Ontological Commitment of Natural Language Semantics

MSc Thesis (*Afstudeerscriptie*)

written by

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Abstract

This thesis considers ontological commitments from a semantic perspective. Quine's logic/language criterion for ontological commitment is a starting point for a discussion of correlations between ontological commitment and semantics. I discuss some peculiarities of Quine's criterion for ontological commitment, which is formulated for first-order sentences. I discuss two possible lines of criticism of Quine's criterion, which are raised by problems in its philosophical implications and by the limitations of the method of regimentation employed by Quine. I shift from extensional to intensional logical languages in order to explore the notion of ontological commitment as such. I investigate commitments within possible worlds semantics in order to identify the difference between ontological commitments depending on semantic framework we choose.

Taking into account the results of a discussion centered on regimented discourse, I explore some difficulties concerning ontological commitments of natural language. In particular, I point out distinctions that must be drawn on the basis of one's purposes for determination ontological commitments. In this discussion, I highlight aspects of the correlation between a formal theory for semantic of natural language and ontology.

This thesis presents a methodology for the investigation of ontological implications in natural language. It frames ontological commitments within semantic theories for natural language and draws distinctions between the types of commitments in natural language.

Introduction

This thesis has two goals: to show that (1) the best way to look at ontological commitment is from a semantic perspective; (2) existence is a "uniform" concept. The thesis is motivated by the work of W. V. O. Quine, who introduced a logic/language criterion of ontological commitment. Syntactically, ontological commitment is reduced to the occurrence of a bound variable. Semantically, it connects truth-conditions to the existence of certain types of entities.

Quine's initial project was sought to consider the existence of kinds of entities in a theory using the truth-conditional semantics of standard first-order logic. In section 1.1, I will touch upon the nominalistic framework of Quine where the question of existence and ontological commitment arises. Additionally, I will focus on the ontological dispute presented in Quine's paper 'On What There Is,' and discuss his motivation for defining the criterion of ontological commitment the way he does. I will highlight three questions that are central to the initial goals of the thesis. Firstly, I will follow Quine and state two reasons to operate on a semantic level when talking about ontology. Secondly, in section 2.3, I will discuss the significance of the ontological criterion for semantics. Thirdly, in section 2.4, I will consider the purpose and the limitation of the regimentation, or logical paraphrase, of natural language that is employed by Quine.

The second chapter is devoted to criticisms of Quine's ontological criterion. In section 2.1, I will discuss Michael Hodge's critique of the philosophical importance of the criterion. In particular, I am interested in determining whether Quine's criterion withstands this critique, which is the topic of section 2.2. Even in where cases we can defend the philosophical importance of the criterion, it faces a number of difficulties with respect to the language of regimentation. It turns out that a first-order logic as a language of regimentation cannot account for the ontological commitments of sentences that contain plurals and modals. In section 2.3, I will discuss the critique of the ontological criterion provided by Augustin Rayo (2007). Rayo's analysis also serves to give a better picture of Quine's approach. If we accept that the number of entities under consideration makes a difference in the ontological commitments, then we are in position to consider languages beyond first-order language. Quine's ontological criterion clarifies commitments that are available only for first-order paraphrase. In Rayo's approach, we shift from the first-order logic to a plural first-order logic, which he maintains gives us broader understanding of ontology.

In the third chapter, I will look at possible worlds semantics, where ontolog-

ical commitments of identity statements containing proper names bring us some interesting and surprising results. Some reasons for a shift to intensional language in order to examine the notion of ontological commitment were already stated in the second chapter. In section 3.1, I will focus on Rayo's reformulations of Quine's criterion in order to dissect the difference in ontological commitments within extensional and intensional languages. Specifically concerning the difference between them regarding commitments of sentences that contain proper names. In this respect, I will focus on Kripke's notion of rigid designators and his analysis of identity statements between names. In particular, I am interested in revealing what commitments identity statements containing names have. It turns out that we should pay attention to the findings of science in order to account for the commitments of some statements. On the one hand, the involvement of scientific knowledge correlates with Quine's initial aim: to have a language which is suitable for all scientific purposes. On the other hand, my purpose is to concentrate on the semantic aspects of ontological commitments. Therefore, I will not talk about the peculiarities of some identity statements that come from findings of science, nor will I judge whether Quine's criterion satisfies his aim. The most important idea that arises when we consider ontological commitments within possible worlds semantics is the acceptance of the fact that the commitments differ depending on what semantics we prefer.

To explore this idea, I will discuss Hilary Putnam's externalist account of the division of linguistic labour in determining the meaning of natural kind terms. Here, we are faced with semantic externalism, which states that meaning is determined by sources outside the mind. Therefore, ontological commitment for natural kinds leads to the discussion of who determines what we are committed to. Externalists also raise a question as to where ontological commitments that the speakers of a language have, are located. Putnam has shown that the meaning of natural kind terms is determined by the experts in the linguistic community. If this is so, then the question arises of whether we are committed to the experts' ontology.

Finally, in the fifth chapter I will focus upon the ontological commitment of natural language. This leads us to accept some important distinctions. First of all, the ontological commitments of a natural language are to be considered within some particular semantics for that natural language because a truth-theory is needed to specify our commitments. Secondly, we are faced with different types of ontological commitments. The first is ontological commitment in terms of types of entities; the second is specified in terms of concrete numbers of entities. It turns out that the former type does not correlate with any truth-theory for natural language because it takes place on the conceptual level. The latter type concerns ontological commitments within some particular semantics for natural language. I will argue that the first type considers more than actual truth, whereas the second type needs a semantic theory to specify truth conditions.

Quine, himself, points out that ontological disputes tend to be a disagreement

over words. However, he does not see linguistics as the right framework with which to consider the ontological commitments of natural language. In the same chapter, I will take Emmon Bach's linguistic approach to study some natural language phenomena, especially his idea of a tight correlation between metaphysics and natural language, which he refers to as "natural language metaphysics." Using this idea, we can look at the topic of ontological commitment in correlation with linguistics. There are two questions to consider: "Is linguistics interested in metaphysical questions?" and "What can linguistics take from metaphysics and vice-versa?"

In order to answer these questions, I will make use of Bach's idea of natural language metaphysics and Richard Montague's semantics as a method to take a logical language as an auxiliary device to deal with natural language expressions. Here, I will need to differentiate between natural languages and formal languages, as well as the commitments of natural languages and logical languages. Moreover, I should distinguish between the commitments of extensional languages and those of intensional languages. In this respect, I will need to touch upon the distinctions between Quine's purposes within extensional languages and Montague's purposes within intensional languages concerning metaphysical problems. This is important for the reason that natural language is intensional and consequently, I state that we should choose an intensional logical language in order to reveal the ontological commitments of natural language.

The two goals of the thesis are correlated with each other. I consider existence as a "uniform" concept, because this notion is connected to the semantic theory which we choose to reveal ontological commitments. Looking at ontological commitment from a semantic perspective, one needs to operate with semantic facts stated within a particular semantic theory. Accordingly, I do not distinguish between kinds of existence but between different semantic theories that clarify the ontological commitments by employing different formal tools.

Chapter 1

Quine's Ontological Criterion

This chapter will evaluate Quine's criterion of ontological commitment. In particular, it discusses the framework and preconditions of the establishment of the criterion. The general framework where the questions of existence and ontological commitment have been raised is within Quine's nominalism. I will point out that the formulation of the criterion "to be is to be the value of a variable" has appeared in respect to an explication of nominalistic approach to language in Quine's early paper 'Designation and Existence'. In this paper, a language of first-order logic is employed for explication of his ideas on the designation of some terms and, in general, to defend a nominalistic position. I will focus on Quine's argumentation in the paper, 'On What There Is', where ontological questions are broadly discussed. Especially, I am interested in following Quine's idea to operate on semantic level talking about ontology. Accordingly, the purpose to put ontology in semantic level will be a satisfaction of Occam's razor and avoidance of Meinong's jungle. Quine chooses the language of first-order logic as the formal language of regimentation of natural language expressions. I will consider what aims Quine wants to achieve by way of the regimentation and the limitations that imposed by the choice of the first-order language.

1.1 Why do we need to define the criterion of ontological commitment?

The starting point of a discussion is Quine's early paper, 'Designation and Existence' (Quine, 1939), where the problem of existence of some kinds of entities is considered, with the focus on a nominalistic approach. In general, he sorts out the entities being of some kind in respect to whether the names of the entities really designate. Quine distinguishes two types of existence statements, namely singular and general. He calls singular existence statements, statements of the form "There is such a thing as so-and-so". The expression following the word "as" designates one particular entity or property, or other abstract entity. The statement is true if only if the expression really designates an entity. For example, the expression following the word "as" in "There is such a thing as Pegasus" designates Pegasus and this statement is true if and only if Pegasus exists. The singular existence statement "There is such a thing as horse" means that there is the abstract property, that is "horse". Another type of existence statement is

general existence statements such as "There are horses", "There is such a thing as a unicorn". The latter type of the existence statement requires variables for quantification. For example, $(\exists x)(x$ is a unicorn). This way, the variables substitute names. So, the example is read as "There is something which is a unicorn".

Quine's nominalism is the framework within which the question of existence and ontological commitments are central. The question of existence arises when we want to state whether some terms name entities. We should answer this question with respect to (a) abstract entities, such as numbers, geometrical entities; (b) fictional and imaginary entities, such as unicorns, the golden mountain; (c) universals, such as "horse(hood)", "red(ness)". On the one hand, nominalists refuse to acknowledge the existence of these kinds of entities. On the other hand, they accept certain uses of the words that designate universals, abstract and fictional entities as well as factual statements of medicine and zoology about these entities.

For nominalists, variables of a language admit only concrete objects as values. To guarantee this, expressions supposedly referring to abstract entities are analyzed as syncategorematic expressions that do not designate anything. Below, I will give an example of how nominalists assign meaningfulness to the expressions that contain non-denoting term without ontological commitment. Most notably, nominalists do not confer existence to fictional or imaginary entities. For example, by use of the term 'Pegasus' one does not commit to the existence of a winged horse, because this word does not designate anything on its own. However, "Pegasus" is a contextually meaningful word. For example, a statement "Pegasus is the winged horse captured by Bellerophon" is meaningful and understandable without special inquiry into zoology of whether Pegasus designates an entity. The word "horse" is considered similarly. Although there are entities which are horses, a term "horse" does not name or designate an entity. Quine states "The universe of entities is the range of values of variables." (Quine, 1939, p. 708)

It is in this paper that Quine claims for the first time that "to be is to be the value of a variable" (Quine, 1939, p. 708), although he goes no further in discussion of ontological issues. Later on, in his paper 'On What There Is.' Quine(1948) focuses on the problems arising in arguments in favour of certain ontologies.

Quine debates an imaginary opponent, McX, who accepts the existence of the things that Quine refuses to accept. The arguments refuting the existence of some object or objects initially suffer from two seemingly unsolvable difficulties. These arguments are meaningful only if there is something that one claims does not exist. Besides, if there is something about which one gives that argument, the argument must be false. Therefore,

> [...]in any ontological dispute the proponent of the negative side suffers the disadvantage of not being able to admit that his opponent disagrees with him. (Quine, 1948, p. 21)

For example, if someone denies the existence of a fictional entity, say Pegasus, he should name something as "Pegasus" in order to deny it. Thus, Quine continues:

> This is the old Platonic riddle of nonbeing. Nonbeing must in some sense be, otherwise what is it that there is not? This tangled doctrine might be nicknamed Plato's beard; historically it has proved tough, frequently dulling the edge of Occam's razor. (Quine, 1948, pp. 21–22)

A possible line of reasoning in favour of acceptance of the existence of abstract and imaginary entities is to say that if some objects are not physical, they must be mental. However, when we say that there is an entity, which is the mental Pegasus–idea, we are talking about different kind of entity than the one we have in mind when we deny existence of Pegasus.

> McX never confuses the Parthenon with the Parthenon–idea [...]. But when we shift from the Parthenon to Pegasus confusion sets in. (Quine, 1948, p. 22)

Quine has the second imaginary opponent, Wyman, who is in fact a representation of the philosopher Alexius Meinong[1] (1853 – 1920). Wyman contended that non-existent entities must in some sense be, as we can refer to them. For example, if we deny the existence of Pegasus, it means we are talking about something. If we are talking about something, it should exist somehow; otherwise we would not be able to talk about it. So, Wyman accepts the Platonic riddle of nonbeing. It turns out that in order to avoid contradictions, it is necessary to admit the existence of all the possible things and, correspondingly, attribute some ontological status to them. Thus, Wyman calls Pegasus "unactualized possible" (Quine, 1948, p. 22). Unlike Quine, Meinong (1904)[2] considers the notion of "pluri-form" existence. He distinguishes existence and subsistence: "[...] wherever existence is absent, it is not only can be but must be replaced by subsistence" (Meinong, 1904, p. 81). According to Meinong, Pegasus is, in the sense that Pegasus subsists.

Quine objects such "pluri-form" notion of existence. For Quine, Pegasus is merely non-existent entity. There are some facts that we know about non-existent entities as, for example that only Pegasus has wings. Applying Russell's theory of descriptions, if Bellerophon in fact ever captured a winged horse and he captured more than one horse, the statement "Pegasus is the winged horse captured by Bellerophon" would be false. Fictional entities such as unicorns, square circles, and the gold mountain have some particular properties. Therefore, they are

[1] Russell (1905) already discussed and criticized Meinong's ontology

[2] Originally a paper *The Theory of Objects* was published in 1904. Further, I refer to English translation of the paper which was published in 1980.

"such-and-such" although they do not in fact exist. So, we can make statements about these entities that can be counted as true or false. The objection against Meinong's semantics, is that it admits ontically undesirable objects, and it leads to an ontological extravaganza, often called "Meinong's Jungle".

> The Theory of Descriptions [...] enabled Russell to thin out the luxuriant Meinongian jungle of entities (such as the round square) which, it had appeared, must in some sense subsist in order to be talked about [...]. (Jacquette, 1996, p. 17)

Quine points out that using the word "exist" in a common sense manner, we are inclined to say that Pegasus does not exist bearing in mind that there is no such an entity. If Pegasus existed, it should be present in space and in time due to the fact that the word "Pegasus" has spatio-temporal connotations and it is not due to the fact that the word "exist" has such connotations. "Exist" does not mean to occupy a spatio-temporal region. If there is no spatio-temporal reference in our asserting the existence of a cube root of 27, the reason thereof is that the cube root is not a thing of spatio-temporal state, but not due to using the word "exists" equivocally.

Quine defends the "uniformity" of existence. Meinong tries to solve the riddle of nonbeing by way of introduction of the "pluri-form" concept of existence. However, Quine points out that such a solution is not necessarily and that the Riddle of nonbeing can be solved employing the uniform and ontologically economic conception of existence. While Meinong uses the metaphysical line of argumentation, Quine shifts the discussion into semantic level, which allows us to consider the "uniform" concept of existence. I will take a closer look on the semantic treatment of ontological commitment in the section 1.2.

Using Russell's theory of descriptions, we can paraphrase the sentence "Pegasus is the winged horse captured by Bellerophon" into "Something is a horse, winged, owned by Bellerophon, named 'Pegasus' and everything that is a horse, winged, owned by Bellerophon, named 'Pegasus' is identical with that". In the former sentence "Pegasus" appears to be a name, while in the latter sentence "Pegasus" has became a description. Both sentences are meaningful but the demand of objective reference has shifted from "Pegasus" to "something". In this way, Quine, and nominalists in general, argue that meaningfulness does not require ontological commitment, a topic which I touched upon earlier. "Something", along with "nothing" and "everything", is a bound variable. Meaningfulness of bound variables "no way presupposes there being [...] any specifically preassigned objects." (Quine, 1948, p. 26)

As I noted above, Wyman holds that Pegasus is an unactualized possible. Quine does not accept that any existence be assigned to possible entities: "Take, for instance, the possible fat man in that doorway; and, again, the possible bald man in that doorway. Are they the same possible man, or two possible men?"

