how should it be understood? The demands imposed on the world by a sentence's truth are simply the sentence's truth-conditions. So one's understanding of the former should be informed by one's understanding of the latter. (Demand-talk is not intended as an *elucidation* of the notion of truth-conditions; it is a device for stating what the

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truth-conditions of a representation consist in.)

I shall use demand-talk in such a way that it obeys Kripke-style substitution-rules for names and predicates.[1] Thus, since Hesperus is Phosphorus, there is no difference between the demand that the world contain Hesperus and the demand that the world contain Phosphorus. Similarly, since being composed of water just is being composed of H_2O, there is no difference between the demand that human bodies be composed mostly of water and the demand that human bodies be composed mostly of H_2O. And since part of what it is to be scarlet is to be red, part of what is required by the demand that the world contain a scarlet ball is that the world contain be a red ball. (Accordingly, if you think that the demand imposed on the world by the truth of 'Hesperus is a planet' differs from the demand imposed on the world by the truth of 'Phosphorus is a planet', you will need to specify the relevant demands by appeal to the senses—or narrow contents, or primary intensions—of 'Hesperus' and 'Phosphorus'. Similarly for predicates.)

3. *Sentential commitment vs. speech-act commitment*

One must distinguish between the ontological commitments carried by a sentence and the ontological commitments carried by a speech-act in which the sentence is uttered.

On the one hand, the sentence might be understood non-literally, and therefore

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[1]More precisely: (*i*) if $a = b$, then there is no difference between the demand that the world be such that $\phi(a)$ and the demand that the world be such that $\phi(b)$; (*ii*) if being F just is being G, then there is no difference between the demand that the world be such that $\phi(F)$ and the demand that the world be such that $\psi(F)$; and (*iii*) if part of what it is to be F is to be G, then part of what is required by the demand that the world be such that $\phi(F)$ is that the world be $\phi(G)$. (Here ϕ and ψ are assumed to be extensional contexts.)

Although I am inclined to treat 'part of what it is to be F is to be G' as primitive, you may wish to cash it out in terms of essence, as 'being G is essential to being F'. Should you go this route, it is worth keeping in mind the distinction between essence as an ordering of properties—which is what is at issue here—and essence as a modality of property instantiation—which is what is at issue when one says 'x is essentially F'. (There are important connections between the two, of course. For an influential discussion of the latter, see Fine (1994).)

used to express a proposition other than its literal content. On the other hand, the sentence might be set forth with non-assertoric force, with the result that the speech-act carries commitment to something other than the truth of the proposition that the sentence is used to express. (One might set forth a sentence as a supposition, or in a spirt of make-believe, or on the understanding that one is committed to the sentence's empirical adequacy rather than its truth.)

In order to assess the ontological commitments carried by a speech-act, one needs the notion of speech-act correctness. For a speech-act to be *correct* is for its content to satisfy the criterion of adequacy corresponding to that speech-act.

The criterion of adequacy corresponding to a full-fledged assertion is *truth*. So for a full-fledged assertion to be correct is for its content to be true. The criterion of adequacy corresponding to speech-acts with non-assertoric force might be less stringent: it might consist, for example, of the requirement that the content of the speech-act be empirically adequate, or that it describe a fictional world which matches the actual world in certain respects.

With the notion of correctness on board, one can characterize the notion of speech-act ontological commitment in analogy with our characterization of sentential ontological commitment: to describe the ontological commitments carried by a speech-act is to describe some of the demands that the speech-act's correctness imposes on the world—those that concern ontology. Accordingly, for a speech-act to carry commitment to Fs is for the speech-act's correctness to demand of the world that it contain Fs.

4. *Belief*

The notion of ontological commitment need not be restricted to public language. One can say, for example, that my belief that there are elephants carries commitment to elephants (or that it commits me to elephants). In general, for a belief to

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carry commitment to Fs (or for one's belief to commit one to Fs) is for the belief's truth to demand of the world it contain Fs.[2]

2 Quine's Criterion

Quine famously suggested the following criterion of ontological commitment for first-order sentences:[3]

> QUINE'S CRITERION
>
> A first-order sentence carries commitment to Fs just in case Fs must be counted amongst the values of the variables in order for the sentence to be true.

This criterion should not be thought of as a competitor to the characterization of ontological commitment set forth in section 1. It should be thought of as playing a different role. Whereas the section 1 characterization is meant to supply an elucidation of what ontological commitment consists in, Quine's Criterion embodies a substantial claim about the ontological commitments of first-order sentences.

