Ontological Commitment

Daniel Durante

Abstract: Disagreement over what exists is so fundamental that it tends to hinder or even to block dialogue among disputants. The various controversies between believers and atheists, or realists and nominalists, are only two kinds of examples. Interested in contributing to the intelligibility of the debate on ontology, in 1939 Willard van Orman Quine began a series of works which introduces the notion of ontological commitment and proposes an allegedly objective criterion to identify the exact conditions under which a theoretical discourse signals an assumption of existence. I intend to present the concept of ontological commitment and the Quinean criterion, to expose and evaluate some of the many criticisms to which the criterion has subject and to situate it in the context of Quine's philosophy. As a product of such analyses, I hope to contribute to the discussion on the application and relevance of the notion of ontological commitment.

1 Introduction

THE notion of Ontological Commitment came to light in an article Quine published back in 1939, named "*A Logistical Approach to the Ontological Problem*" (hereinafter LAOP). Its opening sentence questions: "What does it mean to ask, e.g., whether there is such an entity as roundness?" (Quine, 1966a, 64).

Quine does not ask whether roundness exists or not. He asks about the meaning of asking about roundness as an entity. Rather than examining what exists or not, this question invites an appraisal of what it means to exist, to be an entity. The product of his investigation, therefore, will not be a catalogue of what exists, but a construal of *what it is to exist*, which is the core of a "concept of existence" and an important part of a broader "doctrine of being".

To be able to argue for the existence or not of a supposed entity, such that it becomes possible to overcome the fundamental differences of opposing views, there is no plausible alternative to adopting some concept of existence that provides a rational standard for argument. Without such previous characterization of what it means to exist, any debate on ontology is reduced to prejudices and arbitrariness.

Quine's inaugural question presages the path of his investigations. The notion of ontological commitment, which he is to introduce, establishes two preconditions for ontological debates, to wit, the stipulation of a concept of existence, and the requirement of coherence with that concern. No matter how one understands what it is to exist, under Quine's preconditions all suppositions of existence made in an ontological debate can only be ascribed when they are ontological commitments given by the previously assumed concept of existence. The notion of ontological commitment is, therefore, a vindication of rationality.

In LAOP's second line, Quine proceeds:

> Note that we can use the word 'roundness' without acknowledging any such entity. We can maintain that the word is syn-

> categorematic, like prepositions, conjunctions, articles, commas, etc.: that though it occurs as an essential part of various meaningful sentences it is not a name of anything. *To ask whether there is such an entity as roundness is thus not to question the meaningfulness of 'roundness'; it amounts rather to asking whether this word is a name or a syncategorematic expression.* (Quine, 1966a, 64) (emphasis mine) [1]

Here Quine chooses one of two different ways of understanding the question about the existence of roundness. In so doing he counterposes two distinct concepts of existence. The doctrine he rejects associates being with meaningfulness, the one he endorses, with reference.

We should not let the linguistic way in which Quine poses the alternatives to obscure the radical difference between these two concepts of existence. Relating being with significance or meaningfulness, for instance, seems a good way of connecting with idealistic or phenomenalistic conceptions of existence, or even with a deflationism regarding ontology itself. Relating being with reference, by contrast, seems a plausible path toward ontological realism.

Each one of these two concepts of existence demands a particular specification of what are the ontological commitments of the sentences we endorse.[2] Consider the statement:

$$\textit{Pebbles have roundness.} \tag{1}$$

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[1] As used by scholastic logicians the adjective 'syncategorematic' was applied to words that could not stand for any Aristotelian category, having no self-sufficiency, but acquiring meaning only in connection with other terms to form a proposition. Since they were not linked to categories, syncategorematic words would have no metaphysical or ontological weight.

[2] Strictly speaking, the bearers of ontological commitments are sentences or theories. Which of these two options is the best is a subject that will be addressed below. In a broader sense, however, we can also refer to the ontological commitments of discourses or even people. A discourse will have the ontological commitments of the sentences and theories that compose it and people, in turn, assume the ontological commitments of the discourses, theories and sentences they accept.

The word 'roundness' is here a meaningful term of a meaningful sentence. According to the doctrine which associates being with significance, it is plausible to impute the supposition that roundness exists to this sentence and to anyone who endorses it. On the one hand, if meaningfulness assures existence, then sentence (1) expresses an ontological commitment with roundness.[3] On the other hand, according to Quine's preferred doctrine, which relates being with reference, it is only legitimate to impute the supposition that roundness exists to this sentence if the word 'roundness' works there as a vehicle for reference (a role usually occupied by names) and not only as a syncategorematic expression which, though contributing to the meaning of the sentence, does not name anything.

Two fundamental questions arise. First of all, why should we favour reference over meaningfulness when questioning what it means to exist? Secondly, within the doctrine of reference, what are the grounds for deciding when a term is a legitimate vehicle for reference?

Dealing with these two questions will be a recurring task for Quine in the thirty years following the publication of LAOP. The first and more general one is ignored by him at this initial moment. His preference for the doctrine of reference will only be justified by his most general philosophical conceptions: his naturalism; his rejection of the notions of analyticity, synonymy and other intensional notions; his principle of ontological parsimony, guided by adhesion to Ockham's razor, and his standards of ontological admissibility, based on criteria of individuation provided by the logical laws of identity.

Quine's answer to the second question, about the grounds of deciding wheter a term is a legitimate vehicle for reference, will be given precisely by his criterion of ontological commitment, together with his conceptions of regimentation, paraphrase and ontological reduction.

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[3] There is an example of explicit support to the theory of meaningfulness in John Searle (1969, 104).

To summarise this introduction, we could say that the notion of *ontological commitment* represents the recognition that imputation of supposition of existence to discourses is only legitimate when attached to some conception of existence previously taken, while the notion of a *criterion of ontological commitment* clarifies this attachment. Once fixed to a concept of existence, the criterion establishes which elements of discourses testify some determinate supposition of existence. In Quine's proposal, the concept of existence is tantamount to a *referential doctrine of being* and the elements which testify supposition of existence will be those that behave as legitimate vehicles of reference. [4]

In what follows, Section Two presents the methodological choices that led Quine to his formulation of the criterion of ontological commitment, which is given in Section Three, together with an equivalent alternative formulation. Sections Four through Six involve analysis, interpretation and evaluation of Quine's criterion and the notion of ontological commitment. Section Four demonstrates, contrary to Quine's own belief, the intensional nature of ontological commitment, and Section Five presents some objections and answers. The main purpose of this section is not to attack or defend Quine's criterion, but rather to use attacks on it and responses to these to deepen understanding of the criterion and its implications for multiple philosophical issues. Finally, in Section Six, the notion of ontological commitment is put into perspective with other general aspects of Quine's philosophy. Clarifications developed in the previous sections are used not only to defend the unity and coherence of the philosophical view that Quine sustained until the end

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[4] I do not think these few words have clarified what I am calling the referential doctrine of being. This clarification would involve many aspects beyond the purposes of this article. A commendable introduction to these more general Quinean metaontological questions is Peter Van Inwagen (2009). To our purposes here, it is enough to realise that there is more than one distinct mode to conceive the way in which existence shows itself up in the language and that for Quine this way is not reachable through meaning, but through reference.

of the 1960s, but also to point out the impossibility of its complete achievement.

2 Quine's path to the criterion's formulation

In the second paragraph of LAOP, Quine introduces his decisive hunch:

> Ontological questions can be transformed, in this superficial way, into linguistic questions regarding the boundary between names and syncategorematic expressions. Now where, in fact, does this boundary fall? *The answer is to be found, I think, by turning our attention to variables*. (Quine, 1966a, 64) (emphasis mine)

The formulation of the ontological commitment criterion will require Quine to clarify under what conditions a term is a legitimate name, and therefore a vehicle for reference and existence, and under what conditions it only contributes to the overall meaning of the sentence.

Quine understands that he cannot entrust this task to grammar. The "names" he seeks are not the grammatical nouns. If so, there would not be much difference between the doctrines of reference and significance, since most of the verbs, adjectives, adverbs to which we attach some meaning can easily be transformed into nouns. In his own example, the word 'roundness', is a noun obtained from the adjective 'round'. Besides, there is the opposite problem of many expressions which are grammatical nouns, but have no ordinary reference, such as 'Pegasus', or 'the typical Brazilian'.

Furthermore, to produce an inventory of the possible nouns of a language and to impute to them the supposition of existence could, at most, give us a roll of what there can be for the speakers of that language. This list, however, was never Quine's intention, and it wouldn't help to answer his inaugural question, which wasn't to know if roundness exists or not, but to find out what it means to ask if roundness exists. The title of his most famous article on this

topic, published in 1948, isn't "What there is", but "<u>On</u> what there is"(Quine, 1963d). Therefore, the answer his criterion of ontological commitment can give will not be a catalogue of what there is, but it will be a step towards the clarification of what it means to exist.

In a rework of LAOP published at the end of that same year of 1939, under the title "Designation and Existence", Quine gives the clearest description of what had motivated him in the formulation of his criterion: [5]

> Perhaps we can reach no absolute decision as to which words have designata and which have none, but at least we can say whether or not a given pattern of linguistic behaviour construes a word W as having a designatum. *This is decided by judging whether existential generalization with respect to W is accepted as a valid form of inference*. (Quine, 1939, 706) (emphasis mine)

Quine clarifies that the pattern of linguistic behaviour that construes a word as a vehicle for reference will not be grammatical, but logical. Not all grammatical nouns lead to what exists, only do that those to which an application of the existential generalisation logical rule is accepted as valid. [6]

When I say:

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[5] Unlike LAOP, which was republished in "The Ways of Paradox and Other Essays", the article "Designation and Existence" does not appear in Quine's famous Collected Works. I owe my awareness of this article and this very quote to Oswaldo Chateaubriand (1971).

[6] In a strict sense, the rule of existential generalisation is the logical rule that authorises an inference of a general affirmation of existence (*there are Fs*) from a sentence that predicates something of an individual (a *is an F*). In symbols: $F(a) \vdash \exists x\, F(x)$. In a broader sense, as it is used by Quine in the above quotation, to say that existential generalisation is accepted as a valid inference with respect to a word 'W' equals to consider 'W' as a legitimate name. That is, a name that designates something, which has a reference. Therefore, a formal application of the existential generalisation rule of the type $G(w) \vdash \exists x\, G(x)$ would be a valid application.