(Quine, 1948, p. 23) To answer this question we would have to formulate identity criteria for possible entities but there is no way to decide whether one possible entity is identical to another possible entity. So, the existence of possible entities violates Quine's statement "No entity without identity." (Quine, 1948, p. 22)

Quine, in rejecting any actual existence of Pegasus, proposes to limit the modality "possible" to the statement as a whole. For example, when we replace modality from the position before the object in "There is a possible winged horse" to the position before the whole statement "Possibly, there is a winged horse", we get out of merely possible objects. There are modalities like possibility, necessity, impossibility and contingency that make modal sentences: "Necessarily, there for any two real numbers there is another one in between them." or "It is possible that horses fly." Hence, Quine rejects quantifying into modal context.

In modal logic modal quantification has two possible readings: *de re* and *de dicto*. In the *de dicto* reading the operator ranges over the whole quantified statement, a closed formula or sentence. Then the scope of the operator is a sentence that follows after it. This way a statement "Possibly, there is a winged horse" is rendered as $\diamond \exists x W(x)$. In the *de re* reading, we quantify into modal context, and the result is that the modal operator ranges over an open formula. For example, "There is a possible winged horse" is rendered as $\exists x \diamond W(x)$.

Quine stands against the *de re* interpretation of modalities. This analysis does not allow expanding our universe to a degree that it would include possible objects. For philosophers, like McX, the main motive of such an expanding is the view that Pegasus, for example, must be, as otherwise it would be nonsense to say that it is not. However, there are no possible objects like possible flying horses.

Quine and McX continue their ontological dispute about another kind of entities, namely universals:

> Now let us turn to the ontological problem of universals: the question whether there are such entities as attributes, relations, classes, numbers, functions. McX, characteristically enough, thinks there are. Speaking of attributes, he says: "There are red houses, red roses, red sunsets; this much is prephilosophical common sense in which we must all agree. These houses, roses, and sunsets, then, have something in common; and this which they have in common is all I mean by the attribute of redness. (Quine, 1948, p. 29)

Here, McX argues in favor of the existence of universals. Since we are able to correctly classify red houses, red roses and red sunsets as having the same color, there must be something that makes grouping them as same-colored correct. Hence, there is something that is the shared property of redness.

Quine argues that universals do not do clarify what things have in common:

> One may admit that there are red houses, roses, and sunsets, but deny [...] that they have anything in common. [...] the word 'red' or 'red object' is true of each sundry individual entities which are red houses, red roses, red sunsets; but there is not, in addition, any entity whatsoever, individual or otherwise, which is named by the word 'redness.' That the houses and roses and sunsets are all of them red may be taken as ultimate and irreducible." (Quine, 1948, p. 29)

Quine concludes that universals, such as "redness", do not explain anything. Consequently, there is nothing to clarify with the use of universals and that means that we do not need to accept the existence of universals. In general, this conclusion measures with the pragmatic/epistemological nature of Quine's argumentation. The universals are denied within a scientific theory because of the absence of any pragmatic reason for employing them. Quine's ontological criterion is embedded into his naturalistic/scientific enterprise, since concrete ontological commitments are determined by the theory as a whole.

Quine's opponent, McX, insists that there must be something responsible for our ability to classify things. We compare meanings of objects in order to classify them:

> 'Let us grant,' McX says, this distinction between meaning and naming of which you make so much. Let us even grant that is red', pegasizes', etc. are not names of attributes. Still, you admit they have meanings. But these meanings, whether they are named or not, are still universals. (Quine, 1948, p. 30)

As competent English speakers, we usually correctly classify things such as, for example red things. There must be meanings for such expressions as "is red", otherwise this ability seems to be groundless. Quine distinguishes between a statement having meaning and a statement being meaningful. For Quine, meaningfulness can be explained behaviorally, as for example, when McX and Quine agree in identifying red things. Quine calls this aspect of meaningfulness 'significance'. Synonymy, another aspect of meaningfulness, involves substitution or interchangeability. Quine claims that with the help of synonymy we may say whether a term is meaningful. Talking about significance, behavior shows whether synonymy takes place, that is how terms are used. Quine contends that

> [W]e speak directly of utterances as significant or insignificant, and synonymous or heteronymous with another. [...] But the explanatory value of special and irreducible intermediary entities called meanings is surely illusory. (Quine, 1948, p. 31)

Sameness of meaning can be paraphrased as synonymy. When synonymy is applied to sentences, it is formulated in terms of assent and dissent. Quine

(1960) does not talk about synonymy in terms of truth conditions because he prefers word usage on the basis of verbal behavior than the way things happen in the world.

What Quine rejects is the statements having meanings in a sense of meanings being distinct entities. Quine criticizes the view, which he calls "the myth of museum", because meanings, as abstract entities, do not posses definite identity criteria. Quine (1951) The metaphor suggests that meanings are ready-made entities at a disposal of the speaker.

According to Quine, nothing we say commits us to the assumption of universals or other entities; only the use of a bound variable commits us to the existence of an entity. We may say that there is something which houses, roses and sunsets have in common, and thereby posit the existence of an entity. But we can also decline to use this kind of statement.

> We can very easily involve ourselves in ontological commitments by saying, e.g., that there is something (bound variable) which red houses and sunsets have in common [...] but that is, essentially, the only way we can involve ourselves in ontological commitments: by our use of bound variables ... [W]hen we say that some zoological species are cross-fertile, we are committing ourselves to recognizing as entities the several species themselves, abstract though they be. We remain so committed at least until we devise some way of so paraphrasing the statement as to show that the seeming reference to species on the part of our bound variable was an avoidable manner of speaking. (Quine, 1948, p. 32)

According to Quine, to be is to be the value of a bound variable. A theory is committed to those, and only those, entities to which the bound variables of the theory refer to in order that the statements made in the theory be true. The way to avoid ontological commitment is by paraphrase or regimentation of the statements. This helps Quine to argue for meaningfulness of the syncategorematic expressions without any ontological commitments. For example, when the expression "There is never a road without a turning." is paraphrased as "No situation in life stays the same forever.", the commitment to "turning" as (abstract) entity disappears. The commitment to universals may be also avoided by paraphrase. For example, "The redness of sunset is beautiful." is paraphrased as "There is something that is sunset, red, and beautiful."

So, Quine formulated "bound variable" criterion and offered the method of regimentation or paraphrase. It is important to point out that the criterion itself is not enough: the commitments that it determines can be gotten rid of by way of the regimentation or paraphrase. Therefore, the combination of a "bound variable" criterion and the method of regimentation determines the real commitments that cannot be avoided.

Ontological commitment is relative to a theory: "to be is to be the value of a bound variable" does not tell us what theory to accept. We look to bound variables in connection with ontology not in order to know what there is, but in order to know what a given remark or doctrine says there is.

> Our acceptance of an ontology is [...] similar in principle to our acceptance of a scientific theory [...] we adopt [...] the simplest conceptual scheme into which the disordered fragments of raw experience can be fitted and arranged. (Quine, 1948, p. 35)

The choice of our best theory, whether it is mathematical or physical theory, takes place on pragmatic grounds.

> Physical objects are postulated entities which round out and simplify our account of the flux of experience just as the introduction of irrational numbers simplifies laws of arithmetic. (Quine, 1948, p. 37)

After we choose a theory, we apply the criterion of ontological commitment to it. Quine discusses two competing conceptual schemes, namely the physicalistic scheme and the phenomenalistic one. While the physicalistic scheme is useful for organizing sensory experience, the phenomenalistic scheme is valuable for epistemology. Although these schemes are useful for different purposes, they should cross-fertilize each other. We choose the conceptual scheme to account for it on pragmatic grounds: "the question what ontology actually to adopt still stands open, and the obvious counsel is tolerance and an experimental spirit." (Quine, 1948, p. 38) The point of view on what theory to adopt corresponds to our various interests and purposes.

In summary, I pointed out two options to choose between the references to accept in our ontology. First, we may consider "pluri-form" notion of existence and construct a hierarchy existence. Second, we may distinguish between different kinds of objects but does not give rise to the treatment of them as different types of existence. Quine takes the second option. He accepts paraphrasing as a tool to avoid ontological commitment. The paraphrase preserves original meaning of a sentence, while avoiding commitment to undesirable objects. For example, the paraphrase of a sentence "There is an important experience that they will get" into "They will get an important experience" avoids commitment to existence of 'important experience'. Quine accepts the existence of different entities. However, this difference between entities is purely qualitative (how things are) and not in terms of the type of existence.

The sections 1.2, 1.3 and 1.4 continue the discussion of Quine's criterion with the focus on the particular ideas concerning interrelation between semantics and ontology.

1.2 Why do we operate on the semantic level when talking about ontology?

Language and ontology are inseparably linked with each other in a conceptual schema. Every theory expresses its conceptual schema. For example, if you allow microscopic objects, like electron, into your conceptual schema, this means that you include the sentences of the form $\exists x$ (Electron x) into your theory. The choice between the conceptual schemes, which according to Quine, interprets reality in their own way, is carried out on the basis of pragmatic considerations:

> One's ontology is basic to the conceptual scheme by which he interprets all experiences, even the most commonplace ones. Judged within some particular conceptual scheme – and how else is judgment possible? – an ontological statement goes without saying, standing in need of no separate justification at all. Ontological statements follow immediately from all manner of causal statements of commonplace facts, just as – from the point of view, anyway, of McX's conceptual scheme – 'There is an attribute' follows from 'There are red houses, red roses, red sunsets'. (Quine, 1948, p. 29)

The ontological dispute between Quine and McX has arisen from the difference in their conceptual schemes where these conceptual schemes are linked to language use. Therefore, the first step to resolve the dispute in ontology is the study of language. In this respect, we should clarify Quine's position by looking over the aspects that are involved in the study of language.

First, there is a semantic term that comes into play within the philosophy of language, namely meaningfulness. According to Quine, the confusion between the field of naming and the field of meaning leads to a mistaken acceptance of the existence of some entities:

> Confusion of meaning with naming not only made McX think that he could not meaningfully repudate Pegasus; a continuing confusion of meaning with naming no doubt helped engender his absurd notion that Pegasus is an idea, a mental entity. The structure of his confusion is as follows. He confused the alleged named object Pegasus with the meaning of the word 'Pegasus', therefore concluding that Pegasus must be in order that the word have meaning. (Quine, 1948, p. 29)

Quine holds that it is not necessarily for a term to designate (i.e. actually name) any entity in order to be meaningful. There are many so-called syncategorematic terms, which being significant, do not indicate any entity at all. For example, there is a class of syncategorematic adjectives. These adjectives are not terms that indicate a group of objects; they make sense only with a term that indicates an object. For example, 'mother' is a part of a term 'expectant mother'

(Quine, 1960, p. 103) and an adjective 'expectant' does not have meaning on its own.

We understand such terms as Pegasus or "the present king of France" and at the same time are not required to accept any entity because we name nothing using those terms:

> The understanding of a term [...] does not imply a designatum; it precedes knowledge of whether or not the term has a designatum. (Quine 1939, p.703)

For example, if I say that there is not such a thing as Pegasus, my opponent may understand what I am talking about even though he does accept existence of Pegasus.

Second, the criterion is formulated in terms of logical language. This way, Quine's ontological criterion – "to be is to be the value of a variable" – is a semantic criterion because whether to include some kinds of entities into one's ontology is determined by a semantic notion, that is "being the value of a variable". From this point of view, ontology itself can be considered as the function of semantics, for example, in the arguments explaining the way we make meaningful statements using the terms that designate non-existing things.

Quine proposes to operate on a semantic level in debating over what there is for two reasons. The first reason for shift to the semantics is motivated by the disagreement between speakers on admitting of the existence of certain entities. In other words, people may have different ontologies. Quine illustrates this point by setting forth a dispute between him and McX. Quine does allow difference of opinion on what there is. A speaker A can talk about entities that the speaker B thinks do exist and A does not think exist, but A can choose formulations that do not commit him to these entities. More precisely, the commitments that A has and that B does not, cannot be expressed in B's language (and vice-versa) as commitments. As long as Quine sticks to his ontology in opposition to McX's ontology, he cannot allow his bound variables to indicate the entities belonging to McX's ontology. But Quine can describe their disagreement characterizing McX's statements. For example, B thinks that "flying horses" exist, but A does not. However, A can talk about flying horses without acknowledging their existence. A can deny the existence of flying horses by saying that "flying horses do not exist". A can either utter or write down the sentences about B's suppositions on the ground that A's ontology admits the linguistic forms.

Another reason for operating on a semantic level it is a way to find a mutual acceptance of common ground in the disputes. In case of a disagreement in ontology, the conceptual schemes of people involved in a dispute are different. In spite of those basic disagreements, McX and Quine consider their conceptual schemes as being understandable for each other and this allows them to communicate successfully about various topics, especially about language. If the basic

disagreement in ontology is considered a semantic controversy, then the words may help to resolve the former disagreement. This means that ontological disagreement develops into controversy over language. However, this does not imply that "translatability of a question into semantical terms" (Quine, 1948, p. 35) is the linguistic question. Apparently semantics in the sense that is at stake here is not considered to be a part of linguistics by Quine. The reason is that the regimentation of natural language expressions into first-order sentences is involved. This regimentation does not require linguistic considerations such as the structure of sentences in terms of what lexical items are used. For example, in terms of grammar and lexicography the word "Pegasus" is a noun and it is synonymous with the phrase "the winged horse captured by Bellerophon". Here, a question about the existence does not arise. Linguistics as such is concerned a natural language use. I will come to the discussion of the role of ontology in linguistics in section 5.3 of the last chapter.

1.3 What does Quine's ontological criterion bring to semantics?

Some of Quine's ideas on ontological problems are original. Although he continues Russell's ideas, developed in the theory of descriptions. As I pointed out earlier on p.8, in order to make his criterion of ontological commitment applicable to proper names, Quine analyzes proper names in terms of Russell's theory of descriptions. Names are considered to be incomplete symbols, i.e., syncategorematic expressions which do not denote anything on their own, but only become meaningful within the context of complete sentences. These complete sentences, in turn, do not contain proper names as constituents, names are paraphrased away and replaced by bound variables. So, "to be is to be the value of a variable" is applicable to the properly regimented language, where

> The variables of quantification, 'something', 'nothing', 'everything', range over our whole ontology, whatever it might be. (Quine, 1948, p. 32)

We might, for example, state that some dogs are white, while at the same time we are not obliged to recognize doghood and whiteness as entities. The expression: "Some dogs are white" states that some of those entities which are dogs, are white. In order to make this sentence true, there should be some white dogs among those entities in terms of truth-conditions given by a language of first-order logic. It is possible to state that "Some dogs are white" without the commitment to the universals, like doghood and whiteness. This expression commits us to dogs but it does not commit us to the whiteness because we are not allowed to quantify over the predicates. This is one of the reasons why Quine prefers a first-order

logic, and this also is connected to his nominalistic position discussed earlier (section 1.1). On the other hand, when we say that some zoological species are cross-fertile, we are obliged to admit the existence of several species in spite of their being abstract. We cannot be released from this commitment before we apply the method of regimentation in order to show what bound variables can be avoided. Another peculiarity of the criterion is that it is given in terms of the existence of kinds of entities. And we will discuss in the fourth chapter that there is another possible talk about the ontological commitments with respect of semantics of natural language. For Quine, the bound variable and its connection with ontology are considered not for the sake of knowing what there is, but for the sake of knowing what is according to this doctrine, which can be ours or somebody else's. The criterion "to be is to be the value of a variable" as such does not solve the dispute between the competing ontologies. It is rather the case that the choice of ontology is a theory-relative; it serves for verification of conformity of the doctrine with the previous ontological standard.