Consider a disagreement about the ontological commitments of '$\exists x$ ELEPHANT(x)'. On one view, '$\exists x$ ELEPHANT(x)' is committed to elephants and nothing else. On a rival view, '$\exists x$ ELEPHANT(x)' is committed also to the property of elephanthood. The section 1 characterization won't decide the issue. All it tells us is that the matter depends entirely on the truth-conditions of '$\exists x$ ELEPHANT(x)'. But wheel in Quine's

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[2]Here I take for granted that beliefs are propositional attitudes. See, however, Szabo (2003).

[3]See Quine (1948) p. 32, Quine (1951a) p. 67, Quine (1951b) p. 11 and Quine (1953b) p. 103. For discussion, see Alston (1957), Jackson (1980), Parsons (1982), Routley (1982), Hodes (1990), Lewis (1990), Melia (1995), Azzouni (1998), Yablo (1998) and Priest (2005).

The formulation of Quine's Criterion I use here is to be thought of as a *schema* whose instances are there result of substituting a count-noun for 'F'. By 'the variables', I mean the variables of the *language* rather than the variables of the sentence, so as to ensure that, e.g. 'RUNS(CHARLES)' carries commitment to runners (and to Charles), even though it contains no variables. By 'first-order language', I mean a language containing *objectual* first-order quantifiers.

Criterion and the matter is decided in favor of the first view. For properties needn't be counted amongst the values of the variables in order for '$\exists x$ ELEPHANT(x)' to be true. So '$\exists x$ ELEPHANT(x)' carries no commitment to properties.

Quine's Criterion makes substantial claims about ontological commitment by establishing a correlation between the ontological commitments of a first-order sentence and the semantic machinery that must be deployed by a semantic theory if it is to count the sentence as true. It is important to be clear that such a correlation is in no way *constitutive* of the notion of ontological commitment. One should generally distinguish between the ontological commitments carried by a sentence and the semantic machinery employed by a semantic theory assigning truth-conditions to that sentence. Note, for example, that on standard semantic theories one assigns to each first-order predicate of the language a *set* as its semantic value. From this it follows that one's semantic theory for '$\exists x$ ELEPHANT(x)' carries commitment to sets. But it would be a mistake to conclude on those grounds alone that '$\exists x$ ELEPHANT(x)' itself carries commitment to sets. Just because a semantic theory uses sets in *specifying* truth conditions for '$\exists x$ ELEPHANT(x)', it doesn't follow that the truth-conditions thereby specified demand of the world that it contain sets. Similarly, just because a semantic theory uses elephants in specifying truth-conditions for '$\exists x$ ELEPHANT(x)' it doesn't *immediately* follow that the truth-conditions thereby specified demand of the world that it contain elephants.

Insofar as one agrees with Quine's Criterion, one will think that it is nonetheless a feature of first-order languages that there is an exact correspondence between the ontological commitments carried by a sentence and the objects that must be counted amongst the values of the variables in order for the sentence to be true. But this in itself is not a reason for thinking that such a feature will generalize beyond first-order languages. On the standard (Kripkean) semantics for modal languages, for example, possibilia (or objects representing possibilia) must be counted amongst the values of the variables in order for '$\diamond(\exists x(\text{ELEPHANT}(x) \wedge \text{PURPLE}(x)))$' to be true. But it would be a mistake

to conclude on those grounds alone that '$\diamond(\exists x(\text{ELEPHANT}(x) \land \text{PURPLE}(x)))$' itself is committed to possibilia (or objects representing possibilia). To insist: just because a semantic theory uses possibilia (or objects representing possibilia) in *specifying* truth conditions for '$\diamond(\exists x(\text{ELEPHANT}(x) \land \text{PURPLE}(x)))$', it doesn't follow that the truth-conditions thereby specified demand of the world that it contain possibilia (or objects representing possibilia). In the absence of further argumentation, all one gets is the conclusion that one's *semantic theory* is committed to possibilia (or objects representing possibilia).

2.1   Is Quine's Criterion Adequate?

Quine's Criterion can undergenerate when the language contains atomic predicates expressing extrinsic properties.[4] Part of what it is to be a daughter is to have a parent. So the truth of '$\exists x(\text{DAUGHTER}(x))$' demands of the world that there be parents. But parents needn't be counted amongst the values of the variables in order for '$\exists x(\text{DAUGHTER}(x))$' to be true. One could try to avoid the problem by limiting the application of Quine's Criterion to cases in which the offending predicates are avoided. But so many of our predicates express partly extrinsic properties that one would run the risk of ending up with a criterion too restricted to be interesting. (Part of what it is to be a human is to belong to a certain lineage; part of what it is to be a moon is to orbit around a planet; part of what it is to be a table is to be used, or designed, as a table.) One could, of course, embark in a project of philosophical analysis, and attempt to supply paraphrases for one's extrinsic predicates in terms of non-extrinsic predicates. But it is hard to feel optimistic about the prospects of such a project. A more modest option is to place no restrictions on the range of admissible predicates, but set forth the criterion on the understanding that it is assumed to be adequate as a necessary condition on ontological