> *This coin and that pizza have roundness.*   (2)

It seems clear that I would accept as valid an application of existential generalisation that would lead to:

> *This coin exists.*   (3)
> *That pizza exists.*   (4)

It is not clear, however, if I would accept as valid an application of existential generalisation that would lead from (2) to:

> *Roundness exists.*   (5)

For even though 'roundness' is a name in (2), I could have said what I meant by (2) through the sentence:

> *This coin and that pizza are round.*   (6)

But I cannot infer (5) from (6) by existential generalization, since 'round' is not a name, but an adjective that in (6) functions as a predicate nominative.

It seems we go back to square one. After all, we can, as we wish, accept or not as valid an application of existential generalisation on 'roundness' depending on whether we attach ourselves to the form (2) or we allow the form (6).

Some issues, however, need to be clarified. We again must remember that the purpose of Quine's criterion has never been to decide whether roundness or any other supposed entity exists or not, but only to indicate the exact circumstances in which, according to the referential doctrine of being, we can impute to discourses (and its holders) a particular assumption of existence.

The appeal to the existential generalisation rule indicates Quine's preferences for his criterion. Natural language, with all its subtleties and different ways of expression, is not the adequate environment to judge if an application of the existential generalisation rule is accepted as valid or not. A more auspicious entourage to do that will be the language of first-order classical logic, with the additional restrictions Quine imposes on it: the elimination of names (individual constants) and the Russellian way of formalising descriptions. It is in this strict *canonical notation* that, according to Quine, we will finally be able objectively to verify suppositions of existence. [7]

In the austere ambience of canonical notation there are no discourses, but formalised sentences and theories; there are no names, but variables and quantifiers; there are no properties or relations, but limited sets of pre-established symbols of predicate and relation that constitute the non-logical vocabularies of each formalised theory. Quine's criterion is formulated by focusing on the formalised theories in this canonical notation. Its application to general discourses thus is only indirect. It requires the intermediate step of formal *regimentation*.

More than forty years after LAOP, in "Things and Their Place in Theories", of 1981, Quine justifies formal regimentation in the following terms:

> The idea of a boundary between being and nonbeing is a philo-sophical idea, an idea of technical science in a broad sense. Scientists and philosophers seek a comprehensive system of the world, and one that is oriented to reference even more squarely and utterly than ordinary language. Ontological concern is not a correction of a lay thought and practice; it is

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[7] A first-order language includes among its non-logical symbols individual constants, which are the formal counterparts of the names. In his 1939 articles, Quine still accounted individual constants in his canonical notation. Yet, in "On What There Is", he expanded the theory of definite descriptions of Bertrand Russell (1905) to reach names also, and promoted through this a complete elimination of individual constants from canonical notation (Quine, 1963d, 7–8). See Daniel Durante (2011, 34).

foreign to the lay culture, though an outgrowth of it. (Quine, 1981b, 9)

In order to evaluate the ontological commitments of a discourse, we first need to regiment it in the canonical notation. Then we need to specify an interpretation for the non-logical symbols, of predicate and relation, and to treat the regimented version as a theory, that means, to add to the explicitly declared sentences (the axioms of the theory) all its logical consequences. As there are no names in the canonical notation, the only vehicles for reference and therefore for existence are variables. And mathematicians usually say that the reference of a variable is its *value*.

3 "To be is to be the value of a variable"

We have finally reached the point of making sense of both, the statement of Quine's ontological commitment criterion and his famous slogan about being. And we already find a first expression of both in 1939, right on the third page of LAOP.

> We may be said to countenance such and such an entity if and only if we regard the range of our variables as including such an entity. *To be is to be a value of a variable*. (Quine, 1966a, 66) [8]

Quine's slogan is nothing more than the statement of the concept of existence he favours, the referential doctrine of being, in conjunction with the conception that the variables of canonical notation are the only unequivocal and legitimate vehicle for reference. Quine's criterion, in turn, is only an immediate consequence of that: if to be

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[8] Quine later changed the expression "a value" to "the value". Thereby the definitive version of his slogan became "to be is to be the value of a variable" (Quine, 1963d, 15). Many authors, as João Branquinho (2006, 152), add the adjective "bound" to the term "variable" and present the slogan as: "to be is to be the value of a bound variable". Both versions are equivalent by reasons which will be made clear in this section.

is to be the value of a variable, then we are ontologically commit-
ted to the existence of everything we count among the values of our
variables.

So defined, the slogan still requires explanation. What are the
means available to identify in the canonical notation the values of
the variables of a regimented theory? Another formulation of the
criterion presented in one of the last papers Quine devoted to this
theme, "Existence and Quantification" first published in 1968, clari-
fies the issue better:

> To show that a theory assumes a given object, or objects of a
> given class, we have to show that the theory would be false if
> that object did not exist, or if that class were empty. (Quine,
> 1969a, 93)

Then a theory ontologically commits itself to something when the
theory would be false if that thing didn't exist and were not among
the values of the theoretical variables. Consider the following canon-
ically regimented sentences:

$$\exists x\, \mathsf{Ghost}(x) \qquad\qquad - \quad (\textit{There are ghosts}) \qquad\qquad (7)$$

$$\forall y\, (\mathsf{Ghost}(y) \to \mathsf{Diaphanous}(y)) \quad - \quad (\textit{Ghosts are diaphanous}) \qquad (8)$$

When will (7) be false? It will be false when none of the possible
values for the variable x is a ghost. If in the range of x there is no
ghost, then (7) is false. So, if the class of ghosts is empty, (7) is
false and, therefore, (7) and any theory of which (7) is one of its
sentences *ontologically commits* itself to ghosts.

What about (8), when will it be false? It only will be false if,
among the range of y's values there is at least one which is a ghost
but not diaphanous. If none of the values of y is a ghost, the formal
semantic rules assure that (8) is true. After all, (8) does not state

that there are ghosts. It only states of anything that if it is a ghost, then it is diaphanous. Hence, unlike (7), (8) *does not ontologically commit* itself to ghosts, because there need be no ghosts for (8) to be true.

The resort of regimentation in canonical notation and the appeal to semantic rules that explain the truth conditions of formalised sentences help us to perceive that we can use the word 'ghost' in meaningful and possibly true sentences, as (8), without any commitment to the existence of ghosts. These examples, I believe, help to clarify not only the importance of the notion of ontological commitment for the ontological debate but also the foundations of Quine's criterion.

Another advantage given by regimentation is that *semantic rules*, which establish the truth conditions of sentences, and *logical rules*, which settle its logical consequences, are so strongly related that one can prove that a theory $\mathbf{T}$ requires an entity of type P among the values of its variables if and only if '$\exists x\, P(x)$' is one of the logical consequences of $\mathbf{T}$. In other words, to say that $\mathbf{T}$ would be false if the class P were empty is the same as to say that '$\exists x\, P(x)$' is one of the logical consequences of $\mathbf{T}$. Then, given that a theory ontologically commits itself to what would make it false if it were not among the values of its variables, we could propose the following alternative formulation for Quine's criterion:

$$\mathbf{T} \text{ ontologically commits itself to } Ps \iff \mathbf{T} \vDash \exists x\, P(x) \;^9$$

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[9] Though overly formal details have been avoided, some clarifications are needed to avert misunderstandings: **(1)** The expression 'theory $\mathbf{T}$' is being used ambiguously to express both a set of axioms of $\mathbf{T}$ as well as its deductive closure, that is, the collection of $\mathbf{T}$'s axioms plus all its logical consequences. **(2)** To formalise a theory in canonical notation, one uses a non-logical vocabulary, a set of predicate and relation symbols that are part of the theory's sentences. Then in '$\exists x\, P(x)$', for instance, 'P' is a predicate symbol of the theory's vocabulary. Fonts sans serif are being used for symbols of canonical notation; which can be upper case letters (as 'G') as much as words beginning with upper case letters (as 'Ghost'). **(3)** A theory $\mathbf{T}$ is interpreted in the sense used by Quine when for each predicate symbol 'P' and relation symbol 'R' from its vocabulary there is an accepted criterion to judge from which

That means that the theory **T** ontologically commits itself to entities of type P if and only if '$\exists x\, P(x)$' is one of the logical consequences of **T**. Thus, to know the ontological commitments of any theory **T**, it is enough to examine its existential affirmations; both the explicitly stated ones, **T**'s axioms, as much as those that are logical consequences of them.

Slightly altered versions of this formulation have been repeatedly suggested in the literature by Richard Cartwright (1954), Alonzo Church (1958), Chateaubriand (1971), Mark Richard (1998), Agustín Rayo (2007) and Michaelis Michael (2008), among others. Quine has, however, always preferred to formulate his criterion in more directly semantic terms. Nevertheless, his agreement to this alternative formulation can be attested in some passages.

> Existence is what existential quantification expresses. There are things of kind F if and only if $\exists x\, F(x)$. This is as unhelpful as it is undebatable. (Quine, 1969a, 97)

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things (entities) one considers true to say they are Ps and from which sequence of things one considers true to say they are related according to R. Then, to each predicate symbol 'P' from the vocabulary of a theory **T**, an interpretation associates an extension given by the class of things regarded to be of P kind, that means, the extension of 'P' is the class given by the values of 'x' to which the interpretation considers 'P(x)' is true. For instance, to the predicate symbol 'Blue' an orthodox interpretation associates the class of blue things as its extension. **(4)** There are two possible readings to expressions 'class P', 'entities of type P' and 'Ps', as they are being used. In an *extensional* rendering, what has been called 'class P' corresponds exactly to this extension associated with 'P' by a predefined interpretation. In this case, the 'entities of type P' or simply the 'Ps' are the elements of this extension, the entities (values of 'x') to which the predefined interpretation considers the predication P(x) to be true. In an *intensional* reading, otherwise, 'class P', 'type P' or just 'P' refer to the proper concept (or characteristic function) which defines the extension of the predicate 'P' by the predefined interpretation. I do not intend to resolve this ambiguity for reasons that will be clear in the next section. **(5)** The symbol '$\vDash$' corresponds to logical consequence. As we are in the scope of first-order classical logic in which the completeness theorem holds, an alternative equivalent formulation to finitely axiomtizable theories can be obtained substituting '$\vdash$' (deductive consequence) for '$\vDash$'.

Now, if there are things of the type F if and only if $\exists x\, F(x)$, then the theory **T** assumes things of type F (ontologically commits itself to Fs) if and only if $\mathbf{T} \vDash \exists x\, F(x)$, that is, if '$\exists x\, F(x)$' is one of the affirmations of **T**.