In his discussion of the choice between the competing conceptual schemes, Quine talks about "simplicity". The criterion, as such, is applicable to the theory or a doctrine as a whole, so we should know within what conceptual schema we want to reveal the ontological commitments. Since the simplicity is "a guiding principle in construction conceptual schemes" (Quine, 1948, p. 37), it may play role as a purpose of the determining the ontological criterion.

Quine believes that the way we accept ontology is generally similar to the way we accept a scientific theory, say, the system of physics: "we adopt [...] the simplest conceptual scheme into which the disordered fragments of raw experience can be fitted and arranged" (Quine, 1948, p. 37). We determine our ontology having determined the general conceptual scheme of science in the broad sense of the word; and the considerations determining construction of sense data of any part of this conceptual scheme, for example, biological or physical, do not differ from the considerations determining formation of the theory as a whole. For example, one scientist commits to the existence of sense data. Another scientist wants to commit to microscopic objects. In this case it will be a commitment in terms of physical entities. However, as Quine notes, simplicity as a guiding principle of forming conceptual schemes is not such a clear and unambiguous idea; it is quite possible to assign a double or a multiple standard.The question arises of how we choose the theory. It is illustrated by the example of experience of roundness. Quine invites us to imagine that we have invented the most economical set of concepts suitable for the detailed report about the immediate experience (Quine, 1948, p. 35). Assume that the entities supposed by this scheme, namely, the values of bound variables, are individual subjective sensation and reflection events. The physicalistic conceptual scheme has arguments for simplicity in a way that the diverse sense events are treated "as perceptions of one object" (Quine, 1948, p. 35). So, we get less objects, but have the same predictive power. The simplicity is a guiding maxim, when we fix it at object's sensory

data. We associate our sensations of a round object with the same penny or with two different pennies. Consequently, we come up with the different theories that explain the same in different ways.

Thus, the criterion itself is not supposed to explain what kinds of things exist. Quine's ontological criterion may be considered as a way of determining the types of entities a given theory assumes to exist (Glock, 2003, p. 42). Being applicable for formalized logical languages, the criterion is supposed to offer an approach of their common consideration:

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

In section 2.3, I will examine applicability of the criterion for modal and plural first-order languages.

As I already pointed out earlier, Quine offers the standard of the ontological commitment that is applicable to the theory as a whole. This standard is aimed to help to express one's own ontology. In case we want to decide over ontologies another factor comes to play, namely simplicity. As I have already pointed out in the section 1.1, the choice of ontology is similar to the way we adopt a scientific theory that is made on the basis of the simplest conceptual scheme. Simplicity is the general scientific virtue. It is easier to deal with the theories that have many primitives, that is basic entities which you allow in the theory. For example, if the scientist says the theory about microscopic objects, he commits to the existence of apples within this theory. The standard of the ontological commitment provides us with a clearer way of discussing the ontological problems. With the formulation of the ontological commitments, the traditional philosophical disputes can be held in a clearer way. In the end, the ontological disputes are decided by the plausibility of the theory in the whole. The ontological dispute becomes a part of a larger dispute, which can follow in a regimented way. Then, simplicity may be considered as the explanatory power.

1.4 What is the role of logic in determination of the ontological commitment?

As has already been highlighted, Quine proposes a method of regimentation, which is used in the translation of a theory into formal language. Glock states two purposes of regimentation (Glock, 2003, p. 43). First, by way of regimentation we reveal the ontological commitments of the theories by translating them into

a formal language. Second, by reforming of the formal language we reduce these commitments.

Logic allows us to reveal commitments from the structure of the sentences. What regimented sentences require us to do is to look at quantifiers, and the variables that they bind. The syntactic structure says what ontological commitments are, which is easier than to talk about ontological commitments in natural language. If we have some particular formal theory for natural language, it allows us to reveal commitments regardless of conflicting positions concerning the different uses of words. For example, if we operate within the framework of first-order logic, we are able to apply Quine's criterion and assess commitments of the theories.

There is no presupposition of synonymy or sameness of logical form in Quine's approach. Traditionally, synonymy indicates that two words have the same meaning. Intrinsically, we want to have natural language expressions that have true meanings of what we wanted to convey in saying them. As soon as Quine denies the existence of meanings, it invalidates this approach. We do not talk in terms of meanings or logical form, instead we try to accomplish the same thing in a more straightforward way: "If we paraphrase a sentence to resolve ambiguity, what we seek is not a synonymous sentence, but one that is more informative by dint of resisting some alternative interpretation." (Quine, 1960, p. 159) In doing this, we can determine if it is possible to reformulate the language. The natural language expressions are translated into artificial language in order to make the ontological commitments visible. Then, we reform the formal language to determine whether we can dispense with some classes of objects, which exist in our natural language. For example, "The blueness of the eyes are beautiful" is paraphrased into "There is something that is eyes and blue, and beautiful", which does not commit us to blueness.

This regimentation is required for the revealing of commitments of the theories. In natural language we talk about possible entities. We can commit ourselves to impossibilia, for example when we talk about possible events. But we are not able to systematize them using the languages for which some criterion of the ontological commitment is not accessible. Quine tries to make his canonical notation simple. As I have already pointed out in a discussion of syncategorematic expressions, names are eliminated from his canonical notation, otherwise canonical notation faces the Platonic riddle of nonbeing. For example, a statement "Pegasus does not exist" would be meaningless since in the first place there must be something that is Pegasus. Hence, proper names are paraphrased as definite descriptions ("the thing that pegasizes"), then definite descriptions are paraphrased according to Russell's theory of descriptions. For example, a statement "There is nothing which pegasizes" does not contain singular terms and, consequently, it does not refer to non-existent entities.

So, logic plays instrumental role in the establishment of the ontological commitments. With the help of logical language, we reveal the commitments of the

theory and show its true commitments by reduction of the commitments to undesirable objects. This way we talk about the "uniform" concept of existence, which is given in semantic terms of "a bound variable".

In addition to allowing the application of Quine's criterion of ontological commitment, first-order languages are grammatically simple. However, it may not always be the case that we choose the first-order language as a language of regimentation as Quine does. Augustin Rayo (2007) points out that the choice of the language of regimentation should be done on the basis of its applicability to further purposes. Depending upon the circumstances, first-order languages may turn out to be not the best candidates for that purpose. In the next chapter, I discuss the cases where first-order logic is not useful as a language of regimentation.

1.5 Concluding remarks

The first chapter was devoted to Quine's original criterion of ontological commitment. As I have observed, it appeared within a nominalistic framework, talking about the references of the terms. Furthermore, the formulation of the criterion appeared in connection to the ontological disputes. Quine solves the Platonic riddle of nonbeing by providing the standard with which to decide what the ontological commitments of the theory are. It is emphasized that this standard was not aimed to decide ontologies. The criterion "to be the value of a bound variable," requires regimentation to determine the real commitments of the theory.

I specified the reasons why we operate on semantic level when talking about ontology: the difference in conceptual schemes is linked to a language use and ontological disagreement is reduced to disagreement over language. I discussed the significance of Quine's definition of the criterion of ontological commitment: it reveals the commitments of the regimented language and considers the existence of the kinds of entities according to some particular theory. Finally, I talked about regimentation, the method of translation a theory into formal logical language. I stated that first-order regimentation imposes certain restrictions on the framework we can talk about the ontological commitments as such.

I have indicated many times that Quine is focused on important philosophical problems. In this respect it is necessary to evaluate the various critiques of Quine's approach. In sections 2.1 and 2.2, I will turn to the critique of the philosophical importance of the ontological criterion. Additionally, I have underlined the role of first-order language as a language of regimentation. In section 2.3, I will discuss the possible critique of the choice of first-order logic with regards to the ontological commitment.

Chapter 2

Critique of the Ontological Criterion

In this section, I will discuss the critique of Quine's ontological criterion. I will focus on Michael Hodges (1972)'s critical analysis of the philosophical importance of the criterion and Augustin Rayo's (Rayo (2002), Rayo (2007)) review of the range of its application. The choice to consider Hodge's position is motivated by his critical analysis of the formulations of the criterion. In the previous chapter, I considered the criterion in semantic terms of a "bound variable." Hodges makes a claim about the three separate criteria in Quine's works and reveals omissions in all of them within philosophic framework. I will review his position in order to check whether the implications of the first chapter stands against Hodge's account. The section 2.1 represents the ideas pointed out in Hodges (1972)'s paper 'Ontological Commitment'. The section 2.2 concerns the evaluation of Hodge's critique of the criterion and reveals some difficulties in his view on the problem of ontological commitment.

In this chapter, I use Rayo's work for the reason of examining of the first-order regimentation as a method for clarification of the ontological commitments. In section 2.3, I will give exposition of Rayo's findings. In particular, I will reveal the difficulties that this method faces and provide a motivation to look over intensional language in order to examine Quine's ontological criterion. Additionally, I will consider Rayo's analysis of ontological commitments of the sentences that contain plural nouns and modals. In section 2.4, I will give my evaluation of Rayo's review of the criterion.

2.1 Hodges on the philosophical importance of ontological commitment

Michael Hodges (1972) examines Quine's formulation of ontological commitment: "being ontologically committed to x's' is asserting or implying (logically) 'There is (are) an x ('s)". On the one hand, "ontological commitment" is a technical term, the criterion of ontological commitment connects ontological implications with the formal apparatus of first-order logic. On the other hand, Hodges says, Quine makes his definition of criterion for ontological commitment philosophically important. Indeed, Quine touches upon old philosophical problems, such as the existence of universals:

> [...]the great medieval controversy over universals has flared up anew

> in the modern philosophy of mathematics. The issue is clearer now than of old, because we now have a more explicit standard whereby to decide what ontology a given theory or form of discourse is committed to. (Quine, 1948, pp. 32–33)

Hodges holds that "a more explicit standard" is the same as the criterion for ontological commitment.

However, Hodges does not consider regimented theories in his critical analysis of Quine's ontological criterion. Rather, he focuses on the formulation of the criterion in terms of the natural language expressions beginning with "There is ...". Talking about philosophical importance, Hodges points out three separate but related 'criteria'. The first of these is put in terms of the ordinary expression 'There is something...'. However, there are expressions beginning 'There is something which...' that do not satisfy this criterion. Hodges gives the following examples:

1. There is something he is looking for, namely, the fountain of youth.
2. There is something he believes in, namely, God.
3. There is something he is talking about, namely the absolute.
4. There is something which the theory says exists, namely, universals.

For Quine, every statement of this type carries "ontological commitment," but, as Hodges shows, such commitments do not have important meaning. There are cases when we use the expression "there is" without becoming ontologically committed. One of such case is in the rendering of someone's speech. Hodges considers the following situation (Hodges, 1972, p. 106):

Take statements (2) and (4). For example, suppose at the end of lecture on a medieval philosopher who refuses the existence of physical objects, mental states, and God. Somebody may ask: "But surely there is something that he says exists?" (Hodges, 1972, p. 106) and receive the answer: "Yes, there is something that he says exists, namely, universals" (Hodges, 1972, p. 106). Hodges reasons as follows. If Quine contends that the statement bears an ontological commitment, we would mistakenly argue that the lecturer accepts philosopher's ontology by announcing his theory. Obviously, in a case, where we make an utterance that there is something according to a certain philosopher, we do not become "ontologically committed" to that philosopher's "ontology". However, if Quine accepts that this type of utterance does not bear any "ontological commitment", then his "criterion" turns out to be false. We can use the expression "there is..." without becoming "ontologically committed".

Hodges gives the examples (1–4 above)of expressions that, in principle, do not have any important ontological sense even though they start with "there is".

He contends that "There is something he is looking for, namely, the fountain of youth" is correct way express what we wanted to say. The reason one has to paraphrase this sentence is avoidance of ontological commitment. But the idea of his examples (1–4) was to show that the question of ontological commitment does not arise with respect to these cases.

A similar idea is spelled out by William Alston (1958) with respect to the ontological commitment to possibilities: "a man admits (asserts) the existence of possibilities depends on what statement he makes, not on what sentence he uses to make this statement." (Alston, 1958, p. 13) Alston distinguishes a statement and a sentence in a way that more than one sentence can be used to make the same statement. The statement about the existence of some entity may be formulated in different ways. Hence, the way someone makes an assertion of existence does not depend on the verbal formulation which he chooses. Alston contends that the preference of one verbal expression over another is granted by logicians and "the use of the phrase 'ontological commitment' here is unjustifiable and misleading." (Alston, 1958, p. 14) I will consider in the next section that this line of critique, basically misses the point that Quine is concentrated on the regimented discourse in the first place. As I tried to stress in the section 1.4, for Quine, an access to the ontological commitments is not provided by the verbal formulations. This is not a question of the distinction between sentence and statement. One has to provide first-order paraphrase in order to have an access to the ontological commitments of the natural language sentences.

Relative to Hodge's argumentation, Quine could possibly say that the sentence "There is something he is talking about, namely the absolute," is not translated into logical notation by means of the existential quantifier. However, a sentence "There is the absolute", would be translated using existential quantifier. So, Hodges concludes that Quine substitutes his original definition of the "ontological commitment" in terms of "There is ..." to the definition in terms existential quantifier. Thus, the criterion turns out not to be applicable to everyday language which does not contain existential quantifier.

The second formulation of the criterion Hodges finds in *Word and Object*, where Quine says: "The quantifiers are encapsulations of these specially selected, unequivocally referential idioms of ordinary language." (Quine, 1960, p. 242) In other words, "there is" should be replaced by quantifiers where $\exists x$ encapsulates existential assumptions of the expression "There is". Further Quine states:

> To decline to explain oneself in terms of quantifications, or in terms of those special idioms of ordinary language by which quantification is directly explained, is simply to decline to disclose one's referential intent. (Quine, 1960, pp. 242–243)

Hodges holds that this definition does not clarify Quine's arguments, instead it requires additional interpretation. First, if Quine means by the "special idioms

of ordinary language" simply "There is...", then his definition of the criterion in terms of the quantification is a question begging.

Hodges apparently means that someone should disclose his referential intent by way of "There is". So, the above quote would be read as: to decline to explain oneself in terms of quantifications, or in terms of "There is" by which quantification is directly explained, is simply to decline to disclose "There is". To disclose "There is" means to render it in canonical notation, which contains quantifiers. It follows that to refuse to explain in terms of quantification is to refuse to explain oneself in terms of quantification, that is a question begging.

Second, if quantification is explained in terms of the ordinary expression "There is ...", then all the difficulties mentioned above in connection with the criterion in terms of "There is," will be fair to the formulation in terms of the existential quantifier. For example, Alston (1958) says that a scientist would not be reassured that there are no electrons by giving a translation of the form $\exists x(x$ is an electron) into another sentence with the same meaning, but which does not require variables to range over electrons. But this criticizm misses the point that Quine talks about ontological commitments in theories and not of individuals.

Hodges considers the third formulation of Quine's criterion, which is directly applied to everyday language in contrast to the formulation of the criterion in terms of the existential quantifier.