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[4]As Gabriel Uzquiano pointed out to me, not all atomic predicates expressing extrinsic properties lead to trouble: '$\text{LONELY}(\dots)$', for example.

commitment only to the extent that there is no problematic extrinsicness in one's atomic predicates. This is the policy that I shall adopt throughout the reminder of the essay.

As Cartwright (1954) has emphasized, there is a crucial ambiguity in Quine's Criterion: it is not clear how to interpret the 'must' in 'Fs *must* be counted amongst the values of the variables in order for the sentence to be true'. The issue cannot be avoided because, as Cartwright shows, an extensional version of Quine's Criterion would be hopelessly inadequate.

Disambiguating the 'must' is an especially delicate matter for Quine because of his uneasiness about non-extensional notions. But here I will not be concerned with Quine-scholarship. I will simply mention two different ways of disambiguating the crucial 'must', and make some observations about the resulting criteria. On the first—and highly anachronistic—disambiguation I would like to consider, the 'must' is cashed out in terms of metaphysical necessity:

> QUINE'S CRITERION (Metaphysical Version)
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> A first-order sentence ψ carries commitment to Fs just in case, as evaluated with respect to an arbitrary possible world, ψ is true only if Fs are counted amongst the values of the variables.

On the second—and only slightly less anachronistic—disambiguation, the 'must' is cashed out in terms of logical truth:

> QUINE'S CRITERION (Logical Version)
>
> A first-order sentence ψ carries commitment to Fs just in case $\ulcorner \psi \rightarrow \exists x\ \mathrm{P}(x) \urcorner$
> is a truth of (free[5]) logic for some predicate P expressing F-hood.

or, equivalently:

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[5]The restriction is needed to avoid the conclusion that, e.g. an arbitrary sentence carries commitment to every object named by an individual constant in the language.

A first-order sentence ψ carries commitment to Fs just in case there is a predicate P expressing F-hood such that any (free) model of ψ is a model whereby some amongst the values of the variables are in the extension of P.

Neither of these reformulations preserves the snappiness of the original, and they each involve a notion that Quine would have disapproved of (metaphysical possibility and expressing F-hood, respectively). Such are the costs of making the criterion precise.

When it comes to their adequacy as criteria of ontological commitment, it seems to me that neither is ideal. Let me start with the metaphysical version. Suppose that being Winston Churchill and being Jennie Jerome are purely intrinsic properties. (So, in particular, it is not the case that part of what it is to be Winston Churchill is to have Jennie Jerome as a mother.) Then the truth of 'Winston Churchill and Jennie Jerome exist' demands of the world that it contain Winston Churchill and that it contain Jennie Jerome, but not that it contain mothers. Yet—on the Kripkean assumption that any world in which Winston Churchill exists is a world in which he has Jennie Jerome as a mother—the metaphysical version of Quine's Criterion yields the result that (a first-order version of) 'Winston Churchill and Jennie Jerome exist' carries commitment to mothers. (If you *do* think that part of what it is to be Winston Churchill is to have Jennie Jerome as a mother, you will still think that the metaphysical version of Quine's Criterion misfires, since it entails that 'Winston Churchill exists' carries no commitment to mothers. But you will take this to be a special case of the problem of extrinsicness identified above.)

The logical version of Quine's Criterion tells us that '$\exists x \, \text{WHALE}(x)$' carries commitment to whales, but not to mammals (since, e.g. '$\exists x \, (\text{WHALE}(x)) \to \exists x \, (\text{MAMMAL}(x))$' is not a logical truth). But part of what it is to be a whale is to be a mammal. So if the truth of '$\exists x \, \text{WHALE}(x)$' demands of the world that it contain whales, it demands of the world that it contain mammals. (Note that the problem can't be solved by substituting 'analytical truth' for 'logical truth' in the logical version of the criterion, since 'whales are

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mammals' is not analytic. Nor will it do to substitute 'metaphysically necessary truth' for 'logical truth', since this would yield the result that every sentence carries commitment to any necessarily existing objects.)