This alternative formulation takes us back to "Designation and Existence", where Quine pointed out, in the rule of existential generalisation, the linguistic behaviour that signals a commitment to existence. It also highlights what may be Quine's most influential contribution to contemporary ontology: the metaontological conception that existence is inseparable from quantification. Any doctrine about being requires and binds to a particular theory of quantification. Therefore different theories of quantification reflect different concepts of existence.

> Classical quantification theory enjoys an extraordinary combination of depth and simplicity, beauty and utility. [...] Deviations from it are likely, in contrast, to look rather arbitrary. But insofar as they exist it seems clearest and simplest to say that deviant concepts of existence exist along with them. (Quine, 1969a, 112–113)

This link between existence and quantification is a legacy of Quine that is present on almost every flank of the contemporary ontological debate, incorporated as a methodological element accepted by philosophers with the most divergent views on ontology and metaphysics.[10]

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[10] As Branquinho (2012) points out, we can go back a little further and assign to Frege and Russell the origins of this linkage between existence and quantification. It was, however, Quine and his notion of ontological commitment that gave it its more mature expression. In David Chalmers et al. (2009), which is a collection of articles, there are good examples of how the link between existence and quantification is used and accepted by proponents of widely divergent positions on ontology and metaphysics. Although among these articles there are examples of disagreement with this thesis, as in Kit Fine's "The question of ontology", whose influential position has produced a new growing movement away from the Quinean thesis linking existence and quantification. In this regard see, for instance, Tuomas Tahko (2015) and Berto and Plebani (2015).

4   Ontological commitment and intensionality

The distinction between the *extension* and the *intension* of a predicate was already known by the medievals, and its origins go back to Aristotle. The extension of a predicate is composed of the things of which it is true, and its intension is roughly connected with its meaning. The extension of the predicate 'courageous', for instance, are the brave individuals, and its intension corresponds to what enables us to distinguish courageous individuals from those who are not. Intensions and extensions do not always go together. The predicates 'being a rational animal' and 'being an animal with opposing thumb' clearly have distinct meanings: what enables us to identify whether or not an animal is rational is clearly different from that which allows us to determine whether or not it has an opposing thumb. Therefore even though these two predicates have the same extension, for being true of exactly the same individuals, they have different intensions.

Just as traditional mathematics and set theory are exclusively extensional disciplines, Quine believed that the same could be obtained in general theoretical discourse. He believed that we could do science and philosophy without the need of dealing with intensions, meanings, and related notions. What is more, he considered these as problematic notions and strove to exclude them altogether from his philosophical project. In "Ontology and Ideology", from 1951, he wrote:

> [A] fundamental cleavage needs to be observed between two parts of so-called semantics: the theory of reference and the theory of meaning. The theory of reference treats of naming, denotation, extension, coextensiveness, values of variables, truth; the theory of meaning treats of synonymy, analyticity, syntheticity, entailment, intension. Now *the question of the ontology of a theory is a question purely of the theory of reference*. The question of the ideology of a theory, on the other hand, obviously tends to fall within the theory of meaning; and, insofar, it is heir to the miserable conditions, the virtual lack of

scientific conceptualization, which characterize the theory of
meaning. (Quine, 1951, 15) (emphasis mine)

The theory of reference is thus the part of semantics for which the extensional notions are enough, which dispenses with considerations about the intensions of linguistic expressions. The theory of meaning, in turn, is the part of semantics whose understanding extrapolates reference and extension and requires the notions of intension, meaning, and analyticity, which Quine vehemently rejects as confusing and obscure. In "Two Dogmas of Empiricism", from 1951, perhaps his most famous article, Quine (1963e) presents an eloquent critique of the notions of analyticity and synonymy, well according to this zest for rejecting intensional notions.

In one of the earliest critical reactions to Quine's ontological commitment criterion, Cartwright (1954) contests the above-highlighted statement, which places questions about the ontology of a theory exclusively within the theory of reference's scope. In examining the formulations of the criterion, Cartwright noted that they employ terms that Quine associates with the theory of meaning.

Among the more than a dozen formulations Quine presented for his criterion, all catalogued by Chateaubriand (1971), we can choose the following as perhaps the most representative:

[E]ntities of a given sort are assumed by a theory if and only if some of them *must* be counted among the values of the variables in order that the statements affirmed in the theory be true. (Quine, 1963b, 103) (emphasis mine)

To say that entities *must* be the values of certain variables is the same as saying that it is *necessary* for them to be such values, and according to Cartwright (1954, 319), the term 'necessary' is as good a candidate for the meaning theory as the terms 'analytical' and 'entailment' are. Also, our alternative formulation does not escape the problem since it is not explicit about how we should interpret the ex-

pression 'Ps' in "**T** ontologically commit itself with Ps". [11] Besides, it explicitly employs the notion of logical consequence '$\vDash$', whose characterization as belonging to the theory of meaning or reference is at least controversial (Etchemendy, 1990).

Most contemporary philosophers do not share Quine's suspicions against the theory of meaning and therefore do not consider the supposed intensional character of ontological commitment as a problem. Yet, being accused of disrespecting one's own standards is one of the worst philosophical faults. One possible way of bringing Quine out of this embarrassment would be to present an extensional interpretation of the criterion which did not need for its formulation any intensional notion related to the theory of meaning. Unfortunately, this possibility has not been realised. Cartwright (1954), Israel Scheffler and Noam Chomsky (1958), Terence Parsons (1967), Michael Jubien (1972), Chateaubriand (2003), among others, have shown that the intelligibility of the notion of ontological commitment is incompatible with any extensional interpretation.

The notions of intension and extension, earlier related with predicates, can also be defined as applying to other linguistic expressions. Just as the extension of a predicate are the objects of which it is true, the extension of a n-ary *relation* (or an open sentence with n free variables) are the sequences of n objects to which the relation (or sentence) is true. The extension of a *singular term* is its reference, the object it denotes, and the extension of a (closed) sentence is its truth value. Two expressions (predicates, relations, open sentences, individual terms or closed sentences) will be *co-extensive* if they have the same extension (Hylton, 2007).

These definitions provide a fairly objective test of whether the interpretation of certain expressions may be restricted to their extensions, which is called an *extensional context*, or whether the intelligibility of what is said requires the incorporation of the intensions of terms, which is known as an *intensional context*. The test works like

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[11] See item (4) of footnote 9.

this: if substitutions of singular terms, predicates, and relations in a closed sentence by coextensive singular terms, predicates, and relations never alter the extension of the sentence itself (its truth value), then this indicates an extensional context of interpretation. Otherwise, when substitutions of coextensive expressions can change the extension of the compound expression, then this shows that the understanding of what is said requires the use of intensional notions, which characterises an intensional context.

For example, when we replace 'Morning Star' with the co-referential expression 'Evening Star' in the true sentence, "*Ancient astronomers knew that, besides the moon and the sun, the Morning Star was the last orb to go out of sight in dawn*", we get the false sentence "*Ancient astronomers knew that, besides the moon and the sun, the Evening Star was the last orb to go out of sight in dawn*". Then, sentences that deal with knowledge claims do not pass the extensionality test since the substitution of co-referential terms may change the sentence's truth value. This indicates that the intelligibility of knowledge claims requires an intensional semantic context.

The bases of the test are both, the principle of *substitutivity of identicals* and the law of *identity of indiscernibles*.[12] If all that matters semantically are extensions of expressions, then expressions with the

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[12] In very general terms, the principle of substitutability of identicals establishes that identical things can be substituted for each other without provoking any consequence, since being identical, they are in fact the same thing. And the principle of identity of indiscernibles, also known as Leibniz's law, states that it is not possible for two different things to be exactly similar to each other. That is, distinct things need to be discernible, dissimilar in some respect. Otherwise, they were not distinct, but the same thing. There is a lot of disagreement about the understanding, validity and precise formulation of these principles. For our purposes here, given the semantic context we are in, we can consider that the substitutability of identicals states that two expressions with identical *semantic values* (sense and reference) can be substituted for each other in a sentence without this causing the change of the semantic value (sense and truth value) of the complete sentence. The identity of the indiscernibles, in its turn, guarantees that if two expressions are semantically indiscernible, that is, if they affect the semantic value of all sentences in which they can occur in exactly the same way, then their own semantic values (sense and

same extension should be semantically indistinguishable, and thus by the identity of indiscernibles, semantically identical. Then, by the substitutivity of identicals, they should be substitutable without any semantical consequence. When this is the case, substitutions of co-extensive expressions do not change the extension of the compound expression, which circumstance characterises extensional contexts. Otherwise, when replacement of coextensive expressions does alter the extension of the compound expression, this circumstance characterises a situation where expressions with the same extension are not indiscernibles and thus not semantically identical. Then, their semantic account requires more than extensions. It also demands their intensions, which characterises intensional contexts. There is a clearly pragmatic intuition in the use of the test: where intensions make no difference, do not alter the truth or falsity of what is said, we do not need them. They should only be considered part of the semantic interpretation when required.

Jubien (1972) used the test of substitutability of coextensive expressions to show that the intelligibility of the concept of ontological commitment is incompatible with any extensional interpretation. Firstly, he proposed to treat an ontological commitment as the second term of a binary relation whose first term is an interpreted theory. Thus, to assert that α is one of the ontological commitments of the theory $\mathbf{T}$ is equivalent to affirm the following relation:

$$\mathbf{T} \quad assumes \quad \alpha$$

The concept of ontological commitment will have an extensional interpretation if all assertions of the kind ($\mathbf{T}$ $assumes$ α) respect the principle of substitutivity. In this case, if it is true that ($\mathbf{T}$ $assumes$ α)

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reference) are identical. Thus defined, these become plausible principles, whose non-acceptance would undoubtedly require more justification than the acceptance.

and that α and β are coextensive, then it must also be true that ($\mathbf{T}$ *assumes* β).[13]

At this point, a question hitherto avoided imposes itself: what kind of thing can be an ontological commitment of a theory? When I say that ($\mathbf{T}$ *assumes* α), what is it that $\mathbf{T}$ assumes? What is the domain of the α variable? The answer that a literal interpretation of Quine's criterion gives is that the domain of α and of the variables of the theory $\mathbf{T}$ are the same. After all, Quine states that "entities of a given sort are assumed by a theory if and only if some of them must be counted among the values of [its] variables" (Quine, 1963b, 103).