> We may be perceived to have posited the objects only when we have brought the contemplated terms into suitable interplay with the whole distinctively objectificatory apparatus of our language: articles and pronouns and the idioms of identity, plurality, and predication, or, in canonical notation, quantification. Even a superficially term like occurrence is no proof of termhood, failing systematic interplay with the key idioms generally. (Quine, 1960, p. 236)

Here, the object becomes a central notion. We determine "the objects" in language when some terms are in a "suitable interplay" with all the "objectificatory apparatus of our language". Hodges holds that in spite of the fact that this criterion seems to be correct, it contains some concepts which Quine does not clarify, namely, "the objectificatory apparatus" and "suitable interplay".

Hodges argues that it is not clear how such notions as the articles, pronouns, identity idioms, plurals, and statements correlate with the ontological commitment. Hence, he says, this criterion suffers in this general form the absence of interpreting some central notions; therefore, it does not assist in investigation of the ontological commitments. Quine states that there is the only "objectificatory apparatus" in canonical notation, namely, quantification:

> To paraphrase a sentence into the canonical notation [...] is, first and foremost, to make its ontic content explicit, quantification being a device for talking in general of objects. The moot or controversial

> part of the question of the ontic import of a sentence may of course survive in a new guise, as the question how to paraphrase the sentence into canonical notation. (Quine, 1960, p. 242)

To paraphrase a sentence into canonical notation is to know when a sentence must be rendered in terms of quantifiers. But, to have a criterion of ontological commitment is also to know what the bound variables of a sentence are. Hence, to be able to paraphrase a sentence into canonical notation, we need to specify what our commitments are. Further, a paraphrased first-order sentence may serve to reduce our commitments. We need such reduction to accept as less entities as possible in our ontology. In Hodge's reading, Quine refers to the criterion of ontological commitment by talking about "the moot or controversial part of the question". But I should correct Hodges. In this quote, Quine notes that the paraphrase may leave until ontological issues unresolved.

At the end, Hodges states that there seem to be three separate, but coherent "criteria". The first of them is considered from the point of view of the ordinary utterance "There is something ..." Hodges tries to show that this is improper, as there is a number of utterances containing the expression "There is something ..." and which by no means "contains any ontological commitment".

The second interpretation of the criterion connects the notion of "ontological commitment" with the existential quantifier. Hodges contends that the second "criterion" cannot be equivalent to the first one; that is why it suffers, at least, from two difficulties. Firstly, it can present only one type of ontological disputes at best. Secondly, it does not belong separately to an ordinary language, thus requiring an addition to the third criterion, namely, from the point of view of the objectificatory apparatus. The third "criterion" is simply inappropriate due to absence of any meaning specification of its most important terms.

2.2 Evaluation of Hodges's exposition

Quine's aim is to introduce a standard of ontological commitment, trying to establish a new standard to deal with old philosophical problems. He claims that his criterion is a new standard in a way that it gives a novel perspective to consider the ontological problems. Hence, the criterion is undoubtedly concerned with philosophical problems, but these problems are somewhat "extrinsic" to the formulations of the criterion. Thereby, old ontological problems take a new form. As I pointed out in section 1.2, Quine develops a new standard to decide what types of entities exist within a particular theory or doctrine. Hodges does not note that Quine connects ontological commitments with theory. Consequently, Hodge's attempt to evaluate the philosophical importance of the criterion is restricted to the analysis of some distinct sentences. Quine's ontological criterion should substitute for old standards in order to solve philosophical problems of existence of certain types of entities within some particular theory or doctrine.

This is because it contains clearer existential assumptions. Hodges believes that the more explicit standard is simply the criterion for ontological commitment. I agree with Hodges that Quine refers to the criterion for ontological commitment by a "more explicit standard," but I would like to add that the more explicit standard involves the employment of formal tool used to solve old philosophical problem. Hodges also claims that the using this criterion as a standard faces difficulties when one is talking about its philosophical importance. I think that this criterion, as such, is important in the way it has intrinsic philosophical implications. As I pointed out in the section above, Quine's aim was not to make a decision in favor of some ontologies.

When we evaluate the different readings of the criterion of ontological commitment in Quine's texts, we realize that all of them are stated in a way that is suited to his canonical notation. I believe that this is the first reason why it is difficult to discern philosophical importance of his criterion. I would argue that his criterion should be read as a technical term that has ontological implications, rather than a term that was introduced for the purpose of clarifying some ontological problems. As we have discussed in section 2.4., Quine's criterion requires first-order regimentation in order to reveal the ontological commitments of the theory. This is not what makes his criterion of ontological commitment weak, rather it is significant in the way that it connects semantics of a first order logic with ontology.

Hodges focuses not on the formal language that Quine employs, but on the philosophical significance of his criterion. For Quine, every statement in examples (1 – 4) given by Hodges carries "ontological commitment", but, as Hodges has tried to show, it has no important meaning. There are cases when we use the expression "there is" without becoming ontologically committed. It is difficult to argue against Hodge's point, however in phrasing his criterion, "to be is to be a value of a bound variable," Quine focuses on a notational component of the commitment, that is connected with a notation of a first-order logic. Hodges makes his argument based on the interpretation of a verbal formulation of the utterance that bears ontological commitment. Therefore, there are two perspectives where we can consider ontological commitment in respect to the expression of the form "There is ...". One is Quine's method, which interprets "there is ..." as a 'sign' for quantification that is showing that there is a variable bounded by the existential quantifier. Here, the criterion may be understood as notationally important rather than philosophically significant.

Another perspective is Hodge's interpretation of a grammatical formulation of the criterion. In this case, we judge the importance of the interpretation of logical notation (since for Quine "There is ... " is strongly connected with the use of the existential quantifier), but not logical notation itself.

Quine's aim is to make our real commitments explicit. Therefore, a sentence "There is a possibility that Mary will sing" should be paraphrased in order to avoid a 'seeming' commitment to this possibility. In paraphrasing, we avoid

commitment to undesirable entities, which can be misleading when we use the expression "there is ..." to point to some, perhaps abstract, entity. Quine's criterion does not recognize ontological differences, since it does not matter that the sentence says the same thing as the paraphrased sentence. Every time the expression "There is..." occurs, Quine thinks about existential quantifier. This way, "ontological commitment" is not a philosophical term. It is logical language that contains quantifiers, so the ontological criterion concerns an interpretation of logical language.

In the end, our consideration of ontological problems turns into a discussion about syntax and semantics. Quine's ontological criterion deals neither with abstract ontological categories nor with the existence of some particular entities. Rather, Quine considers the kinds of entities that are divided in accordance with whether the terms have references or not. Therefore, it is hardly possible to say that Quine's criterion, as such, is a philosophical criterion. Even though it concerns the question of what is there, his criterion serves as an explanation of the existence of the kinds of entities in accordance with semantics of first-order logic.

In this way, Quine's criterion is able to withstand Hodge's critique, but the range of its application is another issue. In section 2.3 I will turn to the criticisms of Quine's approach that stem from the application of the criterion to intensional contexts and plural first-order language.

2.3 Beyond the semantics of standard first-order logic

Another line of critique stems from two facts that were discussed in the first chapter. Firstly, Quine uses extensional language in his formulation of ontological commitment. Secondly, the ontological commitments for the theories are established by way of regimentation. In this section, I will discuss Augustin Rayo's critique of this criterion, which suggests that first-order logic is not the best instrument of regimentation in cases where we want to reveal the ontological commitments of natural language.

2.3.1 The difficulties concerning first-order regimentation

Quine proposes a criterion of ontological commitment only for sentences in a first-order language. As shown by Augustin Rayo (2007), Quine's criterion makes strong statements on determining the interrelations between ontological commitments of first-order sentences and semantic mechanisms, which should be developed by semantic theory in order to specify the truth-conditions of sentences: "the nature of truth-conditions – and hence ontological commitment – not a defining feature of the notion of ontological commitment" (Rayo, 2007, p. 429). Hence, in

order to study the nature of ontological commitment, Rayo proposes to identify the ontological commitments that the sentence carries and determine how the semantic theory interprets these commitments.

Rayo (2007) discusses the characteristics of ontological commitment in order to clarify the components that make up the ontological commitment. Rayo proposes the following characterization of ontological commitment:

> To describe a sentence's ontological commitments is to describe some of the demands that the sentence's truth imposes on the world - those demands that concern ontology. (Rayo, 2007, p. 428)

Consequently, changing the ontological commitments carried by a sentence involves changing the sentence's truth-conditions. In terms of the demands that a sentence's truth imposes on the world, a characterization of ontological commitment is read "for a sentence to carry commitment to Fs is for the sentence's truth to demand of the world that it contains Fs." (Rayo, 2007, p. 428)

In this respect, I would like to distinguish between the semantic theory or framework within which we determine ontological commitments and semantic facts. The semantic facts are determined within a particular semantics, but the semantic framework may be chosen. In accepting Quine's criterion, we acknowledge that this is the peculiarity of first-order languages, in that there is the ability to define the ontological commitments. Since we are able to consider languages outside first-order logic, we are in a position to examine whether the first-order language has enough expressive power to reveal ontological commitments. The disadvantage of this approach is that, in some cases, we have to acknowledge semantic facts that are determined by the semantic framework, which is different from the one Quine has chosen. In the first place, it concerns the shift from the commitments of the theories to commitments of languages. Taking this into account, it may appear that, although Rayo's theory was motivated as a critique of Quine's formulation of the criterion, his amendments to the criterion is just another approach to the ontological commitment. In what follows, I will focus on the commitments of languages that differ from Quine's connection of commitments with the theories.

Rayo's aim is to reveal the nature of ontological commitment without linking it to a particular semantic theory. In particular, he makes use of possible worlds semantics in order to observe the commitments of modal sentences (I will consider this approach later in section 2.3.3) and semantics of a plural first-order logic in case of pluralities (I will talk about this case in section 2.3.2). Quine chooses one particular semantic framework; he formulates a criterion of ontological commitment for first-order sentences that is correlated with the semantics of first-order logic. As Rayo says, this correlation does not constitute the notion of ontological commitment. The ontological commitments carried by a sentence must be distinguished from semantic theory when assigning truth-conditions to

that sentence. For example, in first-order semantic theories we assign to each first-order predicate of the language a set as its semantic value. However, it does not follow that $\exists x$ Elephant(x) carries commitment to sets.

Rayo discusses the case of a substitution of possible-world talk for demand-talk. In terms of possible world talk, the characterization of ontological commitment is given as follows: "sentence carries commitment to Fs just in case every possible world at which the sentence is true is a world that contains Fs." (Rayo, 2007, p. 428–429) If demand-talk cannot be substituted with possible world talk, then the demands imposed on the world by the sentence truth are, simply, the sentence's truth-conditions. The demand-talk is not aimed at clarifying the notion of truth conditions, but to show "what the truth-conditions of a representation consists in" (Rayo, 2007, p. 429). Rayo underlines that studying the nature of truth-conditions implies an investigation into the nature of ontological commitment, but not the definition of the notion of ontological commitment.

When Rayo takes into account intensional language when evaluating the ontological criterion criterion, he finds some problems in Quine's formulation of the criterion. Firstly, Quine formulates the extensional criterion of ontological commitment, therefore it is not adequate in the cases where we take into account atomic predicates expressing extrinsic properties. Rayo gives the following example: "Part of what it is to be a daughter is to have a parent. So the truth of $\exists x$(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 $\exists x$(Daughter(x)) to be true". (Rayo, 2007, pp. 431–432) Rayo states that there may be options to avoid this problem. Firstly, we can restrict the application of Quine's criterion to the predicates that express only non-extrinsic properties. However, this is impractical because most predicates express partially extrinsic properties. For example, "part of what it is to be a human is to belong to a certain lineage; part of what it is to be a moon is to orbit around a planet [...]." (Rayo, 2007, p. 432) Alternatively, we can make an attempt to paraphrase extrinsic predicates in terms of non-extrinsic predicates. But in this case, we would rely upon an analysis of statements that may appear to be much different from the initial statements. A way to circumvent the problem of atomic predicates expressing extrinsic properties is by acknowledging that the criterion is adequate without any restrictions on the use of the predicates.

Secondly, while considering the ontological commitment within intensional possible worlds semantics, we take into account the commitments relative to a particular possible world. In terms of possible worlds semantics, the characterization of ontological commitment is given as follows: "sentence carries commitment to Fs just in case every possible world at which the sentence is true is a world that contains Fs." (Rayo, 2007, pp. 428–429) In this way Rayo explains demand-talk in terms of necessitation. For example, take numbers as necessarily existent. A sentence "Susan runs" does not commit us to numbers, even though numbers exist in every possible world because the truth of this sentence demands of the world

that it contains Susan and runners, but not numbers. This example illustrates that the ontological commitments of a sentence (stated in terms of the demands made by its truth-conditions) differ from the commitments that are related to the semantic framework that we use.

2.3.2 Regimentation of the sentences that contain plurals

Quine's preference for first-order regimentation does not imply that only first-order sentences bear ontological commitment or that non-first order sentences need first-order paraphrase. Rayo (Rayo (2002), Rayo (2007)) argues that it is not always possible for a sentence to be paraphrased into a first-order sentence preserving ontological commitments. For example, plurals and modal operators cannot be captured by first-order language. In this section, I explain his example of formalization of sentences that contain plural nouns. In section 3.2.3, I will focus my attention on modal sentences.

Consider the following example (Rayo, 2007, p. 434):

(GKB) Some critics admire only one another.

This sentence can be regimented in first-order logic:

(GKB. Set theoretic version) There is a non-empty set of critics A s.t. for all $x, y \in A(x \neq y \implies \text{Admire}(x, y))$ is read there is a non-empty set of critics such that any member of the set admires only other member of the set.

Taking into account that the paraphrase should preserve ontological commitments, Quine's criterion gives the result that GKB carries commitment to sets. In order to avoid the commitment to sets, one needs to find another language of regimentation.

Rayo proposes to consider a plural first-order language. This language contains plural terms, plural predicates and quantifier-expressions binding plural variables. To give a paraphrase for GKB, one needs plural variables ('xx', 'yy', etc.); the plural predicate ' $\prec'$ ($x \prec yy$ means 'x is one of the yy's'); and the quantifies binding plural variables is $\exists$ ($\exists$ is read 'there are some things such that'). Taking into account this enrichment of first-order language, Rayo gets the following paraphrase of GKB:

$$\exists xx \forall y \forall z((y \prec xx \wedge \text{ Admires } (y, z)) \rightarrow (z \prec xx \wedge z \neq y)))$$

This formula indicates that there are some critics - the xs - such that, for any y and z, if y is one of the xs and y admires z, then z is one of the xs and z is not identical to y.

The application of Quine's ontological commitment to a sentence paraphrased in a plural-first order language gives the result that the plural version of GKB bears commitment to critics. This gives us the result we wanted to acheive by the reformulation.