My best suggestion for patching things up is this:

> QUINE'S CRITERION (Revised Logical Version)
> A first-order sentence ψ carries commitment to Gs just in case: (a) $\ulcorner \psi \rightarrow \exists x\ \mathrm{P}(x) \urcorner$ is a truth of (free) logic for some predicate P expressing F-hood; and (b) part of what it is to be F is to be G.

Thus, '$\exists x\ \textsc{Whale}(x)$' carries commitment to mammals (since part of what it is to be a whale is to be a mammal), and '$\textsc{Runs}(\textsc{charles})$' carries commitment to Charles and to runners, but not to, e.g. Charles's singleton. (If you think that part of what it is to be Charles is is to be human, then you will also think that '$\textsc{Runs}(\textsc{charles})$' carries commitment to humans.)

A feature of Quine's Criterion, on any of the versions I have considered, is that it treats contradictions as carrying arbitrary commitments. I'm not sure what to make of this. The truth of a contradiction makes an impossible demand on the world, but it is not clear that demanding the impossible is the same as demanding everything. Perhaps it is best to think of Quine's Criterion as tacitly restricted to satisfiable sentences, and take the commitments of contradictions to be undefined.

Even if it is a bit rough around the edges, most philosophers believe that Quine's Criterion is by and large a sensible one—more sensible, at any rate, than a criterion whereby 'Charles runs' carries commitment to numbers, or to the property of being a runner.

3 Beyond First-Order Languages

As it stands, Quine's Criterion is only defined for the sentences of a first-order language. This is *not* to say that only first-order sentences carry ontological commitment, or that the ontological commitments of non-first-order sentences can only be assessed on the basis of first-order paraphrases. All it means is that, in its current formulation, Quine's Criterion remains silent about the commitments of non-first-order sentences.

One could claim that any intelligible sentence has a commitment-preserving first-order paraphrase, and that assessing the ontological commitments of a non-first-order-sentence sentence is a matter of applying Quine's Criterion to its paraphrase. But it is important to be clear that this is a substantial thesis, and that it is not entailed by Quine's Criterion. In fact, many philosophers believe that there are intelligible linguistic resources that cannot be adequately captured by a first-order language. Two prominent examples are plurals and modal operators.

3.1 Plurals

There is considerable disagreement in the literature about how to interpret the following sentence:[6]

GKB

Some critics admire only one another

According to one side of the debate, GKB can be adequately paraphrased as the following:

GKB (set theoretic version)

There is a non-empty set of critics such that any member of the set admires

only other members of the set.

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[6] 'GKB' is short for 'Geach-Kaplan-Boolos'. There is an enormous literature on plurals, but the seminal texts are Quine (1986) ch. 5 and Boolos (1984). For a short overview of some of the main issues, see Linnebo (2004) and Rayo (forthcoming). The extension of Quine's Criterion I discuss below is drawn from Rayo (2002).

which in turn has an adequate first-order paraphrase. So, on the assumption that adequate paraphrase preserves ontological commitments, Quine's Criterion entails that GKB carries commitment to *sets*.

According to the rival side of the debate, GKB does not carry commitment to sets. But the complaint is not that Quine's Criterion is mistaken. The complaint is rather that the set theoretic version of GBK is not an adequate paraphrase of GBK. For whereas the truth of the former demands of the world that it contain a *set* of critics each of whose members admires only other members of the sets, all that the truth of the latter demands of the world is that the critics in question exist, and that they admire only one another.

On this view, one must go beyond first-order resources to find an adequate paraphrase for GKB. One way of doing so is by setting forth a *plural first-order language*, which is the result of enriching a standard first-order language with plural terms (including plural variables), plural predicates (i.e. predicates taking plural terms as arguments), and quantifier-expressions binding plural variables. For the purposes of supplying an adequate paraphrase for GKB, the only plural terms that are needed are plural variables ('xx', 'yy', etc.); the only plural predicate that is needed is '$\prec$' (where '$x \prec yy$' is read 'it is one of them'); and the only quantifier-expression binding plural variables that is needed is '$\exists$' (where '$\exists xx$' is read 'there are some things such that'). The following is a paraphrase of GKB in a plural first-order language with a domain consisting of critics:

GKB (plural version)

$\exists xx \, \forall y \, \forall z \, ((y \prec xx \land \text{A\scriptsize DMIRES}(y, z)) \rightarrow (z \prec xx \land z \neq y)))$

(*Read:* there are some critics—the xs—such that, for any y and z, if y is one of the xs and y admires z, then z is one of the xs and z is not identical to y.)