Consider then the following two theories, each of them with only one existential affirmation orthodoxly interpreted:

$$\mathbf{T_U} : \quad \exists x\, \mathsf{Unicorn}(x) \qquad \text{—} \quad (\textit{There are unicorns})$$

$$\mathbf{T_C} : \quad \exists y\, \mathsf{Centaur}(y) \qquad \text{—} \quad (\textit{There are centaurs})$$

If '*assumes*' is taken as a relation between theories and entities of the same type as the values of their variables, then, since there are neither centaurs nor unicorns, there is no entity among the possible values of 'x' and 'y' to make true the sentences of $\mathbf{T_U}$ and $\mathbf{T_C}$. Therefore, according to Quine's criterion, $\mathbf{T_U}$ and $\mathbf{T_C}$ will have no ontological commitment.[14] In general, it will not be possible for a theory

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[13] Jubien's article is much more detailed than this quick outline which, nevertheless, respects the general structure of the Jubien's argument, organised on the analyses of the relation '*assumes*' and on the domain of its second term.

[14] Even if one wants to admit the existence of abstract entities that reifies the concepts of centaur and unicorn, the application of predicates 'Centaur' and 'Unicorn' to these abstract entities will not be true. Admitting the opposite is both counterintuitive and leads to contradictions. It is counterintuitive because if there is, for example, an abstract entity that is the universal of the colour blue, precisely because it is abstract this entity has no colour, that is, it is not blue, it does not satisfy the predicate 'Blue'. And it leads to contradictions only because we can conceive contradictory properties. If the square roundness universal is round square, then it is round and not round, and it is also square and not square. Therefore,

to commit itself ontologically to what does not exist. This conclu-
sion is, however, contrary to any acceptable intuition for the notion
of ontological commitment. As Quine has repeatedly stated, "we
have moved now to the question of checking not on existence, but
on imputations of existence: on what a theory says exists" (Quine,
1969a, 93). But what a theory says exists cannot be held hostage to
what exists. Although there are no centaurs, T_C says there are, and
therefore makes ontological commitments.

A first possibility for solving this problem is to construe the re-
lation '*assumes*' not between theories and the entities that may be
values of their variables, but between theories and classes of these
entities. Since the empty class is still a class, even if there are no
unicorns the theory T_U would have an ontological commitment to
the empty class. The problem now is that there being no centaurs,
the ontological commitments of T_C would also come down to the
empty class, and therefore T_U, which only states that there are uni-
corns, and T_C, which only states that there are centaurs, would
nevertheless have the same ontological commitments, namely, the
empty class. Moreover, if we call α the extension of the predicate
'Unicorn' (that is, the unicorns' class) and β the extension of 'Centaur'
(the centaurs' class), we have:

$$T_U \quad assumes \quad \alpha$$
$$T_C \quad assumes \quad \beta$$

If we want to support that the context of the relation '*assumes*' is
extensional, then it must pass the test of substitutability. So, since
$\alpha = \beta = \varnothing$, we should be able to replace α with β in the above state-
ments getting:

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if there is some abstract entity that reifies the concept of a unicorn, it is not itself
a unicorn, but an abstract entity which, therefore, does not satisfy the 'Unicorn'
predicate. Thus, even if the value of x is precisely this entity, Unicorn(x) will be
false and therefore, under the hypothesis that the domain of the second term of
(T *assumes* α) is the same as that of the variables of T, T_U and T_C will not have
any ontological commitment.

$$\mathbf{T}_\mathsf{U} \quad assumes \quad \beta$$
$$\mathbf{T}_\mathsf{C} \quad assumes \quad \alpha$$

The principle of substitutability of identicals forces us to accept that $\mathbf{T}_\mathsf{U}$, which only states there are unicorns, ontologically commits itself to centaurs and $\mathbf{T}_\mathsf{C}$, which only states there are centaurs, ontologically commits itself to unicorns. Reasoning in the same way we can conclude that $\mathbf{T}_\mathsf{U}$ and $\mathbf{T}_\mathsf{C}$ also are ontologically committed to Pegasus, Count Dracula, phlogiston, and anything other theories wrongly claim to exist. In general, under the hypothesis that the second term of the relation *assumes* varies over classes of entities that may be the values of variables, all theories that affirm the existence of something that does not exist share some of their ontological commitments. Again, all these conclusions contradict the intuition that the ontological commitments of a theory should depend exclusively on what it claims to exist, not on what exists or on what other theories claim to exist. This leads to the conclusion that the relation '*assumes*' does not respect the substitutability of identicals, and thus does not pass the test either when we consider that its second term varies over classes of entities that may be values of the theory's variables.

If ontological commitments can neither be the entities that are the values of the theories' variables, nor classes of them, what are they? Concepts? Ideas? Attributes? Universals? Abstract particulars? Linguistic expressions (terms) that do not designate? According to Jubien (1972, 384), the adoption of any of these candidates and the "abandoning [of] the idea of a relation between theories and entities or classes forces us in the direction of intensionality". After all, what distinguishes centaurs from unicorns is, precisely, what differentiates the ontological commitments of $\mathbf{T}_\mathsf{C}$ and $\mathbf{T}_\mathsf{U}$. But we have seen that this distinction lies not in the entities (or their classes), which are centaurs and unicorns, for which the predicates 'Centaur' and 'Unicorn' apply. So it seems fair to say that the distinction between centaurs and unicorns is conceptual, intensional. It is not in

the things that are centaurs or unicorns but in the concept of being a
centaur or being a unicorn. This is the "direction of intensionality".

Furthermore, it does not matter our ontological categorization
for this I am calling a concept. We can treat it as something mental,
and insert it within the scope of meanings, ideas, intentions; we can
treat it as a linguistic term which belongs to some formalisation, as
the lambda calculus, or some semantic theory. We can even reify
the concepts of being a centaur and being a unicorn, attaching them
to some sort of abstract entity. All these possibilities are open to ex-
ploitation and may result in quite distinct and interesting approaches
to ontological commitments. All these approaches, however, will be
intensional because none of the candidates for second term of the
relation '$assumes$' capable of explaining what differentiates centaurs
from unicorns will respect the principle of substitutability of identi-
cals. Since there are no centaurs and unicorns, the things that are
centaurs and unicorns are identical, but what $\mathbf{T}_C$ commits to when
it only assumes centaurs cannot be identical to what $\mathbf{T}_U$ commits
to when it only assumes unicorns. According to Jubien, "[i]t is in
just this sense that commitment is asserted to be intensional: sub-
stitutivity of codesignative expressions in the second position of the
locution '$\mathbf{T}$ $assumes$ α' fails" (Jubien, 1972, 384).

To sustain that ontological commitment is an intensional notion
can show some incoherence in Quine's philosophy inasmuch as he
always defended its extensionality. But it is neither an objection to
the idea of ontological commitment nor a criticism of the criterion
itself. It is rather a clarification and a characterization of it. Church,
for example, in his 1958 paper, "Ontological Commitment", defends
both, the importance of the notion of ontological commitment and
its intensional character. On its importance, he states that "no dis-
cussion of an ontological question [...] can be regarded as intelligi-
ble unless it obeys a definite criterion of ontological commitment."
(Church, 1958, 1012). And he shows examples from Alfred Ayer,
Gilbert Ryle and Arthur Pap of ontological positions which are inco-
herent and unintelligible precisely because they do not respect any

notion of ontological commitment. On the intensionality of ontological commitments, he restrains itself to a footnote:

> I remark in passing that ontological commitment is an intensional notion, in the sense that ontological commitment must be to a class concept rather than a class. For example, ontological commitment to unicorns is evidently not the same as ontological commitment to purple cows, even if by chance the two classes are both empty and therefore identical. (Church, 1958, 1013–1014 (note 3))

The intensionality of the notion of ontological commitment is now considered a decided question, with Cartwright (1954) and Scheffler and Chomsky (1958) being the obligatory references. See, for example, Jill Humphries (1980, 164), Chateaubriand (2003, 47–49), Rayo (2007, 432) and Howard Peacock (2011, 89). It is worth noticing that in addition to some unsuccessful attempts to reformulate the criterion in an explicitly extensional way, Quine himself never responded directly to these accusations of intensionality.

5   Objections and replies

Over the years, the notion of ontological commitment has played a prominent role in the analytical tradition of philosophy. To the same extent, however, that Quinean metaontology has gained recognition and importance, several specific aspects of his criterion have received criticisms and objections, a few of which will be briefly discussed in this section. [15]

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[15] A theme so controversial and central to multiple areas of philosophy, with a constant presence in the literature for more than 70 years, surely deserves a less arbitrary an incomplete cut than the one done by the few objections here addressed. Nevertheless, among the objections with which I became aware, I chose to include those whose treatment I thought would contribute to deepening the understanding of the notion of ontological commitment and would highlight its connections with language, semantics, logic and metaphysics.

5.1 Alston, Searle and the relationship between ontology and language

A very common type of objection, first made by William Alston (1958) and then by many others, such as Searle (1969), Michael Hodges (1972), Frank Jackson (1980), Humphries (1980) and Hans-Johann Glock (2002) addresses the linguistic and formal aspect of Quine's proposal. These authors consider it is inadmissible that paraphrase or regimentation can solve substantive ontological questions. Alston, for instance, analyses several pairs of sentences where the second one supposedly avoids the ontological commitments of the first, such as:

$$\textit{There is a possibility that James will come.} \tag{9}$$

$$\textit{The statement that James will come is not certainly false.} \tag{10}$$

Then he states:

> whether a man admits (asserts) the existence of possibilities depends on what statement he makes, not on what sentence he uses to make that statement. [...] It is a question of what he says, not of how he says it. Hence he cannot repudiate his admission by simply changing his words. (Alston, 1958, 13)

According to Alston, if (10) says the same as (9), then either both commit themselves to the existence of possibilities or none commits. Our ontological commitments should depend only on what we say and not on how we say it.