Rayo draws a distinction between "ontology – the realm of objects – and plethology – the realm of pluralities". (Rayo, 2002, p. 454) He sees the importance in the formulation of the criterion of plethological commitment because it takes into account plurals without introducing a plural kind of commitment:

> A singular or plural first-order sentence carries commitment to Fs just in case Fs must be counted amongst the values of the (singular or plural) variables in order for the sentence to be true. (Rayo, 2007, p. 436)

Here, Rayo proposes to consider ontological commitment in terms of concrete numbers of entities (I will clarify the distinction between ontological commitment in terms of kinds of entities and ontological commitment in terms of concrete numbers of entities in the Chapter four). In this way, his criterion of plethological commitment is distinct from Quine's ontological criterion. Indeed, Quine points out the shift of ontological dispute from the existence of entities to natural language. But Quine avoids the discussion of linguistic problems concerning natural language. It turns out that Rayo takes Quinean criterion as the basis for the formulation of his own criterion, which takes linguistics seriously. In the fourth chapter, which is devoted to the ontological commitment of natural language, I will discuss interrelation between metaphysical implications and linguistics in details. In comparison to Quine's criterion, Rayo describes sort of commitment, a commitment to linguistic elements, namely plurals. This is interesting, in that this is not a commitment to objects. It follows that if ontological commitment is to be considered a philosophical concept, then the field of ontology is enriched with plethology. The criterion of plethological commitment increases explicitness of the framework, within which we discuss ontological commitments, that is semantics.

2.3.3 Regimentation of modals

In this section, I will touch upon modal logical language in order to consider commitment to a sentence that contains a modal. As I stated in section 1.1, Quine rejects *de re* reading of sentences that contain modal operators in order to avoid commitments to possible objects. Rayo considers the case of de re reading, which is obtained within possible worlds semantics. The reading is given in terms of the demands:

For example, the truth of a sentence "something is a mammal and might have been a human" (Rayo, 2007, p. 437) demands of the world that it contains mam-

mal:

$$\exists x(\text{Mammal}(x) \wedge \diamond(\text{Human}(x)))$$

The truth of this sentence demands that at least one possible world that is accessible from the actual world contains a human. What kind of ontological commitment can we establish in this case? Well, we may say that in some possible world, we are committed to the existence of an individual, x, such that it is both mammal and human, and in some other possible world, we are committed to the existence of x such that it is mammal but not a human.

If we are dealing with modalities, the ontological commitments that follow from truth-conditions of a sentence should be clarified relative to a world. The truth of the above formula in a world w commits us to the existence of a mammal in w; the existence of something that is a mammal and a human in some world $w^{'}$ accessible from w.

In the above example, we considered the language of modal logic as a language of regimentation. It is important to mention that to satisfy the truth-conditions for the sentence, logical language requires the object, but not the existence of this object. The object is required by semantic theory in order to specify these truth-conditions, whereas the existence of object is needed in order to satisfy already specified truth-conditions.

We use logical apparatus in order to say what exists regardless of one's conceptual scheme.

Concerning the example given above, Rayo (2007) proposes to reason as following:

> Being such that one might have been human just is being human. So what the truth of Modal demands of the world is that it contains a mammal who is also a human. But part of what it is to be a human is to be a mammal. So the truth-conditions of Modal boil-down to the demand that the world contains humans. (Rayo, 2007, p. 437)

He concludes that all that the truth of Modal demands of the world is that it contains humans. Rayo assumes here a strong premise, namely that being a human is an essential property. I.e. if x is a human in w, then x is a human in all worlds. With this assumption on board, Rayo's conclusion follows.

The significance of this conclusion is that it is independent from the semantics one employs to consider languages containing modal operators:

> It is possible to adopt a Kripkean semantics, in which modal operators are treated like quantifiers ranging over possible worlds and the usual quantifiers are taken to range over possibilia. (Rayo, 2007, p. 437)

Consequently, he says, one increases the ontological commitments of one's meta-theory, but not the ontological commitment of one's object language. This idea is concerned with the way the criterion by which ontological commitment is understood in the framework of meta-theory, but not object language. Indeed, it may seem that when we are talking about the objects that are bound by quantifier, we interpret logical language. Accordingly, Rayo's investigation has shown that it is possible to interpret the criterion regardless of one's preferable semantics. For Quine, the preferable semantics is the semantics of first-order logic, whereas Rayo has shown that it is not merely a question of the preference of one semantics over another. In a case where we take into account the plural form of a noun, we should adopt a plural first-order language. In a case where we consider modals, we are supposed to use a language of modal logic. Therefore, Rayo's approach suggests a shift from the ontological commitment in terms of types of entities (which is provided by first-order regimentation) to the ontological commitments in terms of concrete numbers of entities.

2.4 Evaluation of Rayo's exposition

Rayo makes use of Quine's idea to consider regimented theories. In this way, his approach correlates with the initial goal of the thesis, which is to show that the best way to talk about the ontological commitments is from a semantic perspective. On the other hand, Rayo reveals some difficulties in Quine's approach. In the last section, I focused on the "critical" part of Rayo's method and I will start the third chapter by describing his reformulations of Quine's criterion. In the beginning of section 2.3, I pointed out that Rayo's ideas may also be counted as a different approach to the problem of ontological commitment. For example:

Rayo contends that demand-talk obeys Kripke-style substitution-rules for names and predicates (Rayo, 2007, p. 429). To illustrate substitution-rules for names and predicates, Rayo gives the following examples: since Hesperus is Phosphorus, there is no difference between the demand that the world contains Hesperus and the demand that the world contains Phosphorus. Likewise, since being composed of water is the same as being composed of H_2O, there is no difference between the demand that human bodies be composed mostly of water and the demand that human bodies be composed mostly of H_2O.

A use of substitutions rules is already quite a deviation from Quine. A quantifier is not objective or substitutive in and of itself, rather it is the interpretation of quantification that imparts these qualities and the possibility of further interpretation is not excluded. Quine asserts that it is more likely that substitutive interpretations will not give rise to any ontological commitments:

> Substitutuinal quantification, as I call it, thus brings no way of distinguishing names from other vocabulary, nor any way of distinguishing between genuinely referential or value-taking variables and other

> place-holders. Ontology is thus meaningless for a theory whose only quantification is substitutionally construed [...]. The question of ontology makes sense only relative to some translation of the theory into a background theory in which we use referential quantification. (Quine, 1969, pp. 63–64)

Thus, simply to define a class of substitutions and to give a substitution definition of truth does not require an acceptance of those or other ontological commitments. However, the possibility of accepting such commitments is not ruled out either. So according to Quine, if we give substitutions for the quantifiers, then we are neutral with respect to the ontological commitments.

In respect to the goals of this thesis, Rayo's account highlights some important ideas. It implies that logical language servers as "strict" instrument to to determine what exists. First, logical language is a formal one. When we work within a logical language, we know what to render as variables available for quantification. If we are not sure what consider as the values for the variables once quantified, then this is the problem of the meta-language. What Rayo wanted to show is that there is plethological commitment that is couched in terms of the numbers of entities. It is important to remember that Quine's criterion deals with not natural language, but with regimented discourse. From this, it follows that Rayo is making an attempt to explicate ontological commitments of ordinary language. So, in application to natural language, we have not only ontological commitment, but also plethological commitment.

I think that in general, Rayo's approach to ontological commitment may be accounted as either critique of Quine's criterion or another account on the criterion of ontological commitment. On the one hand, Rayo refers to Quine's explanation of ontological commitment and tries to modify it. On the other hand, the tools he uses are too different from the tools used by Quine. In this section I took Rayo's ideas as a critique, since a discussion of his approach is beyond the scope of this thesis. As a critique of Quine's criterion, Rayo gives a new perspective on the discussion of metaphysical problems with respect to semantics. Moreover, his papers are recently published and utilize modern formal tools and research findings to explicate the notion of ontological commitment. In the next section, I will focus upon Rayo's reformulations of Quine's criterion with the purpose to discover the commitments in possible worlds semantics.

Chapter 3

Ontological commitment within possible worlds semantics

In this chapter, I will focus on the notion of ontological commitment outside extensional logical language. The motivation to explore intensional languages is twofold. First, Rayo proposes to utilize possible worlds semantics to explain the nature of ontological commitment. In this respect, any particular semantics is considered to be a different framework that can be used to elucidate ontological commitments. This is because it is the semantic theory that assigns a truth-value to a sentence. Therefore, I distinguish the real existence of an object from the existence that is assigned by the semantic theory. In case of possible worlds semantics, the task becomes complicated because one has to take into account counterfactual situations. I begin by dissecting Rayo's reformulations of Quine's ontological criterion and then continue with a discussion of Kripke's semantics and its inherent ontological commitments.

Second, the semantics of extensional logic, in particular first-order logic, does not address the question of determining meaning outside some particular theory. It is of great interest to examine Putnam's externalist account of the way the meaning is determined in order to determine if it adds to our understanding of ontological commitment.

3.1 The reasons to consider ontological commitment in intensional language

Rayo attempts reformulate the criterion for ontological commitment in order to disambiguate the term "must" in Quine's approach, namely "Fs must be counted amongst the values of the variables in order for the sentence to be true." (Rayo 2007, p. 8) I will consider only the logical and metaphysical versions[1].

Rayo formulates metaphysical version of Quine's criterion:

> A first-order sentence ψ carries commitment to Fs just in case, as evaluated with respect to an arbitrary possible world, ψ is true only if Fs are counted amongst the values of the variables. (Rayo, 2007, p. 432)

[1] another reformulations of the criterion may be found in Rayo (2007)

Furthermore, Rayo presents the following example:

> Suppose that being Winston Churchill and being Jennie Jerome are purely intrinsic properties (it does not mean that part of what it is to be Winston Churchill is to have Jennie Jerome as a mother). Then the truth of 'Winston Churchill and Jennie Jerome exist' demands of the world that it contains Winston Churchill and that it contains Jennie Jerome, but not that it contains mothers. Giving Kripke semantics, any world in which Winston Churchill exists is a world in which he has Jennie Jerome as a mother. (Rayo, 2007, p. 433)

Therefore, the metaphysical version of the criterion indicates that the first-order version of 'Winston Churchill and Jennie Jerome exist' carries a commitment to mothers. Concerning the commitment to proper names, Rayo does not address the notion of the rigid designator introduced by Kripke. I think that the rigid designator has to be taken into account when there is an attempt to reformulate the criterion with respect to proper names. Of course, Rayo cites a general case when constructing a metaphysical version of Quine's criterion. However, he gives a statement that contains proper names. Indeed, this example is interesting in that it takes into account Kripke's idea of necessity of origin. It is not possible for a person to be born from different parents: "anything coming from different origin would not be this object. (Kripke, 1980, p. 113) It must be pointed out that Winston Churchill and Jennie Jerome are rigid designators according to Kripke's semantics. They designate the same people in all possible worlds. A sentence 'Winston Churchill and Jennie Jerome exist' is true in all possible worlds where Jennie Jerome is the mother of Winston Churchill. It may be the case that in some counterfactual situation, Winston Churchill exists, but Jennie Jerome does not exist. Possible worlds semantics states that if in the actual world the objects exist, we can still imagine some counterfactual situation where these objects do not exist. But necessity of origin mandates that in every possible world where Winston Churchill exists, we have a commitment to Jennie Jerome. In the next section, I will focus on Kripke's approach, which regards names as rigid designators. I only will consider commitments of sentences containing proper names without commenting on the merits of the notion of necessity of origin, a discussion of which would be beyond the scope of this thesis.

Logical Version of the criterion is given as follows:

> A first-order sentence ψ carries commitment to Fs just in case $\psi \rightarrow \exists x P(x)$ is a truth of (free)[2] logic for some predicate expressing F-hood. (Rayo, 2007, p. 432)

[2]Rayo notes that "the restriction is needed to avoid a conclusion that, e.g. an arbitrary sentence carries commitment to every object named by an individual constant in the language." (Rayo, 2007, p. 432)

This formulation is equivalent to:

> A first-order sentence ψ carries commitment to Fs just in case there is a predicate P expressing F-hood such that any (free) model of ψ is a model whereby some amongst the values of the variables are in the extension of P. (Rayo, 2007, p. 432)

All these formulations do not preserve Quine's original statement which considers only first-order sentences. Rayo's reformulation of Quine is intended to make ontological commitment more precise. However, even these reformulations do not completely address the the shortcomings inherent in ontological commitment.

According to the logical version of Quine's criterion, $\exists x$ Whale(x) carries commitment to whales, but not to mammals. The reason is that '$\exists x$(Whale (x)) $\rightarrow \exists x$(Mammal(x))' is not a logical truth. However, part of what it is to be a whale is to be a mammal. Hence, if the truth of '$\exists x$ Whale(x)' demands of the world that it contains whales, it also demands of the world that it contains mammals. Taking into account these amendments, Rayo formulates Revised Logical Version of Quine's Criterion:

> A first-order sentence ψ carries commitment to Gs just in case: (a) $\psi \rightarrow \exists x P(x)$ is a truth of (free) logic for some predicate P expressing F-hood; and (b) part of what it is to be F is to be G. (Rayo, 2007, p. 433)

In this version '$\exists x$ Whale(x)' carries commitment to mammals.

Rayo constructs reformulations of Quine's criterion in order to show the ways to overcome its limitations. These reformulations are aimed to demonstrate that the first-order language is not the most appropriate language for regimentation of the natural language expressions. The problems are very various. As was noted in Chapter 2, given that a natural language contains plurals and modals, it is not possible to express them in a first-order language while preserving the required ontological commitments. As a result, we need a reformulation of this criterion using semantics of a plural first-order logic in case of plurals. The expressions that contain modals need possible worlds semantics to express their commitments. Moreover, there is an ambiguous "must" in Quine's formulation of ontological commitment that needs to be explained. For clarification of this "must," we need to adapt possible worlds semantics. These limitations show that either Quine's criterion is not adequate and it need to be reformulated with the help of intensional logic.

3.2 Ontological commitment for proper names

In Kripke semantics, every possible world contains possible objects that may exist in this world. In this respect, there are two cases to study. First, ontological

commitment to possible objects. In Rayo's terms, this kind of commitment is overcome when we consider the demands that the sentence's truth imposes on the world. This way, we are not ontologically committed to possibly existent objects within possible worlds semantics. However, it may be the case that in the actual world, we say that something possibly exists, putting the possibility operator in front of the sentence or in front of some object. Consequently, in the case where we put the possibility operator in front of the sentence, the truth of the sentence demands the existence of the object in at least one possible world. So, the object may not exist in other possible worlds, connected by accessibility relation to the actual world. This implies ontological commitment to possible objects. The same line of reasoning is applicable in the case where we put the possibility operator in front of the object with the assumption that this concrete object must exist in at least one possible world for this sentence to be true.

Second, we can separately consider the case of ontological commitment to the objects that have been denoted by proper names. This seems necessary because the identity statements containing names deserve special attention. In section 2.4 of the second chapter, I introduced the intensional language in the case of a modal sentences, which is based on possible worlds semantics. In this case, I considered commitments with respect to a particular world. In section 3.1 I pointed out that Rayo's metaphysical version of the ontological criterion gives us unexpected commitments in the case of proper names. The metaphysical problem of the origin states that one person cannot have parents other than the ones this person originally had. Otherwise, it would not be the same person.

Kripke talks about names and descriptions in terms of 'designators'. A designator is rigid if it designates the same object in every possible world where it designates something. A designator is nonrigid if it designates various objects in different possible worlds. For example, 'the inventor of bifocals' is a nonrigid designator. In the actual world, it designates Benjamin Franklin. It might have been the case that, in another world, someone other than Benjamin Franklin invented bifocals, therefore the description 'the inventor of bifocals' would designate another person, yet have the same meaning. The proper name 'Benjamin Franklin' is an example of a rigid designator. There can not be a a counterfactual situation in which this name has a reference, where "Benjamin Franklin" does not refer to Benjamin Franklin.