On the standard semantics for (singular) first-order language, a variable assignment associates a single object with each variable. Proponents of plural first-order languages extend this semantics by taking a variable assignment to associate *one or more* objects

with each plural variable. (Thus, just like '$x = y$' is satisfied by a variable assignment if and only if the object that the assignment associates with 'x' is identical to the object that the assignment associates with 'y', '$x \prec yy$' is satisfied by a variable assignment if and only if the object that the assignment associates with 'x' is identical to one of the objects that the assignment associates with 'yy'.)

What sort of criterion of ontological commitment is appropriate for a plural first-order language? A natural suggestion is to use Quine's (while mindful of the difficulties discussed in section 2.1, and on the understanding that by 'value of a variable' one means either the value of a first-order variable or one of the values of a plural variable). This yields the desired result that the plural version of GKB carries commitment to critics, but not to sets.

Note, however, that even if the application of Quine's Criterion to plural first-order language is fine as far as it goes, it doesn't give us everything we want. One can see the problem by observing that, although Quine's Criterion speaks to the question whether a certain sentence carries commitment to critics, sets or seashells, it remains silent about the question whether the sentence carries commitment to critics who admire only one another, or to sets that are infinitely many in number, or to seashells that are scattered across the ocean floor. This is because 'critics who admire only one another', 'sets that are infinitely many in number' and 'seashells that are scattered across the ocean floor' call for *collective* readings, and Quine's Criterion can only be used to assess questions of the form 'Does ϕ carry commitment to Fs?' where 'Fs' is replaced by a pluralized count noun read *distributively*.[7]

A distinction might be helpful. Say that the *ontological* commitments of a sentence are those of the demands imposed on the world by the sentence's truth that pertain to

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[7]The count noun 'Fs' is read distributively in 'ϕ carries commitment to Fs' when 'ϕ carries commitment to Fs' can be paraphrased as the claim that the truth of ϕ demands of the world that it contain at least one F; otherwise it is read collectively. Similarly, 'Fs' is read distributively in 'the world is required to contain Fs' when 'the world is required to contain Fs' can be paraphrased as the claim that the world is required to contain at least one F; otherwise it is read collectively.

the question 'Is the world required to contain Fs?' where 'Fs' is replaced by a pluralized count noun, read distributively. Say that the *plethological* commitments of a sentence are those of the demands imposed on the world by the sentence's truth that pertain to the question 'Is the world required to contain Fs?' where 'Fs' is replaced by a pluralized count noun, read collectively. Just like a sentence's ontological commitments are an aspect of its truth-conditions, a sentence's plethological commitments are an aspect of its truth-conditions.

One can set forth a criterion of plethological commitment that parallels Quine's Criterion of ontological commitment:

A QUINEAN CRITERION OF PLETHOLOGICAL COMMITMENT

A singular or plural first-order sentence carries commitment to Fs just in case Fs must be counted amongst the values of the (singular or plural) variables in order for the sentence to be true.

where 'Fs' is replaced by a pluralized count-noun read collectively. This yields the desired result that the plural reading of GKB carries commitment to critics who admire only one another. And, of course, on the double assumption that the plural reading of GKB is an adequate paraphrase of GKB and that adequate paraphrase preserves plethological commitment, one gets the result that GKB itself carries commitment to critics who admire only one another.

It is worth emphasizing that *singular* first-order sentences can carry plethological commitments, just like their plural counterparts. The result of conjoining the first few Dedekind Axioms, for example,

$$\forall x[x \neq s(x) \land s(x) \neq 0 \land \forall y(y \neq x \rightarrow (s(x) \neq s(y)))]$$

carries commitment to objects which are infinitely many in number.[8] (More idiomatically: it carries commitment to infinitely many objects.) Quine's original criterion has nothing

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[8]It also carries commitment to objects which are well-ordered by the ancestral of s, and to objects which are finitely many in number, and to objects which are not too numerous to form a set. Simpler

to say about such commitment, but it is a commitment all the same. This is a useful reminder that it can be somewhat idiosyncratic to focus on a sentence's ontological commitments to the exclusion of other aspects of its truth conditions.

The 'must' in our criterion of plethological commitment is as much in need of regimentation as the 'must' in Quine's Criterion of ontological commitment. It is not clear, however, that a pethological analogue of the logical version of Quine's Criterion would do the job. It certainly won't deliver the right results in the case of singular first-order languages, which don't contain plural predicates. And in order for it to deliver the right results in the case of a plural first-order language one would need the assumption that whenever a sentence of the language carries commitment to objects which are κly many in number, the language includes a plural predicate holding of all and an only xs which are κly many in number. (It is also worth noting that the two formulations of the logical version of Quine's Criterion that I described as equivalent in the singular case are not guaranteed to be equivalent in the plural case.[9])

3.2   Modal Sentences

What demands are imposed on the world by the truth of the following sentence?