Criticisms of this nature, however, are grounded in a false supposition that ontological reduction via paraphrase and regimentation demands synonymy. Regimentation in canonical notation requires choices on how to solve the many ambiguities of natural language discourse, some of which are related to ontology. (10) and (9) may not be entirely clear regarding the ontology they assume, but if (9')

and (10') are canonical regimented versions of (9) and (10) respectively and if the truth of (9') depends on one of its variables having a possibility as its value while the truth of (10') does not, then (9') and (10') are not only distinct sentences, they also make different statements. They are not synonyms. One of them (9') commits to the existence of probabilities, while the other (10') does not. Any ontological reduction, like the one from (9') to (10') shall be accepted whenever the ontological entity reduced isn't essential to the communication intended. It is not the case, as Alston claims, of saying the same thing in two different ways, but of saying different things. It is the case of having said more when one could have said less. [16]

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[16] I refrain from presenting (9') and (10'), the regimented versions of (9) and (10) in canonical notation, as this would involve making decisions on how to refer to propositions and sentences in a first-order language, which is a polemical issue that would divert our attention. This point, however, can be exemplified more easily by the sentence

$$\textit{Some dogs are white.} \tag{11}$$

presented by Quine (1963b, 113). (11) can be regimented in first-order language either by

$$\exists x\,(\mathsf{Dog}(x) \wedge \mathsf{White}(x)) \tag{12}$$

or by

$$\exists x\,(\exists y\,(\mathsf{Dogness}(y) \wedge \forall z\,(\mathsf{Dogness}(z) \rightarrow (y = z)) \wedge x \in y) \\ \wedge\, \exists z\,(\mathsf{Whiteness}(z) \wedge \forall w\,(\mathsf{Whiteness}(w) \rightarrow (z = w)) \wedge x \in z)) \tag{13}$$

which is only a version in pure canonical notation, without individual constants, of sentence

$$\exists x\,(x \in \mathsf{dogness} \wedge x \in \mathsf{whiteness})$$

The value of 'x', the only variable of (12), required for its truth is an individual who satisfies the property of being a dog and, also, the property of being white. But for (13) to be true, the variable 'y' must have the very property of dogness as its value, and the value of 'z' must be the property of whiteness. So even though

Among the other authors who raise this same kind of objection, Searle (1969) deserves to be highlighted due to his influence and for having advanced one more step beyond Alston's criticism.

> I want now [...] to attack the whole notion of a purely objective or notational criterion of ontological commitment by showing that if we really take it seriously we can show that any ontological commitment you like is only apparent simply by paraphrasing it. (Searle, 1969, 109)

Searle then proposes two definitions: [17]

'K': the conjunction of all scientific knowledge

'P': $P(x) =_{df} (x = \text{thispen}) \wedge K$

and presents the following proof: [18]

1	K	$(hypothesis)$
2	thispen = thispen	$(= introduction)$
3	(thispen = thispen) $\wedge$ K	$(\wedge\, introduction\ in\ 2,1)$
4	P(thispen)	$(definition\ of\ \text{P}\ in\ 3)$
5	$\exists x\, P(x)$	$(\exists\, introduction\ in\ 4)$

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(12) and (13) are regimented versions of the same sentence (11), they are not synonymous, they do not make the same statement. They make different claims with different ontological commitments. (13) commits itself to the existence of properties (formalised extensionally as sets) while (12) does not.

[17] Searle ignores that there is no individual constant in Quinean canonical notation and builds his argument with the help of the name 'thispen'. This fact, however, is not an essential issue, because the same argument could be produced without using names.

[18] Searle's proof and the next one were formalized here in Fitch's style natural deduction according to the rules of Jon Barwise et al. (1999, 557).

Searle claims this proves that the only ontological commitment of all scientific knowledge is this pen. As his proof depends neither on the sentences that 'K' abbreviates, nor on the reference of the name 'thispen' then, if Searle is right, with this argument we can, as we wish, either eliminate or assign any ontological commitment to any theory. This constitutes a *reductio ad absurdum* of the criterion (Searle, 1969, 110).

At first sight it may seem that Searle is right. After all, an assertion of '$\exists x\, P(x)$' is an assertion of the conjuntction of all scicentific knowledge (K) together with the affirmation of the existence of something identical to this pen. Yet, the only value that 'x' seems to have in order to '$\exists x\, P(x)$' to be true is *this pen* (the reference of the name 'thispen'). Hence, according to Quine's criterion, '$\exists x\, P(x)$' seems to commit itself only to this pen. Nevertheless, there is a glaring fault in Searle's argument. A way to show it is through the following proof:

1	$\exists x\, P(x)$	(*hypothesis*)
2	$\exists x\, ((x = \text{thispen}) \wedge K)$	(*definition of* P *in 1*)
3	ᵃ $(a = \text{thispen}) \wedge K$	(*supposition*)
4	K	($\wedge$ *elimination in 3*)
5	K	($\exists$ *elimination in 2 and 3–4*)

Whoever uses the sentence '$\exists x\, P(x)$' to assert all the scientific knowledge must hold the definition of 'P' Searle gives and, therefore, also has also to accept the above proof, which points out that 'K', the conjunction of all scientific knowledge, is a logical consequence of '$\exists x\, P(x)$'. Searle seems to have forgotten that theories rather than sentences have ontological commitments. Viewed as a theory, '$\exists x\, P(x)$' will have, besides the ontological commitment to this pen, which the sentence itself makes explicit, all the ontological commit-

ments of its logical consequences. Consequently, the above proof shows that '$\exists x\, P(x)$' will have the same ontological commitments as 'K' and one more, to with this pen. Thus, there is no elimination of ontological commitment, but only a single and not gratuitous addition, as '$\exists x\, P(x)$' says, in fact, more than 'K'. In addition to stating the conjunction of all scientific knowledge, it also states that this pen exists.

A different and less important question is to know what exactly the ontological commitments of 'K' are. Searle (1969, 109) only says that " 'K' is an abbreviation for (the conjunction of statements which state) all existing scientific knowledge." Now if he wants to criticise Quine's criterion, then he must show that its use, which demands regimentation on canonical notation, is in some sense problematic. Surely there will be obvious difficulties in any attempt of regimenting all scientific knowledge in one single formal theory and in taking the conjunction of all its axioms. Nonetheless, this is irrelevant to both Searle's argument and my criticism of it, because neither Searle's attack to Quine's criterion nor my defence of it relies on 'K''s constitution. Independently of what the ontological commitments of 'K' are and of how well they represent the ontological commitments of all scientific knowledge, Searle's argument would be successful if he had shown that his construction of '$\exists x\, P(x)$' cancels all the ontological commitments of 'K', replacing them with a single one. We have seen, nevertheless, that this is not the case. [19]

5.2 Rayo and the problem of extrinsic properties

Rayo (2007, 428) defines the *truth conditions* of a sentence "as demands that the truth of the sentence imposes on the world", and defines *ontological commitments* as a part or aspect of the sentence's

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[19] Though faulty, Searle's objection remains influential. Michael (2008) and Peacock (2011), for instance, ground their rejection of Quine's criterion on slightly altered but equally wrong versions of Searle's argument. For a much more detailed analysis of Searle's criticism, see Chateaubriand (1971, 39–47).

truth conditions. Among the demands that the sentence's truth imposes on the world, the ontological commitments will be those concerned with ontology, with what exists. Given this definition, Rayo then presents the following objection to Quine's criterion.

> Quine's criterion can undergenerate when the language contains atomic predicates expressing extrinsic properties. Part of what is to be a daughter is to have a parent. So, the truth of '∃x 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 '∃x Daughter(x)' to be true. (Rayo, 2007, 431–432)[20].

This is a very interesting criticism, bringing up profound issues with regard metaphysics and its relations with epistemology, semantics and language. The objection is quite straight. The only entities needed as values of 'x' for the truth of '∃x Daughter(x)' are daughters. Then, according to Quine's criterion, '∃x Daughter(x)' ontologically commits to daughters only. Yet, there can be no daughters where there are no parents. So it may seem that one of the ontological demands the truth of '∃x Daughter(x)' imposes on the world is that there be parents. Then, given Rayo's definition, '∃x Daughter(x)' also commits to the existence of parents and thus has more ontological commitments than Quine's criterion can tell.

Let's begin by noting that the problem of extrinsic properties, if it affects Quine's criterion at all, it does so much less often than may seem at first sight. The main reason for this is that Quine, unlike Rayo, sees theories, not sentences, as the bearers of ontological

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[20] Rayo also points out some limitations of Quine's criterion mainly related to the narrow expressiveness of canonical notation and formulates some expanded versions of it applicable to more expressive formal languages, such as one for languages with plural quantification and another for languages with modal operators of necessity and possibility. More than criticisms, these proposals are advancements of Quine's criterion of ontological commitment to broader contexts than its original focus, which was scientific theories. Yet Rayo himself admits that these expansions remain susceptible to his objection of extrinsic property (Rayo, 2007, 438)

commitment. We have already quoted one of the formulations of his criterion that states it explicitly:

> [E]ntities of a given sort are assumed by a *theory* if and only if some of them must be counted among the values of the variables in order that the statements affirmed in the *theory* be true. (Quine, 1963b, 103) (emphasis mine)

It seems common sense to expect that the more a property (extrinsic or not) is closely associated with a predicate, the more likely that property will be explicitly addressed by any reasonable theory dealing with the predicate. As the property of having parents is strongly associated with the predicate 'being a daughter', most of the comprehensible theories ontologically committed to daughters, where '$\exists x\, Daughter(x)$' is one of their sentences, will also be committed to parents, and will have the sentence '$\exists x\, Parent(x)$' or some equivalent form of it as one of their sentences. As a result, most theoretical contexts that commits us to daughters also commits us to parents, avoiding the problem of extrinsic properties.

But how strongly associated are daughters and parents? Rayo simply treats the need of parents for the existence of daughters as a triviality, but it's not clear if he treats it as an *analytic* (conceptual) or a *synthetic* (factual) triviality. If it is an analytic triviality, then to have a parent is part of the very meaning of being a daughter and for that reason, any theory dealing with daughters but not with parents is not only unreasonable but meaningless. So, in the case that a predicate is analytically attached to its extrinsic properties, Quine's criterion, understood as having theories as the bearers of ontological commitments, does not suffer from the problem of extrinsic properties at all. Because no theory dealing with a particular predicate can be intelligible, meaningful, without also addressing the properties we recognize as analytically related to it. [21]

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[21] Rayo's agreement with this interpretation becomes more evident in a later work (Rayo, 2013), where he developed the idea of the operator "just is" in which the

Yet what if the main and the extrinsic properties of a predicate are factually (synthetically) associated? Probably this is not how Rayo understands the problem, yet as we have already answered the criticism otherwise, exploration of this angle will give us an opportunity better to understand the notion of ontological commitment. Besides, if we accept the arguments Quine gives in "Two Dogmas of Empiricism", there is no meaning independent of facts, there is no analyticity. The border marking where the meaning of 'daughter' ends and the facts about daughters begin is not as sharp as it may seem. Thus, accepting or not Quine's arguments, there is room for examining the hypothesis that to have a parent is not part of the meaning of being a daughter, but it is a fact about daughters. If so, then it's possible to have meaningful, though unreasonable, theories where there are daughters but no parents.