Kripke states that a rigid designator denotes the object that does not have to exist in every possible world:

> [...] when I use the notion of rigid designator, I do not imply that the object referred to necessarily exists. All I mean is that in any possible world where the object in question does exist, in any situation where the object would exist, we use the designator in question to designate that object. In a situation where the object does not exist, then we should say that the designator has no referent and that the object in

question so designated does not exist. (Kripke, 1971, p. 173)

While Benjamin Franklin might not have existed, the name 'Benjamin Franklin' is a rigid designator because it denotes the same object in each possible world where it denotes something. In the worlds where Benjamin Franklin does not exist, the name 'Benjamin Franklin' does not designate anything that exists in that world. So, rigid designators do not have contingent descriptive context. The name, as a rigid designator, gets the references by a description or ostension, which is called "initial baptism". For example, there might be a possible world where another set of parents gave the name 'Benjamin Franklin' to a different child, but this world would not be the one in which someone was Benjamin Franklin in the sense that we use this name. During the chain of communication, the recipient of the name is supposed to use the same reference as the person from whom he has heard it.

If someone does not know that Benjamin Franklin and the inventor of bifocals are the same person, then it follows that whether this person says that Benjamin Franklin is "the First American" or Benjamin Franklin is the inventor of bifocals, she is committed to the existence of Benjamin Franklin. This is the result of a fixation of the references of names during the chain of communication. More precisely, regardless of the way we use the name Benjamin Franklin, we are committed to exactly the person who was originally given the name, Benjamin Franklin.

Kripke characterizes metaphysical distinctions and epistemological distinctions. A statement is necessary if it is true and there is no way for things to have been otherwise. We say that something is contingently true if we mean that, though it is in fact the case, it could have been the case that things would have been otherwise. Kripke claims that this is a metaphysical distinction and seeks to answer the question "how the world could have been; given that it is the way it is, could it have been otherwise, in certain ways?" (Kripke, 1971, p. 177) A distinction between *a priori truth* and *a posteriori truth* is what [3] Kripke calls an epistemic distinction due to the fact that these notions deal with "what can be known in certain ways about the actual world". (Kripke, 1971, p. 177)

Kripke does not reject that contingent statements of identity may be possible, however. He argues that if the terms of identity statement are rigid designators, then an identity statement, if it is true, is necessarily true. (Kripke, 1971, p. 163):

1. $(\forall x)(\forall y)((x = y) \supset (Fx \supset Fy))$ the substitutivity of identity

2. $(\forall x)\Box(x = x)$ the necessity of self-identity

[3] *A priori truth* is known to be true regardless of any experience; *a posteriori truth* depends on our observations.

3. $(\forall x)(\forall y)((x = y) \supset [\Box(x = x) \supset \Box(x = y)])$ by instantiation from (1)

4. $(\forall x)(\forall y)((x = y) \supset \Box(x = y))$ from (2) and (3)

If an object is identical with itself, than it is necessarily identical. For Kripke, the distinction between *a prioricity* and necessity relies upon the objects having essential properties, more precisely on *de re* modality. [4]

However, this kind of identity statement may not be known a priori. Consider statement "Hesperus is Phosphorus". This statement can be confirmed by empirical investigation and it may turn out false depending on one's beliefs. In spite of seemingly following conclusion that these statements must be contingent, Kripke states that "certain statements of identity between names, though often known a posteriori, and maybe not knowable a priori, are in fact necessary, if true" (Kripke, 1971, p. 181). A notion of rigid designator is given to support this statement. For example, 'Nixon' is a rigid designator and we use the name 'Nixon' to point out a person in both actual world and counterfactual situation: when we say "If Nixon had not written the letter to Saxbe, maybe he would have gotten Carswell through, we are talking about Nixon, Saxbe, and Carswell, the very same men as in the actual world, and what would have happened to them under certain counterfactual situations." (Kripke, 1971, p. 181)

The names 'Hesperus' and 'Phosphorus' are rigid designators. An identity statement "Hesperus is Phosphorus" is necessarily because 'Hesperus' and 'Phosphorus' designates the same planet Venus in every possible world. So there will not be any circumstances in which Hesperus might not been Phosphorus. That would have to be circumstances in which Venus would not have been identical with itself. Then it is not possible to have a situation in Hesperus would not have been Phosphorus.

Therefore, with respect to ontological commitment, we can reason as follows: Ontological commitment to Phosphorus implies commitment to Hesperus, because Phosphorus and Hesperus commit us to the same planet, Venus. It may be noted that this is the case if a speaker does not know that Phosphorus is actually Hesperus. This is a consequence of the fact that in such a theory, the meanings of linguistic expressions are determined by a source outside speaker's mind.

Treating names as rigid designators indicates that you are committed to something, even if you are not completely aware of all the details associated with this thing. In this way, meanings are not individuated, but dependent upon sources outside speaker's mind. To expand upon this idea, I will describe Hilary Putnam's Twin Earth experiment, which is given to support the role of the linguistic community in the determination of the meanings of natural kind terms.

[4]Recall that in the first chapter I discussed Quine's denial of de re modality.

3.3 Natural kind terms

In this section, I will expand upon the use of rigid designators. Hilary Putnam extends Kripke's theory of reference for proper names to natural kind terms. I will make an excursus in order to highlight an aspect of Putnam's thesis on the division of linguistic labour. In particular, I am interested in the question of whether the experts clarify the ontological commitments that speakers have.

Putnam presents a thought experiment, called "Twin Earth.". This thought experiment puts forward the central argument for semantic externalism, which in its basic form, holds that meanings are not based in the head of a speaker. We are asked to imagine a Twin Earth, which is exactly like Earth except for one peculiarity. On Earth, the matter that flows in rivers and falls as rain has chemical composition H_2O, whereas on Twin Earth, the matter that flows in rivers and falls as rain has another composition, XYZ. Furthermore, consider an Earthian, Oscar, and his Twinearthian doppelganger, Twin Oscar.

> If a space ship from Earth ever visits Twin Earth, then the supposition at first will be that "water" has the same meaning on Earth and on Twin Earth. This supposition will be corrected when it is discovered that "water" on Twin Earth is XYZ, and the Earthian space ship will report somewhat as follows:
>
> "On Twin Earth the word 'water' means XYZ."
>
> Symmetrically, if a space ship from Twin Earth ever visits Earth, then the supposition at first will be that the word 'water' has the same meaning on Twin Earth and on Earth. This supposition will be corrected when it is discovered that "water" on Earth is H2O, and Twin Earthian space ship will report:
>
> "On the Earth the word 'water' means H2O." (Putnam, 1973, p. 701)

The word 'water' has different meanings in the sense that it refers to a different substance. In Putnam's terms, extension is not determined by a psychological state. For Quine, one still knows what he is committed to because of the transparency of meaning. More precisely, we always know what our terms mean. Putnam has shown that extension is partially determined by the environment. Therefore, a speaker can be committed to something he is not clear about.

If this is the case, the object appears to be an example of a natural kind. However, it will not be that natural kind if it does not have enough the appropriate fundamental properties (for example, fools' gold). Additionally, an object can be of a certain type, even if it does not posses its characteristic appearance as long as it has the fundamental properties that define the element (for example, an albino tiger). If we wanted to designate water as a natural kind according to this methodology, XYZ cannot be referred to by this term. Although it looks and behaves as H_2O, XYZ fundamentally from water in terms of its core chemistry.

I can point to a glass of water and say "there is water in that glass", but I may be mistaken in my supposition. It may be a glass of champagne. Perhaps, in my own ontology, I am committed to water in the above example, but this commitment cannot be accepted because I am mistaken. In Putnam's terms, the liquid stuff I have pointed to "bears a certain sameness relation [...] to most of the stuff I and other speakers in my linguistic community have on other occasions called 'water" (Putnam, 1973, p. 702). Therefore, the sentence bears ontological commitment, irrespective of whether I am committed to what I do not know or I partially know; determination of whether I am committed to 'water' or not lies outside my current psychological state. It is only through a scientific investigation that we may say whether this liquid stuff is the same as the stuff we call 'water' in our linguistic community. So, according to externalist, in order to determine ontological commitment for a natural kind term, we need to consult with the data outside our mind. In other words, while I may not know what I am committed to, a sentence will still contain a commitment regardless.

Putnam points out that a division of linguistic labor takes place: "every one to whom gold is important for any reason has to acquire the word 'gold" (**?**, p. 705). However, the speaker doesn't need to acquire the method of recognizing if something is gold. "This division of linguistic labor rests upon and presupposes the division of *non*linguistic labor" (Putnam, 1973, p. 705). She can rely on metallurgist as a special subclass of speakers. The psychological state of the average speaker doesn't fix the extension of gold; the speaker belongs to the collective linguistic body, whose sociolinguistic state fixes the extension. The collective linguistic body "divides the labor of knowing and employing" (Putnam, 1973, p. 705) various parts of the "meaning" of gold.

In Putnam's opinion, experts support ordinary speakers in their daily use of language, while natural kind terms are technical terms and used as the components of the theory. Ordinary speakers depend on chemists in making a decision as to whether this colourless substance is water or ethanol. However, the meaning of "water" for any speaker, whether she is an expert or not, is H_2O, a fact that is known to the experts. These two aspects of language, the daily use of natural kind words and their microscopic or theoretical details, must be connected in order to give them sense. Furthermore, ordinary speakers co-operate with experts in a meaningful way if, in their use of natural kind words, their utilization of these words is correct in terms of the meanings they are assigned by the experts. It is the experts who retain the right to define the underlying meaning of natural kind words and ordinary speakers should be prepared to defer to this in their daily use. However, while we, nonspecialists, can not know the chemical formula of water, it is possible to think that we have a certain independent authority on its meaning when we use the term.

Therefore, the truth value of Twin Oscars's utterance "There is water" and his associated thought content depends on the properties of XYZ. Taking into account the assumption that Oscar and Twin Oscar are physical duplicates, the

fact that their utterances and thoughts are about different substances and have different truth conditions is used to support the externalist's position that a person's thought contents are partly individuated by the environment.

When Oscar utters "There is water.", he is committed to water as being H_2O. When Twin Oscar utters "There is water.", he is committed to water as being XYZ. Therefore, Oscar and Twin Oscar's commitments are different, and it is based on the differences in the meaning of the word "water" as accepted in their linguistic communities.

3.4 Concluding remarks

In this chapter, I described the reformulations of Quine's ontological criterion made by Rayo. The metaphysical version of this criterion results in a commitment to the origin in the case of proper names. Expanding upon this idea, I discussed the notion of rigid designator. I highlighted the use of names and natural kind terms as rigid designators and pointed out that they have distinct ontological commitments. It is in the interest of a discussion of linguistics that I have reviewed names and natural kind terms as rigid designators. It is through a consideration of natural language that we determine if a particular term is a rigid designator. In this chapter, I attempted to demonstrate that ontological commitment must be view through the prism of semantic theory.

To this point, I have looked at the regimented versions of natural language. In the next chapter, I will come back to natural language in order to see whether I can say more about ontological commitments of natural languages in the context of what has been presented thus far.

Chapter 4

Ontological commitment of natural language

To define the ontological commitment of natural language is a complicated task. We need to choose a specific semantic theory for natural language and reveal its ontological commitments depending on the semantic machinery employed by this theory. The first thing that one observes is the unavoidable acceptance of multiple distinctions in the types of entities, the natural language expressions for these entities, and the semantic analysis of these expressions. In this chapter, I will make an attempt to clarify these distinctions and discuss what ontological commitment means for the semantics of natural language.

4.1 Revealing the difficulties

First, we tend to organizing entities as belonging to one or another kind. In this way the task is reduced to defining the ontological commitment to certain kinds of entities, such as concrete, abstract, etc. In the third chapter, we have seen that in this case the ontological commitment differs depending on the semantics we choose.

Second, the ontological commitment can be considered in respect to a concrete number of entities. In these cases, we are interested in the ways the terms that denote certain entities are used in natural language expressions. It may be the case that some natural language expressions are ambiguous. One sentence may have different readings and therefore commitment depends on the way in which we comprehend a sentence. For example, a sentence (1) "Every man loves a woman" is ambiguous. In one reading, one particular woman is loved by all men and in the other reading, every man has at least one woman he loves:

(1) $\exists y(\text{woman}(y) \wedge \forall x(\text{man}(x) \Rightarrow \text{love}(x, y)))$

wide scope for 'a woman' commits us to only one woman.

(2) $\forall x(\text{man}(x) \Rightarrow \exists y(\text{woman}(y) \wedge \text{love}\ (x, y)))$

narrow scope for 'a woman' commits us to more women if there is more than one man

The ontological commitment in terms of a concrete number of entities correlates with the logical language we employ to consider natural language expressions and does not presuppose paraphrase. I have already touched upon this idea in section 2.3, when I discussed Rayo's purpose for introduction of plural first-order language in order to preserve the desirable commitments of GKB sentence. More precisely, we look into bound variables to reveal commitment in dependence of the number of entities in order to clarify the ambiguities in natural language. In that way we analyze natural language expressions with the help of logical language. In the above examples, the syntax of first-order logic tells us that sentence (1) has two readings. The semantic analysis requires two different commitments in terms of numbers of entities for a sentence to be true.

Defining the ontological commitment in terms of the concrete number of entities differs from Quine's initial treatise. Even though his criterion of the ontological commitment correlates with the truth-conditions of the theory, it focuses on the kinds of entities that these theories assume exist: a theory is committed to those entities which must exist if it is true. The way Glock puts this idea is more illustrative: "a theory T assumes the existence of entities of type K if T entails or presupposes that there are entities of type K." (Glock, 2003, p. 43)

In cases where we consider the ontological commitment in terms of the types of entities, we should admit that the existence of certain kinds of entities will depend upon one's conceptual scheme. Recall the dispute between Quine and McX highlighted in the first chapter: their different conceptual schemes lead them to accept different ontological commitments. They discuss commitment to certain objects using the same language, so primarily this dispute is about the words in the sense of what concepts are expressed by the words. Quine and McX try to understand each others positions and find a common understanding of the use of words. This is what Quine emphasizes in "On What There Is": "[...] ontological controversy should tend into controversy over language." (Quine, 1948, p. 35) The question of adapting a linguistic framework or conceptual scheme in order to consider what kind of entities exist is a pragmatic one. This question does not have a methodological difference for Quine. To answer the question of whether a color exists, we must adapt a linguistic framework. There is no methodological difference between this choice and the choice to adopt some conceptual schema to answer the question of whether quarks exist.

In the light of our first distinction of the ways we can consider the ontological commitment, we should separate two facts. Firstly, we know that Quine and McX have different conceptual schemes. For this reason they cannot reach an agreement on the ontological commitment in terms of the kinds of entities: McX accepts the kinds of entities that Quine refuses to accept. In different conceptual schemes, we define different ontological categories and check whether an entity fits one or another ontological category. Consequently, we divide the types of entities in accordance with different ontological categories. Secondly, we know that Quine's approach is restricted to a standard first-order language. In this respect,

we are interested in what must be counted among the values of the variables for a sentence to be true. Moreover, as we have seen in the examples above, ambiguities in natural language lead us to consider the ontological commitment in terms of a concrete number of entities. In other words, if an ontological controversy tends into a controversy over language, then we should distinguish the ontological commitment in terms of kinds of entities and the ontological commitment in terms of concrete numbers of entities. This is what natural language requires us to do. To expand upon this idea, I will discuss semantics of natural language and the devices we use for exploring its semantics.