MODAL

$\exists x(\text{MAMMAL}(x) \land \diamond(\text{HUMAN}(x)))$

(*Read:* something is a mammal and might have been a human.)

It is clear that some demand or other is imposed, since whether or not there are mammals who might have been human depends on what the world is like. (As it happens, there *are* mammals who might have been humans, since there are humans, and every human

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first-order sentences can also carry plethological commitments; '$\exists x \exists y(x \neq y)$', for example, carries commitment to two objects.

[9]Whether or not they are equivalent will depend on the truth of a reflection principle. For discussion, see Rayo and Uzquiano (1999).

is a mammal who might have been a human. But had there been no humans, nothing would have been a mammal who might have been a human—at least on the Kripkean assumption that nothing could be a human without being essentially human.)

One way of specifying truth-conditions for MODAL is by stating that what the sentence's truth demands of the world is that it contain something that is a mammal and might have been a human. Whatever its merits, such a specification is not very useful for the purposes of ascertaining ontological commitment. It does not, for example, shed much light on the question of whether the sentence carries commitment to mere possibilia. Suppose, however, that one can reason as follows:

> Being such that one might have been human *just is* being human. So what
> the truth of MODAL demands of the world is that it contain a mammal who
> is also a human. But part of what it is to be a human is to be a mammal.
> So the truth-conditions of MODAL boil-down to the demand that the world
> contain humans.

Then one will be in a position to conclude that all that the truth of MODAL demands of the world is that it contain humans.

This conclusion is independent of the details of one's preferred semantics for languages containing modal operators. Significantly, one is free to adopt a Kripkean semantics, in which modal operators are treated like quantifiers ranging over possible worlds and the usual quantifiers are taken to range over possibilia (or representatives thereof). By wheeling in such semantic machinery one increases the ontological commitments of one's metatheory. But one no more increases the ontological commitments of one's object language than one would increase the ontological commitments of 'Charles runs' by setting forth a semantics whereby the semantic value of 'runs' is a set. (This is a useful reminder of the moral of section 2, that one should be careful not to confuse the the objects used by a semantic theory in the process of specifying truth-conditions, on the one hand, with

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the objects existence of which is demanded by the satisfaction of the conditions thereby specified, on the other.)

In all of its essentials, the conclusion is also independent of whether one is an actualist. When I asked you to think of a sentence's truth-conditions as demands its truth imposes on the world, I did so on the expectation that you would be an actualist. If you are a Lewisian, you should instead think of truth-conditions as demands imposed on one's location in the world (where 'world' is understood as 'the totality of everything there is' rather than 'Lewisian possible world'). You may then rephrase the claim that all that the truth of MODAL demands of the world is that it contain humans as the claim that all that the truth of MODAL demands of one's location in the world is that it be at a Lewisian possible world containing humans.

Finally, the conclusion is independent of whether one thinks that the modal can be reduced to the non-modal. A reductionist can agree that all that the truth of MODAL demands of the world that it contain humans, and go on claim that there is more to be said about what it takes for the world to contain humans than meets the eye. "Being human—a reductionist might claim—is somewhat like being a husband. For one to be a husband is for one to be male and for there to be someone one is married to. Similarly, for one to be human is for one to have certain non-modal properties and for there to be objects in spacio-temporally disconnected locations who are one's *counterparts* and enjoy certain non-modal properties. Thus, when one says that all that the truth of MODAL demands of the world is that it contain humans what one says is compatible with the claim that the truth of MODAL demands of the world that it contain *counterparts*. (Lest this sounds paradoxical, compare it with the following: all that the truth of 'there are husbands' demands of the world is that it contain a husband; but what it is for the world to contain a husband is for the world to contain a male and someone he is married to.)" The crucial disagreement between modal reductionists and nonreductionists concerns the question of what it takes for the world to contain humans, not the question of whether

the truth of MODAL demands any more of the world than that it contain humans.

Is it possible to supply a criterion of ontological commitment for modal sentences? One idea is to use the revised logical version of Quine's Criterion, with 'theorem of (free) modal logic' in place of 'truth of (free) logic'. This appears to deliver the right results in the case of MODAL. But what about the general case? There is no real doubt about the criterion's adequacy as a sufficient condition for ontological commitment, since— in modal and non-modal contexts alike—entailing the first-order formula '$\exists x\, F(x)$' is a reliable indicator of commitment to Fs. When it comes to the criterion's adequacy as a necessary condition for ontological commitment, there is still the problem of extrinsicness. But it is not clear to me that the criterion undergenerates any more than that.