Furthermore, what can we say of less obvious ontological demands the truth of a sentence imposes on the world? One might argue, for instance, that one of the ontological demands that the truth of '$\exists x\, \text{Daughter}(x)$' imposes on the world is that the sun exists. Part of what is to be a daughter is that there is a sun because without the sun we would die or even not have existed, and therefore there would be no daughters. For there to be daughters, there must be the sun. Even more so, someone could argue that a fundamental part of what is to be a daughter is to have grandparents, since without grandparents there are no parents and without parents there are no daughters. The existence of *daughters*, then, seems to demand, in addition to *parents*, that there be *grandparents*; but it seems also to demand that there be *couples*, at least for a certain period of time necessary to start the production of daughters; that there be *females*, since all daughters are females; that there be *males*, because they are still needed to produce daughters; that there

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property of being a daughter, given by the predicate 'Daughter' could fit according to the definition: "for there to be a daughter *just is* to have parents and be a female". If this definition is accepted, then having parents is part of the very meaning of what is a daughter and therefore daughters and parents are analytically related.

be *species*, because couples with physiologically very different members do not produce daughters; that there be *life*, because only living beings can be daughters; and that there be *the sun*, because without the sun there would be no life and no daughters.

Between the obviousness of having parents and the strangeness of being under the sun as demands the truth of '∃x Daughter(x)' imposes on the world, there is a potentially infinite array of candidates. How can we deal with all of them? Which ones are reasonable and which ones are not? The list above is only a tiny sample, and the knowledge of all such demands would require us to be omniscient. Nevertheless, despite our lack of omniscience, we can correctly judge '∃x Daughter(x)' as a true sentence, and we also can produce numerous good theories that deal with daughters and connect them with many of the supposed demands the truth of '∃x Daughter(x)' imposes on the world.

To better address this situation, we must remember that the main reason why Quine devised the concept of ontological commitment was to yield a neutral instrument for the ontological debate. Quine wanted to show that it is possible to meaningfully state that a specific supposed entity does not exist, without thereby making any commitment to the very entity whose existence is being denied. He wanted to cut off Plato's beard (Quine, 1963d, 1-2).

As we have already noted in Section Four (*p.*22), to fulfil this role, the notion of ontological commitment must be versatile enough to make intelligible a statement such as:

$$\text{A theory } \mathbf{T} \text{ is ontologically committed to } Ps, \\ \text{but } Ps \text{ do not exist.} \tag{14}$$

It turns out that for claims like (14) to be intelligible, the ontological commitments of a theory **T** cannot be limited to what is in the world since **T** can be ontologically committed to what does not exist.

An extrinsic property of something is one that depends on a larger whole than the thing itself (Marshall and Weatherson, 2018). So when Rayo states that '$\exists x\,\text{Daughter}(x)$' ontologically commits to parents because to have a parent is an extrinsic property of being a daughter, he is appealing to a larger whole that contains daughters as a part of it. Under the hypothesis we are analysing that the need of parents is factually related to the existence of daughters, this larger whole must be the actual world. Given *the way the world is*, there can be no daughters without parents. But then, the notion of ontological commitment is being subjected to how the world is, to what exists. Therefore, it cannot provide intelligibility to (14) and thus becomes irrelevant, unable to fulfil its fundamental role of being a neutral instrument for the ontological debate.

The demands the truth of a sentence imposes on the world and, among them, its ontological commitments, cannot represent a submission of the sentence to the way the world is, but must be an imposition on the world, a description of how the world should be for the sentence to be true. If the ontological commitments of a sentence were subjected to the way the world is, then the sentence could not commit ontologically to what does not exist, and the notion of ontological commitment would thus lose all its relevance and functionality.

It is worth noting that this mistake is the same one that Quine himself made. There is no problem with Rayo's definition of ontological commitment. It can even be understood as equivalent to that of Quine. The problem begins when one mistakenly interprets it extensionally. The ontological demands that the truth of a sentence imposes on the world should not be sought in the world because they are not part of it. They correspond to what the world would be like if the sentence were true. Therefore, they are not things, extensions, but concepts, intensions. After all, being demands, they are *impositions* on the way the world *needs* to be for the sentence to be true. So, Rayo's criterion also relies on the notion of *necessity* and, as showed in Section Four, is for that reason intensional.

If they are not in the world, where are the ontological demands? Where should we look for them? If we turn, for example, to the above-suggested list of demands that the truth of '∃x Daughter(x)' seems to impose on the world: parents, grandparents, couples, females, males, biological species, life and the sun; how can we decide which ones are reasonable and which ones are not?

Quine himself indicated the answer, though he did not respect his own statement. As we have already mentioned (*p.*22), an ontological commitment is "checking not on existence, but on imputations of existence: on what a theory says exist" (Quine, 1969a, 93). Being intensional and conceptual, the demands that the truth of a sentence imposes on the world are not factual but theoretical. We must, therefore, look for them in the theories we hold. Hence, the only boundary between what is and what is not reasonable to count as a demand that the truth of A imposes on the world must be given by some theory of which A is one of the sentences. It doesn't matter if, given the way the world is, there can be no daughters without there being parents. It will be reasonable to consider the existence of parents as a demand the truth of '∃x Daughter(x)' imposes on the world only if we accept a theory **T** which states the existence of both daughters and parents.

The most common way to understand a theory is through a linguistic characterisation. Given a finite set **T** of axioms, a theory will be its deductive closure, that is, the set of all sentences B such that **T** ⊨ B. Then we could say that given a sentence A of some theory **T** (where **T** ⊨ A) the reasonable demands that the truth of A imposes on the world are precisely all other sentences of **T**, that is, all sentences B such that **T** ⊨ B. Among these demands, the ontological commitments will be the existential affirmations, sentences with the form '∃x F(x)' such that **T** ⊨ ∃x F(x). And this is exactly the alternative formulation of Quine's criterion presented in Section Three (*p.*13).

But there is also a model-theoretical way of characterising a theory. A model for a set **T** of sentences is an interpretation of the

vocabulary in **T** that renders true all sentences of **T**. In a model-theoretic reading, the notation '**T** ⊨ A' means that all models of **T** are also models of A. It means that all interpretations in which all sentences of **T** are true also render A true. An arbitrary model for **T** may render true more sentences than **T**'s deductive closure (the As such that **T** ⊨ A) and for that reason does not characterise **T**. Now let 𝔐 be the intersection of all models of **T**. It's clear that 𝔐 renders true *all and only* the sentences A such that **T** ⊨ A, and hence it does characterise the theory **T**, being its *minimal model*. 𝔐 has no leftovers. We cannot take anything out of it, under the penalty of rendering false some sentence of **T**. All elements of 𝔐's domain are, then, entities that must be among the values of the variables of the sentences of **T** for them to be true. And this is exactly the original formulation of Quine's criterion.[22]

In a linguistic characterisation, a theory is a set of sentences, the deductive closure of a finite set **T** of axioms, and the ontological commitments are the existential affirmations in it. Then, under such a linguistic characterisation, to say that **T** is ontologically committed to daughters is just a more informal way of saying that **T** ⊨ ∃x Daughter(x). Whereas in a model-theoretic characterisation, a theory is the intersection of all models of **T**, its minimal model 𝔐. All demands that the truth of **T**'s sentences imposes on the world are given by the several attributes of 𝔐. In particular, the ontological commitments of **T** are the elements in 𝔐's domain. When **T** ⊨ ∃x Daughter(x), some of the elements of 𝔐's domain, the ones in the extension of 'Daughter', are required to make the sentence '∃x Daughter(x)' true. Others are not, but they are in 𝔐's domain

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[22] Model-theoretic interpretations are merely formal devices, so that the nature of the elements of their domains has no interference over which sentences will be true and which will be false. Two isomorphic models, for which there is a bijection between their domains that preserves the extensions of predicates and relations are, for all semantic effects, the same model. We can then consider without any loss that the minimal model's domain is obtained by the intersection of bijections of all models' domains of a theory **T** which are sets of elements of the same nature, such as cardinal numbers, for example.

because they are required to render others sentences of **T** true and correspond to the ontological demands of the extrinsic properties of 'Daughter', that are given by **T**.

We cannot forget, however, as Quine unfortunately did, that there are no daughters in the extension of 'Daughter'. The elements of the minimal model's domain, the ontological commitments, are not that part of the world to which the predicates and relations of the language refer when literally interpreted. They are not the things themselves, the daughters, but just conceptual representations of them that do not depend on how the world is. It is precisely for this reason that we say that the ontological commitments are not factual, but theoretical. They are not extensional things of the actual world, but intensional concepts that belong to a model-theoretic characterisation of a theory. [23]

These two different ways of characterising theories help us to see both that the two versions of Quine's criterion are equivalent, as much as that both are also equivalent to Rayo's definition, which was made in terms of truth conditions. Still, we can ask ourselves. Why are the demands that the truth of a sentence imposes on the world theoretical rather than a factual matter? How can the truth conditions of a sentence be independent of the actual world? Isn't the world itself and the way it is the best arbiter to establish the truth conditions of a sentence? These are delicate questions whose proper treatment would require a depth and extension incompatible with this text. Below there is but a brief indication of what is involved in the answer.

A banal though fundamental fact, which often goes unnoticed, is that sentences are not always true. They can also be false. But what does it mean to say that a sentence A is false? In Rayo's terms, it means to say that the world does not supply the demands that A's truth imposes upon it. But then, to recognise that a sentence A is false, we must be able to know how the world would be if it were

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[23] See note 14 (*p.*21)

true and find that it is not so. Therefore, the way the world would be, if sentence A were true, must be available to us in a way that is independent of the way the world is, so that we can make the comparison and verify the truth or falsity of the sentence.

This availability regardless of how the world is requires the notion of meaning or sense. The terms present in a sentence A, besides being able to have a reference in the world, also have a meaning or sense. The complete sentence also has a sense that can be understood as what we are calling *the way the world would be if the sentence were true*, and which Rayo called *the demands that the truth of the sentence imposes on the world*, its *truth conditions*. So, the sentence's truth conditions, its sense, does not depend on the world. For if it so depended, we would be unable to identify false sentences. And if it does not depend on the world, the sense must be given by what is present in the sentence. Therefore, the sense attached to a sentence is limited to its vocabulary. The sense of '$\exists x\, \text{Daughter}(x)$', for example, cannot involve more than daughters.