4.2 Formulating the questions

In order to determine the ontological commitment for the semantics of natural language, we need to take into account the structures of the sentences. This was the aim of Quine's regimentation, to translate the sentences of natural language into standard first-order language. As discussed in the second chapter, his project of regimentation faces a number of problems that require us to go beyond first-order logic. If we would like to adopt the truth theory for natural language in order to define ontological commitment of natural language semantics, then we should take into account the various structures of natural language expressions. For example, Donald Davidson (1977) calls "the method of truth in metaphysics" the employment of a truth theory at the basis of a compositional meaning theory for natural languages. The purpose of this method is to explore the ontological commitment with the focus on the commitment to the truth of our utterances. Some commitments are easily captured from the very structure of a sentence, whereas other commitments are tied to beliefs or attitudes. An example of the former kind of commitment is a sentence like "There are books on the shelf." We are committed from the truth of this sentence to the commitments to the existence of a shelf and to there being entities which are books. The example of the latter are sentences that express propositional attitudes such as: "I believe that there are tigers". My belief that 'there are tigers' carries a commitment to tigers, or rather we are committed from the truth of a belief to the commitment that there are tigers.

In the framework of a truth theory for the language, we are committed to the truth of sentences. More precisely, adapting the framework of a truth theory leads us to an ontological commitment that spreads from accepting certain sentences as true. Moreover, the ontological commitments depend on the structure of meanings which occur in natural language. Emmon Bach claims that the structure of meanings that takes place in natural language is tied to metaphysical questions: "no semantics without metaphysics." (Bach, 1986, p. 575) To analyze the semantics of natural language, we should acknowledge the fact that it is compositional. The relation between compositionality and ontological commitment

arises when the lexical meanings takes part in pointing to the ontological commitments that occur in the linguistic practice. Bach says that in order to state compositional rules for semantics, "we have to 'go inside' the meanings of particular lexical items." (Bach, 1986, p. 576) The primarily interest is the meanings of the composite parts of a sentence. The meanings of complex expressions are built up from semantic rules for every construction rule of the syntax. The resultant semantic value requires the principle of compositionality, i.e. it is a function of the semantic values of the component parts. The metaphysical questions in semantics for natural language are concerned with the general structure and the content of the models. In this respect, the ontological commitment correlates with the types of entities that are distinguished within some model. If we accept that natural language reflects reality, then we may reason in the following way. We use language to communicate on the various topics concerning reality. In order to uncover the semantics of natural language, we are obligated to discover the nature of certain entities in order to find their correct representation in the models. However, there are also terms that do not denote real existent entities.

Accepting the framework of possible worlds semantics we should admit that false theories also bear ontological commitments. For example, there are possible worlds in which Santa Claus exists. In these worlds a statements "Santa Claus exists" bears a commitment to Santa Claus. Therefore, the notion of ontological commitment covers more than reality and real truth. As I have pointed out in the third chapter, it turns out that different semantic theories allow different ontological commitments. Hence, with respect to the truth-conditions we should consider any particular semantics to see what ontological commitments the sentence has. The straightforward idea that comes to mind is to find something common in ontological commitments for all semantics. This common thing is meaningfulness. If the sentences about non-existent entities have semantic interpretation, then the model reflects more than reality. But at any case these sentences are meaningful as far as we understand their meaning.

A question about existence is often associated with a question of what is real. A consideration of the ontological commitment in natural language regarding what is real must take place at the level of conceptual resources. Here, meaningfulness plays the central role. We accept the fact that the actual truth is too restricted when we face with the false theories which have certain ontological commitments. So, ontological commitments in terms of kinds of entities lead us to consider more than actual truth. Whereas the ontological commitment, when viewed in terms of concrete numbers of entities, puts certain restrictions on the truth. More precisely, we should take into account the truth, that some particular semantic theory allows us to accept, with respect to one particular individual.

I consider the semantics offered by Richard Montague as an example of formal representation of natural language expressions because he considers both linguistic and philosophical problems. In particular, I am interested in studying the following questions:

1. What aspects of a formal theory for semantics of natural language deal with ontology?

2. How does natural language grasp reality in a formal theory?

3. Is it possible to define ontological commitment for natural language related to a formal theory?

The first question brings us to the formal theories for the semantics of natural language. These theories, like Montague grammar, use abstract models to interpret natural language expressions. For example, a name 'Mary' is associated with an individual and an adjective 'smart' is a property. The construction rules are used in the models and meaning postulates are used to impose restrictions on the models. The purpose of meaning postulates is to restrict the class of all models to a particular subclass. The models in which some semantic relation between (classes of) predicates is valid, certain subclasses of expressions have specific semantic properties which construe the subclass. (Gamut, 1991, p. 172) In our discussion of ontological commitment of natural language, we focus upon the fact that the meaning postulate deals with extensional and intensional characteristic of the expressions.

There are extensional and intensional models that should not be confused with intensional and extensional meanings. The main difference is that while the extensional models deal only with extensional meanings, the intensional models can grasp both intensional and extensional meanings. In extensional models, the meaning of a unicorn is defined merely in terms of references. If in a model we fix the meaning of a term "unicorn" as an empty set, then we are committed to non-existence. If we consider only extensions of the terms, then the terms "unicorn" and "centaur" both come up with the same meaning, that is the empty set. In this respect we accept that the concrete type of entities, that is the type of mythological entities, does not exist. From this it follows that whatever mythological entity we consider, such as a unicorn or a centaur, its meaning is defined as the empty set. The extensional models force us to distinguish the types of entities each time we want to determine the ontological commitment. Accordingly, if we are committed to any entity from a type of mythological entities, a sentence is false regardless of what specific entity we pick up. This approach yields the result that in case we accept that neither unicorns nor centaurs exist, the meaning of a unicorn is the same as the meaning of a centaur.

In general, in extensional logic there are no means to distinguish between the meanings of two expressions with the same extension. The way to overcome the denying of the existence of a unicorn is to construct a model where unicorns exist. Then, this model will be different from the actual world. The intensional models allow us to distinguish between the meanings of a "unicorn" and "centaur" without constructing the models that are different from the actual world. In intensional models there is distinction between extension and intension where the

later is the functions with possible worlds as a domain. Then the intension of unicorns is the function that gives for each possible world a set of individuals (the unicorns). The extension of an expression is the value of the intension function with respect to one particular world. There are possible worlds where unicorns exist, but centaurs do not exist, therefore unicorn and centaur have different intensions.

4.3 Formal and natural languages

Linguistic distinctions are interesting in the way they have an impact on the ability of sentences to assert truth and imply other truth sentences. It may seem that some sentences do not imply truth. For example, "John wants to find a unicorn and eat it". These kind of sentences deserves our attention because they raise questions about what is following from these sentences seeming to be true. Is it possible for the sentences to be true in cases where unicorns do not exist?

In the PTQ models the existence of mythological creatures is determined by the verb with which the term that express individual is used. This way the ontological commitment is to be considered in terms of concrete numbers of entities. It follows that if we accept as true that "John sees a unicorn", then there is a unicorn that John sees. However, from the acceptance of the truth of "John seeks a unicorn", the existence of a unicorn does not follow.

The transitive verb 'seek' is considered as a relation between individuals and second-order properties. This is an important semantic fact that such intensional TVs do not lead an acceptance of the existence of unicorns in the sentences like in the example given above. However, when we use extensional TV like 'see', a sentence "John sees a unicorn" should imply the existence of unicorns. Therefore, such extensional TVs are regarded as relations between individuals. (Gamut, 1991, p. 175)

Then, we may formulate the criterion of ontological commitment in terms of kinds of entities where the kind is determined by the type of a verb:

To be is to be an argument of an extensional TV.

So, the analysis given in the PTQ models leads us to accept the fact that the ontological question is strongly related to the semantics of natural language.

Bach claims that the PTQ models give an infinite collection of different types of ontological entities to the answer to the question "What is there?" The reason is that intensional logic, which is used as the medium device to translate natural language expressions into formal language, allows variables of all types: "if to be is to be a possible value of variable available for quantification, the PTQ gives us an infinite collection of different kinds of beasts to put into our ontological zoo." (Bach, 1986, p. 578) So, Bach considers the infinity of the kinds of ontological

entities that is to be distinguished from the infinity of entities over which we can quantify. In the case we take into account different types of variables, we again arrive to our first distinction. Indeed, there are various types of ontological entities in the framework of intensional logic.

Here, the question may be asked of whether the logical notation matters at all in determination of ontological commitment? With this respect we should draw the new distinction: (a) the ontological commitments of the logical language that we use and (b) the ontological commitments of the natural language that we determine by looking at what part of the logical language we actually employ in specifying its semantics.

As we know, Quine wants to regiment sentences of ordinary language for establishing the ontological commitment as a consequence of such regimentation. If Montague were asked how to interpret regimentation, he would say that, due to regimentation, it is possible to give a syntactic analysis of the sentences. As discussed in Chapter 1, Quine's regimentation has two purposes: First, an explication of commitments and second, their minimisation. For Montague, regimentation is used only for the explication of commitments when it is needed in orders to proceed from surface structure to derivation trees. Montague says that we should reflect the categories which we find in the syntactic analysis of ordinary English on the types of the expressions that we have in intensional logic. Intensional logical language, in contrast to the extensional language preferred by Quine, allows modalities, indirect speech, propositional attitudes, etc. This reflection provides us with the way to translate English sentences of some category to the expressions of some type in intensional logic.

I think that with this respect we should ask the question of what kind of the existence do the PTQ models give us? This is clearly does not require the real existence of the entities because of the fact that we have intensional models at our disposal, i.e the models that go beyond real existence. However, such models are built to explore the structure of the natural language that we use so it is to be connected with reality somehow. In the case of ontological investigation one faces the problem that in language we speak not only about the real state of affairs but also about the situations that might be the case as well as about the entities that possibly exist. For example, we talk about unicorns although these entities do not exist. Furthermore, the sentences in which we use this word have semantic properties. Then we should accept that the models are constructed for more than representation of reality.

Though it may seem that even though the formal models do not reflect reality, in discovering ontological commitment of natural language semantics we should take into account the relation that the models have with the reality. In Montague grammar, we are interested in the structural aspects of the semantics of natural language. Montague does not see "an important theoretical difference between natural languages and the artificial languages of logicians":

> There is in my opinion no important theoretical difference between natural languages and the artificial languages of logicians; indeed, I consider it possible to comprehend the syntax and semantics of both kinds of languages within a single natural and mathematically precise theory. On this point I differ from a number of philosophers, but I agree, I believe, with Chomsky and his associates. (Montague, 1970, p.373)

As Martin Stokhof (2007) points out, this view on the relationship between natural language and formal language places Montague apart from both philosophical and linguistic tradition. Although natural languages differ from formal ones in the way they are developed, learned, and changed, Montague does not accept these differences as theoretically important. (Stokhof, 2007, p.623) In the philosophical tradition, Quine follows in this line of thought, the focus of studies is on the differences between natural and formal languages. The findings in the differences between them are used to find a way to improve on natural languages and formal languages are considered as the tools for such improvement. For example, in Quine's view, regimentation is a tool for the improvement for natural language. In the linguistic tradition, natural language is considered according to human psychology and biology where "language is linked to an organ, and not to a tool." (Stokhof, 2007, p.623) In this respect formal languages are not linked to the human cognitive capacity, and, as a consequence, they are very different from natural languages. The crucial difference between Quine and Montague is that, unlike Quine, Montague does not aim to improve on natural language or introduce its logical form. As I emphasised in Chapter 1, Quine considers ontological commitments within theories. His purpose is revealing of what theories assume to exist. Therefore, Quine sees his task to specify the "right" kind of ontological commitment within a particular theory, whereas Montague just sees the importance in determining ontological implications in natural language as such.

Bach's approach has another perspective of consideration the relation between natural language and formal language. He talks about semantics of natural language in accordance with metaphysics, what he calls "natural language metaphysics" (Bach, 1986, p. 573). Consequently, Bach, a linguist, considers formal models with respect to the fundamental metaphysical problems. For a linguist, ontological question about the kinds of existence there are in the universe, has another formulation, namely, "What exactly we are claiming when we put forward our theories about model structures for natural languages?" (Bach, 1989, p. 98) The questions of real existence of properties, kinds, entities, etc are philosophical or scientific ones. He claims that a linguist should be neutral in the metaphysical project in the analysis of language. For Bach,

> [...] what a linguist is doing is simply seeking linguistic evidence for the nature of the semantic structure that we seem to need to give a

> good account for the meanings of natural language expressions. (Bach, 1989, p. 97)

In this quote, 'evidence' is relevant to the questions that are explored by philosophy and science, and therefore it puts linguistics in connection with other disciplines. Bach suggests that the best contributions that linguist can make to answer questions like "What is the world really like? How do we fit into it? How do linguistic categories relate to reality?" is to develop the theories for linguistic systems (Bach, 1989, p. 98).

From this I propose that the question of how to define ontological commitment is neither the task nor a competence of a linguist. However, the linguist needs the evidence for the nature of semantic structure. Therefore, even though linguistics does not deal with ontological questions per se, it seeks answers to these questions from philosophy or science. Bach acknowledges that linguistics and metaphysics have different tasks: the former does not seek to answer the question "what is there?" So, Bach seems to be "agnostic" about ontological implications as such, but at the same time he does accept that the semantics of natural language comes with a "natural language metaphysics". In fact, Bach says:

> [...] our subdivisions of the world and our efforts to understand it results ultimately from the fact that you cannot say or understand everything all at once. Ultimately, [...] this means that we have to remember that our theories will always and necessarily be partial in some sense, because everything impinges on everything [...]. (Bach, 1989, p. 98)

So, having set the task to define ontological commitment of natural language, we need evidence. Moreover, this evidence may not come from natural language itself, because sometimes we need scientific evidence in order to say whether an entity exists. For example, to say whether a phlogiston exists, we should take into account scientific evidence. It may seem that in this case scientific theories regulate what we should accept as existent according to the current scientific knowledge. Taking into account the scientific evidence, we may establish the best theory of what actually exist. However, from a position of formal analysis of semantics of natural language, we 'ascribe' ontologies rather than 'evaluate' them[1].

Whatever formal languages we employ to study the semantics of natural language, they have something in common. These formal tools are not a part of the body, they do not concern psychological reality and the way human mind perceives reality. With respect to ontological commitment for semantics of natural language an inquiry into the nature of some entities concerns the reality not in

[1] I took the terms 'ascribe' and 'evaluate' from Glock's (Glock, 2003, p. 43) discussion of Quine's initial question concerning ontological commitment.

a way human mind perceives it. Rather, we look into the semantics of natural language and introduce the formal language to describe it. Here, the metaphysics is tied with the semantics of natural language, and as a consequence formal semantics for a natural language cannot avoid metaphysical questions: "A formal semantics for a natural language, if it is to be truth-conditional, cannot ignore metaphysical questions." (Bach, 1981, p. 80)

4.4 Intensional language

It has been noted that Montague stands apart from both the philosophical and linguistic tradition. Montague grammar does not deal with the question of psychological reality. Montague does not take into account psychology and he wants to build semantics for English which should be mathematical in character. This implies that English must be viewed in a mathematically and for its description we need to build formal language. Montague tries to accomplish these two tasks, and in doing so provides a connection between natural language and its formal models. In his paper "The Proper Treatment of Quantification in Ordinary English" (PTQ) Montague (1973) he uses an indirect method for the translation of natural language expressions into formal language. Natural language expressions are translated into logical language, which has interpretation in the model. Intensional logic is used as an auxiliary language only because it can be eliminated. Consequently, every operation performed in the logic is will be interpreted in the model.