3.3   Correctness-conditions

There is a separate class of cases in which Quine's Criterion cannot be immediately applied: cases in which the correctness-conditions of a speech-act come apart from the truth-conditions of the sentence uttered. As noted in section 1, this can happen either because the speech-act is set forth with non-assertoric force, or because the sentence uttered is used to express something other than its literal content.

Amongst philosophers of mathematics it is not uncommon to argue that the correctness conditions of mathematical utterances should be distinguished from the truth-conditions of the sentences uttered.[10] One might argue, for example, that even though the truth of

PLANETS

The number of the planets = 8

demands of the world that it contain numbers, all that the *correctness* of a typical

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[10]For representative examples see Yablo (2001), Azzouni (2004) and Eklund (forthcoming). See also Cian Dorr's unpublished 'Numbers and Electrons'.

utterance of PLANETS demands of the world is that there be eight planets. There are different forms the argument might take. Here are four examples:

1. *Empiricism*

   One might claim that mathematical utterances are set forth on the understanding that one is committed to the empirical adequacy of the sentence uttered, rather than its truth.

   (Alternatively, an empiricist might claim that mathematical utterances are serious assertions which concern the sentence's *empirical* content rather than its literal content.)

2. *Fictionalism*

   One might claim that mathematical utterances are set forth in a spirit of make believe.

   (Alternatively, a fictionalist might claim that mathematical utterances are serious assertions which concern the sentence's *fictional* content rather than its literal content.)

3. *Modalism*

   One might claim that mathematical utterances are set forth on the understanding that one's committed is to the truth of the sentence in a world which contains numbers and is just like the actual world in every other respect.

   (Alternatively, a modalist might claim that mathematical utterances are serious assertions which concern the sentence's *categorical* content rather than its literal content.)

4. *Instrumentalism*

   One might claim that mathematical utterances are set forth on the understanding that one is only committed to the adequacy of the sentence asserted as a tool for

distinguishing amongst possibilities that are regarded as open for the purposes at hand.

(Alternatively, a pragmatist might claim that mathematical utterances are serious assertions which concern the sentence's *instrumental* content rather than its literal content.)

Whatever the merits of such views, it is important to be clear that they do not by themselves deliver the conclusion that typical mathematical utterances are ontologically innocent. For showing that correctness-conditions and truth-conditions come apart is not the same as showing that the correctness-conditions in question are ontologically innocent. In order to do the latter, one must produce a specification of ontologically innocent correctness-conditions for arbitrary arithmetical sentences.[11]

3.4   Natural Language

The project of finding a non-trivial criterion of ontological commitment for a natural language—a criterion that goes beyond the truism that a sentence carries commitment to Fs just in case its truth demands of the world that it contain Fs—is one of daunting complexity. We have no more than a preliminary understanding of what a theory of truth-conditions for natural language would look like. And even if we had such a theory, it wouldn't get us very far in the task of identifying a criterion of ontological commitment for natural language assertions in the absence of a theory of conversational pragmatics unlike anything that has been developed so far.

Happily, Quine has taught us about regimentation. In contexts in which we care about ontological commitment, we have the option of replacing natural language speech-acts

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[11]Doing so in a way that respects the standard truth-values is non-trivial. It is a consequence of Gödel's Incompleteness Theorem that the job cannot be done in terms of a first- or higher-order paraphrase. So one must either abandon the hope of using a paraphrase, or wheel in additional resources, such as counterfactual conditionals. For details, and for a specification of ontologically innocent truth-conditions which is not based on paraphrase, see my 'On Specifying Content'.

by literal assertions of formalized sentences. There is no expectation that the formalized sentences will have truth-conditions matching the correctness-conditions of the speech-acts they replace (and therefore no expectation of sameness of ontological commitment). All that is required is that we be prepared to go about the task at hand using the regimented assertions. Doing so won't help us ascertain the ontological commitments of the original speech-acts, but—given the right formal language—it might allow us to be clear about the ontological commitments we have incurred in while carrying out the task at hand.

The discussion in sections 3.1 and 3.2 suggests that the task of finding a criterion of ontological commitment for formal languages including plural quantifiers or modal operators is at least partially tractable. This is welcome news in the present context, since plural and modal languages are popular vehicles of regimentation. But, of course, they are not the only ones. Additional formal resources include substitutional quantifiers, non-material conditionals and quantifiers that bind variables taking positions other than those of singular or plural terms.[12]

4   The Significance of Ontological Commitment

According to a certain line of thought, the use of object-talk to describe truth-conditions is largely a matter of convenience: if a new way of talking allowed us to make sufficiently fine-grained distinctions amongst truth-conditions without bringing objects into the picture, it could be adopted without any real loss.[13] Before bringing the paper to a close, I would like to mention a way of spelling out this sort of claim.