But how then do we relate daughters to parents, grandparents, couples, biological species, females, males, life, and the sun? We do this through our theories. Whether interpreted linguistically or model-theoretically, theories contain related sentences, and so they relate different senses. In doing so, they express more detailed and complete images of how the world would be if all their sentences were true. Different theories about daughters will include different elements and will make different connections. Some of them would involve only daughters. Others, more commonly, will include parents, grandparents, couples, and some could even include the sun. What will give the limits to what is and what is not among the demands the truth of '$\exists x\, \text{Daughter}(x)$' imposes on the world are, then, the theories of which '$\exists x\, \text{Daughter}(x)$' is a sentence.

Summing up, Rayo missed the point when he changed the bearer of ontological commitments from theories to sentences, and we kept wrong when tried to save his criticism throughout an extensional understanding of his definition, looking for the ontological commit-

ments in the actual world. Quine's criterion of ontological commitment does not suffer any problem of extrinsic properties just because the truth conditions of a sentence, the demands its truth imposes on the world, are not facts of the world, but conceptual senses enclosed in the sentence and in some theory containing it.

5.3   Azzouni and the alternative predicates of existence

Another type of objection to Quine's criterion that is worth dealing with is the alleged absence of standards for judging alternative ontological commitment criteria when they are based on alternative concepts of existence. Interested in defending a deflationary position that considers questions about ontology as philosophically indeterminate, especially in philosophy of mathematics, Jody Azzouni (1998) presents a critique of the debate on the *Quine-Putnam indispensability thesis*, which states that "if one's best scientific (physical) theory requires existential quantification over certain entities, the one is ontologicallly committed to such entities" (Azzouni, 1998, 1).

As our best scientific theories require existential quantification over various mathematical entities, then by endorsing such theories we ontologically commit to these entities. The thesis of indispensability is based both on the notion of ontological commitment and on Quine's very criterion since it assumes that any theory we stand ontologically commits us as well as that these ontological commitments express themselves in existential quantifications.

Azzouni, as we did in the Introduction, also considers that distinct concepts of existence, which he calls *criteria for what exists* (CWE) demand different criteria of ontological commitment, which he calls *criteria for recognising what a discourse commits us to* (CRD). Among examples of alternative CWEs are *concreteness*, *spacetemporality*, *causal efficacy*, *sensory constituency*, or whatever we take as the hallmark of existence. Different metaphysical conceptions on what it means to exist will give different CWEs.

Azzouni, then, states that Quine did not give any CWE, but only a CRD. He also says that even if we accept the first-order canonical regimentation Quine requires, we still can question the role that the existential quantifier plays as the formal resource responsible for attributing ontological commitment to the values of variables. We can, instead, use the alternative CWE we favour to create a predicate of existence, such as 'Concrete' or 'CausallyEffective' and give to this predicate the responsibility of attributing ontological commitment to the values of variables. Existence, then, would cease to be what existential quantifier expresses and would become what the chosen predicate of existence expresses. To do this is to change the very criterion of ontological commitment.

According to Azzouni, alternative criteria of ontological commitment so constructed would be as legitimate as Quine's criterion, because there would be no rational ground for deciding among rival criteria. Each one would be equally adequate for pointing out the ontological commitments given by the concept of existence from which it originates. Therefore, the thesis of indispensability would lose its strength, because even there being an agreement on which are our best scientific theories, different criteria of ontological commitment, built according to distinct concepts of existence, would point out distinct entities as indispensable. Where there is no accordance on what it means to exist, also there is no agreement on what is indispensable to exist.

There is, however, an asymmetry between the logical role of quantifiers and the role of predicates which helps us to realize that Azzouni is wrong when he claims that there are as good reasons to justify Quine's criterion as to justify any other one based upon a predicate of existence. This asymmetry consists of the fact that the first-order quantifiers ($\exists$ and $\forall$) legislate on first-order predicates and relations, and on the entities that can satisfy them by imposing *obligations* and *prohibitions*.

Suppose, for example, I adopt the doctrine that equates being to causal efficacy and take the predicate 'CausallyEffective' as a predi-

cate of existence. Then, paraphrasing Quine, I affirm that existence is what the predicate 'CausallyEffective' expresses, that an entity x exists if and only if CausallyEffective(x). If I also adopt canonical notation and classical logic as formal resources to deal with my theories, then I will be forced to accept constraints imposed on everything that exists, independently of any considerations on causal efficacy. These constraints are obligations and prohibitions imposed by the quantifiers and their logical rules, and no predicate (of existence or not) can interfere with them. If I, for example, consider that 'god' exists, precisely by judging that 'CausallyEffective(god)' is true, then, given any property 'F', 'god' and any entity I consider exists is *obliged* to satisfy or not satisfy 'F'. This obligation is in effect for 'god' regardless of any considerations we make about its causal efficacy. It is in effect for 'god' and for everything else simply because '$\forall x\,(F(x) \vee \neg F(x))$' is a logical truth. And there are not only obligations, but also prohibitions which are imposed on 'god', upon which no consideration of his causal efficacy will have the slightest influence. It is *forbidden* to 'god' satisfying and not satisfying a property 'F' simply because '$\neg \exists x\,(F(x) \wedge \neg F(x))$' is also a logical truth.

To give a somewhat less obvious example, I once heard a lecture by Nathan Salmon in which he demonstrated that the barber from the barber's paradox, the one who shaves all and only those who do not shave themselves, does not exist. And he did not come to this conclusion by any consideration on causal efficacy. He came to it simply by noting that the sentence '$\neg \exists x\,\forall y\,(R(x,y) \leftrightarrow \neg R(y,y))$' is a logical truth which he called Russell's law. Then, the sentence '$\neg \exists x\,\forall y\,(\text{Shaves}(x,y) \leftrightarrow \neg \text{Shaves}(y,y))$', which asserts the non-existence of such a barber and is an instance of Russell's law, is also a classical first-order theorem. There is no barber's paradox because this sentence that denies the existence of the paradoxical barber, the one who shaves all and only those who do not shave themselves, is a theorem of logic. This well illustrates how existence is under the jurisdiction of quantificational theorems of logic despite of all other considerations.

Quantifiers impose obligations and prohibitions that regulate existence in a way that escapes any concept of existence that has been formalised as a predicate. The divergence in the way that classical and constructivist mathematicians conceive the existence of mathematical entities, for example, demanded of the latter more than an alternative predicate of existence. It required an alternative logic, the intuitionistic logic, which is rebellious and does not accept, among others, the obligation expressed by '$\forall x\,(F(x) \vee \neg F(x))$'. The mode of being of the entities of constructivist mathematics is different from the mode of being of the entities of classical mathematics simply because their quantifiers are different and obey different logical rules. In the following passage Quine is quite explicit in this regard:

> The intuitionist has a different doctrine of being from mine, as he has a different quantification theory; and that I am simply at odds with the intuitionist on the one as on the other. (Quine, 1969a, 108) [24]

Church also holds a similar point of view:

> [T]hose philosophers who speak of "existence", "reality", and the like are to be understood as meaning the existential quantifier [...] The justification is that no other reasonable meaning of "existence" has ever been provided. (Church, 1958, 1014)

The moral of the story is that if Azzouni wants to propose alternative criteria of ontological commitment based on alternative concepts of existence, it is not enough to introduce new predicates of existence. He needs alternative logics. It is necessary to present the logical behaviour of these concepts of existence, that is, to translate them into coherent logical rules expressing the restrictions, obligations and prohibitions that these conceptions of existence impose on

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[24] See also quote from p. 15 (Quine, 1969a, 112–113).

beings. Azzouni errs when he says that Quine did not offer a criterion for what exists (CWE). He did propose one. It is his referential doctrine of being, for which there is no better characterisation than the restrictions that the quantificational theorems of classical logic impose on everything that exists. Any alternative CWE which rejects some aspect of Quine's referential doctrine of being must also reject some aspect of the logic it favours. And we can disagree with Quine in many ways. Intuitionistic logic is just one of them. There are modal logics, second-order logic, free logics, relevant logics, paraconsistent logics, and so on. Whenever we choose to use a deviant logic instead of the classical one, we are not only changing our standard of inference but also adopting a different CWE and a different doctrine of being.

All these possibilities, far from deflating ontology, as Azzouni wanted, represent on the contrary the recognition of its fundamental importance. After all, if different doctrines of being demand different theories of quantification and different logics, then our decisions on what it means to exist will influence all other issues we reason about. If instead of just a single predicate of existence, different CWEs were related to distinct logics, then the standard to decide among the alternative concepts of existence and indispensable entities, which Azzouni judged to be non-existent, would be available. It would be provided by a comparison of how the divergent approaches to logical validity given by those distinct logics are adequate to facts and our discourses.

6   Quantification, extensionality and naturalism

I would like to conclude this article reflecting with some of the most controversial aspects of Quine's approach to ontological commitments, seeking to clarify specific points that help the understanding of a few of his polemical positions.

Two of the most fundamental Quinean meta-ontological theses, which according to Van Inwagen (2009), became methodological foundations of an entire tradition, state that:

$$\textit{Existence is univocal.} \tag{15}$$

$$\textit{The single sense of existence is adequately} \atop \textit{captured by the existential quantifier.} \tag{16}$$

Now, if existence is univocal, then there are no different ways of being. Anything that exists does it in precisely the same sense as anything else. If, furthermore, the logical quantifiers capture this unique sense of existence, then there is a single and unrestricted domain of quantification which encompasses everything there is. If numbers, stones, and attributes exist, then a single variable 'x' may assume values among numbers, stones, and attributes. There are no multiple types of variables, but only one. Then theses (15) and (16) lead us to the following thesis:

$$\textit{There is a single unrestricted domain of} \atop \textit{quantification that covers everything there is.} \tag{17}$$

The admission a single unrestricted domain of quantification helps to explain the simplicity of the motto '*to be is to be the value of a variable*', but it also demands from Quine to be careful about what may be among these values, that is, about what may exist. One of Quine's most widely criticised positions is his insistence on first-order logic as the system in which theories must be regimented for the evaluation of their ontological commitments. Why not use second-order logic? Why not also allow quantification on predicates and relations and thereby broaden the possibilities of what can exist? This alternative, however, is not open to Quine. It is incompatible with his admission of a single unrestricted domain of quantification, for if he

admits second order, that is, that there can be quantification over predicates and relations, then he obtains at once Russell's paradox. As Michael Potter (2004, 300) well points out, there are only two ways of avoiding Russell's paradox in second-order logic: either by abandoning thesis (17), or by accommodating second-order quantification in an intensional context where there can be predicates 'G' and 'F' that are true of the same individuals, but which are not numerically identical: $\exists G \, \exists F \, ((G \neq F) \wedge \forall x \, (F(x) \leftrightarrow G(x)))$.[25]

These are concessions Quine is not willing to make, as they are incompatible with fundamental beliefs that underlie his whole philosophical project. Abandoning the uniqueness and absolute generality of the domain of quantification (17) requires the abdication of some of its most fundamental meta-ontological theses: either the univocity of existence (15) or its translatability in the classical existential quantification (16). After all, "[e]xistence is what existential quantification expresses. There are things of kind F if and only if $\exists x \, F(x)$ (Quine, 1969a, 97).