Bach claims that "the kinds of 'semantices' accessible to most of us before Montague were simply not rich enough to give a good fit to natural language meanings." (Bach, 1986, p. 593) Montague's semantics is an intensional one. It is created not for the whole natural language but for a fragment. Natural language is intensional language because it contains sentences that express propositional attitudes, intensions, quotations, temporal terms, and modalities. If we have the task to define ontological commitment of natural language, then it seems to follow that we should study ontological status of the elements of all kinds of indirect contexts. In this section, I will focus upon Montague's intensional semantics for natural language. The main objective of the section is to show that the more language is intensional, the more complicated the task to define ontological commitment of natural language becomes.

The PTQ introduces formal models for dealing with natural language expressions, whereas the paper "On The Nature of Certain Philosophical Entities" Montague (1969) touches upon the philosophical question on the nature of some entities such as pains, tasks, events and obligations.

Montague employs formal language to describe the semantics of ordinary English. This method of analysis of natural language is in particular interest of philosophy. Montague holds that the statements "there is philosophical interest

in attempting to analyze ordinary English" and "ordinary English is an inadequate vehicle of philosophy" are compatible. (Montague, 1969, p.193) When we face the task to clarify the nature of philosophical entities, philosophy and semantics of natural language are related. Semantic analysis has influence on philosophy as well as philosophy has influence on semantics. I would like to point out that Montague sees the task to explore the existence of pains, events, tasks and obligation because the most speakers occasionally accept sentences that entails the existence of such entities. Hence, Montague's initial project concerning ontological problems is different from Quine's. For Quine, every sentence that contains such dubious entities should be paraphrased to the sentences that do not contain references to such entities. This strategy allows us to avoid ontological commitment to undesired entities. As I already noticed, Quine's canonical notation has a purpose to give the "right" kind of ontological commitment.

But Quine's project is restricted to the standard first-order language. Hence, if something cannot be rendered as the value of a variable in first-order logic, then it does not exist. More precisely, the criterion as such is independent of the language, it is Quine's application of it that is extensionally restricted. As I pointed out above, Montague sees importance in revealing ontological implications of natural language as such. He employs intensional logical language in his formal interpretation of the semantics of natural language. He does concentrate on ontological questions, but from a different perspective. For Montague, philosophy can accommodate mathematical or model-theoretical means, which are available in set theory. The foundations of intensional languages lies in justification of "a language or theory that transcends set theory, and then proceeding to transact a new branch of philosophy within the new language" (Montague, 1969, p.166). In order to explicate the nature of certain philosophical entities, he reduces such dubious (as Montague called them) entities as experiences, events, tasks and obligations to the category of predicates. There are two purposes for such reduction. Firstly, predicates should not be dubious. Secondly, this reduction allows us to construct the language

> capable of naturally accommodating discourse about the dubious entities and to introduce an intuitively satisfactory notion of logical consequence for sentences of that language. (Montague, 1969, p.165)

I will not touch upon the notion of logical consequence since it is not of a primary interest for the study of ontological commitment. In the light of ontological commitment, the most significant feature of Montague's proposal is that it accommodates natural language expressions containing the entities which existence is the moot philosophical question. I understand 'accommodate' as finding the formal tools to deal with such natural language expressions.

For example, the property of being red is the function that assigns to each possible world the set of possible individuals, which in that world are red. He

imposes additional condition on predicates that is their extension with respect to a given possible world is to be in a relation among possible individuals existing in that world (Montague, 1969, p.163). Hence, a predicate "is red" is applicable only to existent entities. Existence is included among the predicate constants. A symbol E and a certain type are associated with a predicate constant 'existence'. This type is regarded as the set of individuals existing in some possible world, according to the interpretation.

As I have pointed out above, Bach holds that the PTQ models gives us infinite number of ontological entities because we are allowed to have variables of all types. To examine this claim I take an example of the ambiguity of *de re* versus *de dicto* readings in the sentences that contain a term for a mythological character 'unicorn'.

Consider the following sentences:

(1) John finds a unicorn.

(2) There is a unicorn that John finds.

(3) John seeks a unicorn.

(4) There is a unicorn that John seeks.

Sentence (2) follows from sentence (1). However, sentence (4) does not follow from sentence (3). The ambiguity of (3) is a consequence of two possible readings: a specific reading in which there is a specific unicorn that John seeks (4), and an intensional reading where John is said to engage in the activity of seeking a unicorn. The former reading is the *de re* reading and it entails the existence of unicorns. Moreover, the *de re* reading entails a specific, yet not necessarily existent, unicorn. The latter reading does not imply any real existence of unicorns, such reading is called *de dicto* one. The ambiguity follows from the different relations that are asserted in these readings. In the *de re* reading, a relation holds between two individuals, whereas in the *de dicto* reading, a relation holds between John and the set of properties of a unicorn. If the translation is compositional, then every (nonlexical) semantic ambiguity corresponds to a derivation ambiguity. In the case where a sentence has more than one meaning, there are different ways of constructing it. In the case where there are scope ambiguities (like in the examples above), the different syntactic constructions are a result of the order in which the scope-bearing elements are introduced. (Gamut, 1991, p.179)

The two readings of "John seeks a unicorn" are obtained depending on a quantification rule for the expression a unicorn. The *de re* reading is obtained as the result of introduction of a quantification rule for the expression a unicorn. The *de dicto* reading is the result of a direct introduction of the expression a

unicorn, i.e., without application of a quantification rule.

In case of scope ambiguities, like *de re* versus *de dicto* readings, in the method of sentence construction the syntactic variables play the key role. I propose that this is the quantification process in the ways to derive a sentence that, according to Bach, leads us to accept infinite number of ontological entities. Indeed, the PTQ uses another syntactic variable every time one applies the quantification process. The consequence of this process is that there is an infinite number of ways to derive a sentence. However, the variants to derive a sentence do not yield the semantic difference because different resulting formulae are all equivalent. Therefore, the PTQ models do not take into consideration infinite variants to derive a sentence.

The PTQ models were constructed as the method to look into the meaning of natural language expressions. But it turns out that these models are not rich enough to provide us with the correct account on what there is: "PTQ is not intensional enough; natural language is very intensional." (Bach, 1986, p.580) Bach says that Montague's reconstructions of intensional meanings faces the difficulty to represent some intensional contexts. Bach provides an example based on linguistic facts (Bach, 1986, p.579). Consider the following English phrases:

1. sold
2. bought
3. sold by Mary
4. bought by Mary

According to linguistic methodology and English syntax, we add by to a passive verb phrase or verb in order to construct the phrases like (3) and (4) from the phrases like (1) and (2). "In every possible world in which there is buying and selling, the set of things that are bought will be coextensive with the set of things that are sold. But in Montague's analysis this means that the property of being sold is identical to the property of being bought. Ergo, there is no way to get the function that makes the meaning of (3) and (4). English is trying to tell us what we need to have in our models properties as entities of some sort that can be distinguished even if we pick out the same sets in all possible worlds". (Bach, 1986, p.580)

There are two separate cases that seem to follow from Bach's account:

In a position to consider the ontological commitments of the logical language that we use, it follows that if we are allowed to quantify over everything and there are various ways to represent a sentence, then there should be another ontological commitment than the one given by Quine, that is "to be is to be the value of a bound variable."

Another case is the ontological commitments of natural language. In this case we look at the part of a logical language we employ to specify the semantics of natural language. From this we may conclude that if it is possible to formulate the ontological commitment for natural language in principle using the PTQ models, this commitment should be in accordance with the logical language we employ to represent different natural language phenomena.

Bach claims that if we want to do natural language semantics, we need to provide an answer to the question "What kinds of eventualities are there and what are their properties?" (Bach, 1986, p.584) Do the fundamental distinctions that are reflected in the overt and covert categories of natural language correspond in any way to the structure of the world? How could they not? (Bach, 1986, p.593) Linguistics does not give us answers to these questions. With the questions like these, a linguist appeals to philosophical investigations. The studies of ontological commitment provide us with the findings that are significant for studies of the categories of natural language. So, one faces with the problem to determine the ontological commitment in order to deal with semantics of natural language.

On the one hand, we should determine what there is in order to specify the meanings of the words or sentences. In the first approximation it may seem to be a philosophical question. However, we do not talk about the kinds of existence. Conversely, we focus on the only kind of existence (actual existence) and consider different types of entities or the numbers of entities depending on the angle of ontological commitment we want to specify. For this task we look at the part of the logical language we employ to specify the semantics of natural language. This is why it is not metaphysics per se but 'natural language metaphysics' in Bach's terms. On the other hand, we deal with the criterion of ontological commitment of logical language. If "to be is to be a value of a bound variable" is not a statement applicable only to a first-order logic, then ontological commitment does not boil down to the notation of first-order logic. Rather, the interpretation of the logical language that we employ is what tells us about the kinds of the commitment we have. The ontological commitment of a logical language depends on what kinds of variables are allowed for quantification.

Bach views the task as one to clarify the metaphysical assumptions of natural language. So, when he takes Montague's logical methods for investigation of natural language, he is looking at the logical language language that Montague employs in specifying the semantics of natural language. Bach (1981) shows that some metaphysical assumptions should be taken into account to understand some English tenses where the ideas about the tense have roots in the fundamental types of eventualities. So, in general Bach considers ontological commitment for semantics of natural language in terms of the kinds of entities.

In my point of view, one of the problems to define the ontological commitment for natural language in terms of kinds of entities stems from the hierarchical character of these kinds. Bach focuses on things that go under the names of events, processes, states, activities, accomplishments, achievements and perfor-

mances (Bach, 1986, p.584). This kind of analysis is important to a linguist. He starts from small grammatical elements and classifies them into categories. This methodology leads us to the task of classifying things in the world according to the syntactic, morphological data. For example, Bach argues for the necessity of including eventualities as entities in our models. To include these entities in the models we need to accept different kinds of eventualities. Further, he looks into the constructions in which we use the eventualities such as histories. Consequently, Bach finds that ontological status of the states in the possible histories is different from the status of events and processes.

Let's agree with Bach that events should be included in our models for natural language. This leads us to consider not only present, future or past tenses but also the ways these tenses are represented in English. Bach gives the following examples (Bach, 1986, pp.584–585):

1. Bill loves Mary.

2. Mary finds a unicorn.

3. Bertha builds a cabin.

4. John runs.

5. Bill is loving Mary.

6. Mary is finding a unicorn.

7. Bertha is building a cabin.

8. John is running.

In these examples the distinction between processes (4) and events (2, 3) is made by the interpretation of the simple present and present progressive.

Bach shows that the status of manifestations, stages, bare happenings depend on the linguistic functions that pick them up. Consider the following example:

9. Two plus two equals four.

10. Mary is intelligent.

11. Dogs are mammals.

12. Oscar was drunk.

13. Sally was running.

14. Phillip has left.

The semantic values of these sentences are functions from possible worlds to truth values or sets of possible worlds. Hence, Bach concludes,

> the question of what the ultimate stuff of the world is remains comfortably open in our semantic theories: it can be atoms, wavicles, pure mass-energy, pure spirit, or air, fire, earth, and water. (Bach, 1986, p.592)

The talk about including events into the models develops into further distinctions, such as the state-event-process distinction and the thing-happening distinction. Bach says that time, the structure of happenings, things, and the stuff that constitutes them are basic for the semantics of natural language (Bach, 1986, p.593). These distinctions and classifications are given with the aim to understand of what the world looks like.

4.5 Concluding remarks

I believe that the ontological commitment of natural language semantics is important for everyone who works with the formal tools to represent the semantics of natural language. Unlike a philosopher, a linguist searches for the commitment in the structure of natural language expression. While the former is engaged in the consideration of conceptual schemes and philosophical categories, the latter, considers the ontological commitment to the entities in order to represent the natural language expressions in the formal models.

We do operate with formal models when we talk about ontological commitment of natural language semantics. By adapting the formal apparatus to do the semantics of natural language, we limit the whole infinity of possible expressions to these expressions, which meaning we are able to understand, represent and unify. Logical language is an intermediate device to deal with the meanings of natural language expressions. The expressive power of the formal apparatus depends on the logical language that we employ. Consequently, we operate with the formal languages to specify the ontological commitments of natural language semantics.

Conclusion

In this thesis, I have considered ontological commitment from a semantic perspective. First, I discussed Quine's ontological criterion, which requires first-order regimentation. It turns out that the existence of the types of entities is explained in terms of the truth-conditions of a first-order language. The advantage of Quine's shift of ontological talk to semantic level is that it gives a standard to decide over the types of entities within some particular theory or doctrine.

The question of the uniformity of the notion existence arises within the semantic framework. Quine has showed that the way we are committed to different types of entities is not dependent on how we interpret existence. The problem of existence of the certain types of entities is given in terms of references in the first place. This is merely a problem of language of whether some terms designate or not.

The first-order regimentation, which was adopted by Quine, makes the context of deciding over the ontological commitments more precise. The bound variable criterion is coincided with the way we regiment the theories. The language of first-order logic becomes a device to reveal the commitments of the theories.

The limitation of Quine's criterion, that is applicable only to the regimented theories, gives rise to two lines of critiques. One criticism concerns the philosophical importance of the criterion. I use Hodge's analysis as a common argument against its philosophical implications and showed that Quine's ideas withstand this critique. Another criticism is centered on the restrictions of the extensional logical language. I focus on Rayo's proposal, which is to look over a plural first-order language and possible worlds semantics in order to reveal commitments of the sentences that contain correspondingly plurals and modals. I make a distinction between the semantic theory, or framework, within which we determine the ontological commitments and semantic facts. With this distinction I regard semantic theory as the decisive framework to establish the ontological commitments.

In the third chapter, I made an attempt to depart from the extensional language. Citing Rayo, I show that proper names have different commitments in the framework of possible worlds semantics. Further, I touch upon Kripke's linguistic distinction of proper names as rigid designators. I try to show that in having this distinction, we are committed to what we are not clear about. This idea was supported by consideration of natural kind terms in Putnam's externalistic account.

In the discussion of the ontological commitments of the regimented discourse, I spell out the idea of the "uniform" concept of existence. I emphasize that one can establish the ontological commitments relative to different semantic frameworks. This way we are not talking about the kinds of existence, rather about different objects we are committed to.

This suggests that we should consider the ontological commitments of natural language. I stated that the best way to talk about the ontological commitment is in semantic framework. In the last chapter, I make this statement more concrete by pointing out that the only way to discover the commitments of natural language is the semantic theory for natural language. In general, this idea correlates with Quine's purposes, which frame ontology in a semantic level. However, as I point out many times, first-order regimentation faces difficulties with respect to natural language phenomena.

I make an attempt to depart from the method of regimentation in order to reveal the ontological commitments of natural language. In this respect I made some important distinctions. The first distinction was drawn between the ontological commitments in terms of concrete numbers of entities and ontological commitments in terms of the types of entities. I rise three questions concerning interrelation between the formal theory for semantics of natural language and ontological commitments. As an example of a formal theory, I choose Montague's PTQ models. It gives rise to the second distinction between the ontological commitments of the logical language that we use and the ontological commitments of the natural language that we determine by looking at what part of the logical language we actually employ in specifying its semantics. With this distinction I can clarify that Quine sees the task to define the "right" commitment, but Montague acknowledges the importance of ontological commitment as such.

The shift from extensional language to intensional language, which is Montague's preferred language, motivates discussion of what kind of ontological entities the PTQ models supply us. In this respect, I consider Bach's idea of natural language metaphysics and point out the dependence of a linguistic on metaphysics and vice-versa. The thesis concludes with an example of metaphysical assumptions in natural language.

Overall, this work supports the idea that the best way to look at the ontological commitment is from a semantic perspective. I showed that the tools that are used for a translation of natural language expressions into a formal language clarify the commitments independently of the conceptual resources.

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