The proposal I would like to consider is based on the idea that a theory of content is to be thought of instrumentally: it is no more than a tool for understanding our

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[12]For more on additional resources, see Stalnaker (1968), Parsons (1971), Belnap (1973), Kripke (1976), Prior (1971), Rayo and Yablo (2001) and Hofweber (2005).

[13]The seminal text is Carnap (1950). For a refreshing discussion of related issues, see Burgess (2005).

use of language and our mental life. Assigning truth-conditions to sentences is a way of understanding how we use them to communicate, and assigning truth-conditions to mental attitudes is a way of understanding how our minds work. Accordingly, there is no sense to be made of the question whether an assignment of truth-conditions is correct over and above the question whether it is a successful tool.

A theory of content can be expected to impose structural constraints on the space of possible demands on the world. In particular, one can expect demands to be partially ordered by strength. (If the ordering induces a complete atomic Boolean Algebra, then one can think of the algebra's atoms as 'worlds', and represent demands as sets of worlds. It cannot be taken for granted, however, that such worlds will coincide with the metaphysically possible worlds—this is a substantial matter, to be decided by the theory.) Once the structure is in place, one must decide how to implement it. On the one hand, one must assign a position in the structure to each sentence of the object language and each of the mental attitudes under study. On the other, one must decide what each position in the structure is to demand of the world: one might stipulate, for example, that position δ is to be thought of as the demand that snow be white.

The task of choosing and implementing a structure is highly constrained by empirical considerations. If one treats δ_1 as the demand that mollusks be dangerous, and δ_2 as the demand that there be no dangerous creatures in the garden, then—other things being equal—one should assign δ_1 as the content of one of Jones's beliefs and δ_2 as the content of one of Jones's desires only if one thinks that, under circumstances in which mollusks are dangerous, Jones is disposed bring it about that there are no dangerous creatures in the garden. And if one treats the demand that there be slugs in the garden as stronger than the demand that there be mollusks in the garden, then one had better think that part of what it is to have mollusks in the garden is to have slugs in the garden.

In spite of such empirical constraints, it cannot be excluded *a priori* that different implementations of a structure prove equally successful as tools for understanding the

language and mental life of the population under study. And because a theory of content is thought of as no more than a tool, there is no sense to be made of the question whether an implementation is *correct* over and above the question whether it is successful. So choosing amongst the rival implementations would be simply a matter of convenience.

Here is an illustration. Say that the language under study is the language of arithmetic, and that we have two different implementations of a given structure: $\mathcal{I}_1$ and $\mathcal{I}_2$. $\mathcal{I}_1$ is based on the standard semantics for the language of arithmetic. Accordingly, the arithmetical sentence '$Num_x[\text{PLANETS}(x)] = 8$' is assigned a certain position in one's structure, and this position is thought of as the demand that the number of the planets be identical to the number eight. $\mathcal{I}_2$, on the other hand, is based on a semantics delivering ontologically innocent truth-conditions.[14] Accordingly, '$Num_x[\text{PLANETS}(x)] = 8$' is assigned the same position as before, but this time the position is thought of as the demand that there be exactly eight planets.

Now suppose that $\mathcal{I}_1$ and $\mathcal{I}_2$ form the basis of our two best theories of content, and that neither of them is more successful than the other. What should one say about the ontological commitments of '$Num_x[\text{PLANETS}(x)] = 8$'? On the view we are considering, the choice amongst $\mathcal{I}_1$ and $\mathcal{I}_2$ is merely a matter of convenience. So nothing of substance can turn on the question of whether '$Num_x[\text{PLANETS}(x)] = 8$' is thought of as carrying commitment to numbers and planets, or to planets but not numbers. What is significant is not the question of how to describe the ontological commitments carried by '$Num_x[\text{PLANETS}(x)] = 8$' (and, more generally, its truth conditions). What is significant is the relative position of the demand assigned to '$Num_x[\text{PLANETS}(x)] = 8$' in the space of possible demands.[15]

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[14] As emphasized in footnote 11, identifying such a semantics is non-trivial. For the sake of concreteness, I think of $\mathcal{I}_2$ as based on the semantics set forth in my 'On Specifying Content'.

[15] Thanks to Matti Eklund, Caspar Hare, Zoltán Gendler Szabó and Gabriel Uzquiano for their many helpful comments.

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