To abandon extensionality is to give up what Quine takes to be the minimum requirement for the acceptance of any entity, its standard of ontological admissibility, which is founded on the principles of identity (substitution of identicals and identity of indiscernibles). The most obvious clue that an alleged entity does not exist presents itself for Quine when its semantic interpretation requires intensional contexts in which the principle of substitution of identicals fails (Quine, 1969c, 23). Similarly, one of Quine's admitted ways of reifying a concept is to transform a similarity relation

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[25] The admission of a single unrestricted domain of quantification was also the main reason that led Quine mistakenly to treat ontological commitments extensionally, as we have seen in Section 5.2. If the universal set is the only domain of quantification, then the domains of all models for a theory must be the universal set and so are constrained by what exists. Then the entities that "must be counted among the values of the variables in order that the statements affirmed in the theory be true" (the ontological commitments) must be extensional things in the world.

into identity, thereby assuming as identical what the relation considers indiscernible (Quine, 1963b, 117).

> [W]hat sense can be found in talking of entities which cannot meaningfully be said to be identical with themselves and distinct from one another? (Quine, 1963d, 4)

> I am a confirmed extensionalist. Extensionalism is a policy I have clung to through thick, thin, and nearly seven decades of logicizing and philosophizing. (Quine, 2008, 215)

Quine's choice to avoid Russell's paradox is, therefore, to keep with first-order classical logic, and to abdicate both second-order and intensional contexts. But this does not mean assuming a nominalistic position that denies existence to all abstract entities. Quine is not a nominalist. He accepts and even argues in favour of the inevitability of some abstract entities (Quine, 1963b, 115).

> My extensionalist scruples decidedly outweigh my nominalistic ones. (Quine, 1998, 397)

Nevertheless, our theories will only commit to abstract entities when such entities are explicitly regimented as classes (extensions) in set theory. In "Logic and The Reification of Universals", Quine (1963b, 113) states that when we say that some dogs are white,

$$\exists x \, (\mathsf{Dog}(x) \wedge \mathsf{White}(x))$$

we do not commit to abstract entities such as *dogness* or *whiteness*. But if we want to, we can make such commitments when we explicitly state that

$$\exists x \, (x \in \mathsf{dogness} \wedge x \in \mathsf{whiteness}) \ [26]$$

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[26] I use 'dogness' as the name of the class of all dogs and 'whiteness' as the name of the class of all white things only to abbreviate the formalization in canonical

So regimented, the abstract entities admissible for Quine are constrained by his alternative set theory **NF** (*New Foundations for Mathematical Logic*) (Quine, 1963c). While it maintains abstract entities both extensional and protected from paradoxes, **NF** accepts the universal set and therefore is compatible with the unrestricted quantification, which is so precious to Quine. [27]

These facts help us to understand another much-criticised claim of Quine, his insistence on the defence of the extensional character of ontological commitments. I have here presented the intensionality of ontological commitments only as a characterisation of this notion. Yet, as Quine has always defended its extensionality, this feature is cited in the literature as an objection, perhaps the main one, because it focuses on a particularly sensitive point for Quine: his vehement rejection of the concepts of intension, synonymy, analyticity and other connected notions to the theory of meaning.

If, as we have seen, the formal methods that Quine accepts for regimentation of theories block the occurrence of intensional contexts, and if the ontological commitments of a theory are certain values of its variables, those indispensable to the truth of the statements

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notation which, by requiring the elimination of names and their replacement by descriptions, would have the following less elegant form:

$$\exists x \, (\exists y \, (\mathsf{Dogness}(y) \land \forall z \, (\mathsf{Dogness}(z) \to (y = z)) \land x \in y)$$
$$\land \, \exists z \, (\mathsf{Whiteness}(z) \land \forall w \, (\mathsf{Whiteness}(w) \to (z = w)) \land x \in z))$$

There are ontological commitments to the dog's and white stuff's classes because these classes are the values of the variables 'y' and 'z' required to make the sentence true. It should be noted that 'Dog' is the predicate satisfied by all and only the dogs and 'Dogness' is the predicate satisfied by only one entity, the class of all dogs, while 'dogness' is the name of the set that satisfies 'Dogness'. That is, $\exists y \, (\mathsf{Dogness}(y) \land \forall x \, (\mathsf{Dog}(x) \leftrightarrow x \in y) \land y = \mathsf{dogness})$. The same distinction occurs with 'White', 'Whiteness' and 'whiteness'. See also note 16 (*p.*28).

[27] The formalised set theory most commonly used is the Zermelo-Fraenkel theory (**ZF** or **ZFC** - with or without the axiom of choice). This theory, however, would not serve Quine's purposes because its methods to avoid Russell's paradox prevent the admission of the universal set and, for that reason, imposes restrictions on the domains of quantification, being incompatible with thesis (17).

of the theory, then, as much as the values of variables, ontological commitments should also be protected from intensionality. It was probably this trivial reasoning that led Quine to state without any further argumentation that "the question of the ontology of a theory is a question purely of the theory of reference" (Quine, 1951, 15).

But the talk of values of variables of a theory is a local matter, it only concerns the own theory and does not need to be relativised. To this extent, Quine's formal precautions will protect them from intensionality. In contrast, the talk of ontological commitments, as we have already seen in Section Four, occurs in the ontological debate, where a debater must be able to say that a particular theory, with which he disagrees, assumes ontological commitments to entities that do not exist (affirmation (14)). So, for that such an assertion to be intelligible, and hence ontological commitments fulfil their function as neutral instruments of the ontological debate, they cannot be extensional things that are in the world, but must be intensional concepts, which do not depend on how the world is. Therefore, even though the formal resources we use in regimentation ensure that the ontologies of all theories we admit are extensional, the notion of ontological commitment will not be.

The rejection of the notions related to the theory of meaning and of everything that requires intensional contexts can also be understood as a commitment of Quine to the theses (15), (16) and (17). Any formal treatment of intensional contexts will require one of the following alternatives: (a) an explicitly higher-order logic (second or major) and, together with it, the separation of variables in types and, because of that, the separation of distinct domains of quantification necessary to avoid Russell's paradox and that violate thesis (17); or (b) the admission of modes of existence more subtle and distinct from the actual entities, necessary to accommodate the *possibilia*, non-actually existent entities which are elements of other possible worlds domains, and which violates the thesis (15). Both alternatives violate the univocity of existence and are therefore inadmissible for Quine.

To the point, why does Quine so fundamentally support the thesis of the univocity of existence? Why not allow for alternative modes of existence that can be captured in multiple domains of quantification? It would be enough to accept this possibility to be able to accommodate intensional contexts as well as to use logics of a superior order. This mitigation not only would soften somewhat the austerity of his canonical notation's demands but also would divest him of various criticisms and objections.

A possible answer lies in his philosophical naturalism. Quine calls himself a naturalist, meaning primarily that he sees no essential distinction between philosophy and science. Philosophy does not legislate nor regulate science, but collaborates with it.

> [I]t is within science itself, and not in some prior philosophy, that reality is to be identified and described. (Quine, 1981a, 21)

> The philosopher's task differs from the others', then, in detail; but in no such drastic way as those suppose who imagine for the philosopher a vantage point outside the conceptual scheme that he takes in charge. There is no such cosmic exile. (Quine, 1960, 275)

We can understand a violation of theses (15), (16) and (17) as direct opposition to his naturalistic stance. The admission of different modes of being that could be approached by distinct types of variables confined to diverse sorts of quantifiers, which would therefore not be absolutely generic, opens space for a fundamental separation of philosophy from the rest of science. While to science would fit the sense of being linked to individuals, to actuality and to extensional abstractions, philosophy should deal with the sense of being linked to intensional contexts, to meanings, to non-actual universes. The incommunicability between the domains of quantification would protect and isolate philosophy in a supposed "cosmic exile". The domain of intensional beings, for example, would be untouchable by recalcitrant empirical observations and would require

another mode of thinking, another conceptual scheme which, according to Quine's naturalism, is inadmissible.

Quine never responded directly to the accusations of intensionality of his ontological commitment criterion, nor did he ever explicitly abandon the notion, but after the late 1960s, he practically did not address the subject, except in passing in Quine (1981b). Along with this ostracism, Quine proposed two fundamental ontology-related theses: the thesis of *ontological relativity*, and the thesis of the *inscrutability of reference*. Although these theses are not incompatible with the notion of ontological commitment, methodologically they are opposed to it. While the ontological commitments present themselves as an instrument for the resolution of ontological debates, the theses of ontological relativity and inscrutability of reference are proposed as a lenitive for the impossibility of solving such disputes.

It does not seem, therefore, excessive to say that Quine's refusal to accept intensional contexts, motivated by his naturalism and his commitment to theses (15), (16) and (17), took him from ontological *commitment* to "ontological *indifference*" (Gibson Jr., 1998, 681). We could also accuse him of removing from the scope of philosophical considerations legitimate questions that not only should philosophy deal with, but has in fact dealt with throughout history. After all, we *conceptualize* and *mean*. And not only that, but we also think, allow, judge, conceive, admit, *assume* and so many other things that lead us to the intensional contexts.

Quine's reply is almost impolite. It is again an austere compromise with naturalism, which reminds us that, despite having outgrown the ideas of logical positivists in many respects, he maintains for himself the same philosophical project that motivated the investigations of his professor Rudolf Carnap and other members of the Vienna Circle:

> if certain problems of ontology, say, or modality, or causality, or contrary-to-fact conditionals, which arise in ordinary language, turn out not to arise in science as reconstituted with the help of formal logic, then those philosophical problems have

in an important sense been solved: they have been shown not to be implicated in any necessary foundation of science.[...] Philosophy of science is philosophy enough. (Quine, 1953, 446) [28]

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