

No Metaphysical Disagreement Without Logical Incompatibility

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Abstract: The purpose of this article is to support the logical incompatibility of the opposing views as a criterion for characterizing disagreements as genuinely metaphysical. That is, I intend to argue that a specific dispute is a metaphysical disagreement only when the conflicting views are governed by different logics. If correct, this criterion would not only help to separate merely verbal from genuine metaphysical debates, but it also would ground an argument against deflationism, guaranteeing the substantiality and relevance of metaphysics. I intend to clarify the criterion, to present its basic foundations and commitments, to give some logical and metaphysical motivations for its adoption and some examples of its application.

Keywords: metaontology, metametaphysics, ontological commitment, absolute generality, metaphysical deflationism, metaphysical commitment.

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1 Introduction

We often classify as metaphysical, questions whose answers involve a characterization of the most general structure of the reality. For example, do material objects exist entirely at every instant of time, or they exist only partially at every moment, having temporal parts? Do numbers exist independently of our thinking, or our mental activity constitutes them? These questions are often considered metaphysical because their answers depend upon a clarification on how reality is structured and what composes it. Answers to the first require a conception about what time is and how its passage affects and participates in the structure of reality, and responses to the second require a conception about whether or not the structure of reality has a place for things we understand with thought, but that have no materiality, such as numbers.

Because they are so general, metaphysical questions like these often leave us with the feeling that any answer we give them will have no effect outside the limits of the discussion itself. After all, two plus two will remain four, regardless whether the numbers are mental constructs or abstract objects that exist outside our minds. The computer on which I write these words now does not change, it does not get faster or slower, better or worse, when I consider that it is here in front of me in all its existence, or when I consider that what I have in front of me is only a small temporal part of the computer, whose complete existence includes its past and future parts.

These forethoughts lead us to ask: would there be any substantiality in metaphysical debates, or they are all a mere waste of time without any connection to the world outside of the philosophy departments? Do our conceptions of the most general structure of reality have any consequence that goes beyond their own theoretical limits? If you and I disagree about the role of the mind in the constitution of mathematical reality, will our disagreement have any influence on mathematics itself or on its applications or on other fields of our lives?

Most ordinary people, scientists and even some philosophers consider that the alternative of irrelevance and waste of time is the correct one. Moreover, even those who cherish metaphysics often wonder whether an alleged specific dispute is relevant and substantial or only a merely verbal disagreement. Does a hole, for example, have ontological independence? Is it something that exists by itself, or its existence is dependent on something else, and it is only an aspect of the form of the material that houses it? Although I am one who considers substantial and relevant the metaphysical questions, I am not obliged to think that all supposedly metaphysical disputes are in fact metaphysical. Perhaps this issue of holes is not a genuine metaphysical subject. Maybe it is a merely verbal disagreement and not a problem that deserves the label of a metaphysical problem.

Even if I consider that metaphysics is substantial and also regard a specific inquiry as not merely verbal, but relevant, how to know whether this query belongs to the field of metaphysics? The definition I gave at the outset, that metaphysical questions are those whose answers involve a characterization of the most general structure of reality, is too broad and vague to function as a criterion. Is there a more precise way of distinguishing metaphysical issues and disputes?

Let us reorganize the interrogations raised so far. The first and foremost of them is:

- (1) *Does metaphysics as a discipline have any substantiality or its issues are irrelevant to all matters beyond its theoretical limits?*

A very effective way of answering the question about the relevance and substantiality of any discipline is to analyze whether their theoretical disagreements have external consequences beyond its own limits. If a theoretical divergence provokes other divergences external to the narrow disciplinary scope in which it occurred, then this divergence is not irrelevant. It is not a harmless verbal disagreement, but a substantive divergence that spreads to other subjects.

Moreover, if a theoretical disagreement affects other subjects, then the discipline, the area of studies in which this dispute occurs will not itself be irrelevant.

Suppose, for instance, that you and I have different philosophical conceptions of the notion of a human individual. Suppose we disagree about what characterizes a human individual. Suppose, furthermore, that according to my understanding of the subject, a few-week-old embryo is not yet classified as a human individual. The embryo does not meet all the criteria required by my conception of what a human individual is. Also, suppose that according to your understanding, the same embryo meets your criteria and is therefore characterized by you as a human individual. So our philosophical disagreement on how to characterize a human individual disposes us to disagree as to whether or not a few-week-old embryo is a human individual. Likewise, a disagreement we might have about how material things exist over time could drive us to disagree as to whether the computer on which I type these words is entirely in front of me now, or whether I have only a small temporal part of it under my fingers.

One consequence of our disagreement over what characterizes a human individual is that if according to my classification a few-week-old embryo is not so characterized, then I can support the morality and legality of abortion without contradicting the general principle that every human individual has the right to life. On the other hand, as you consider the embryo as a human individual, you cannot endorse the morality and legality of abortion without contradicting the same principle. Our dissent about what characterizes a human individual then causes other disagreements outside its theoretical context, since because of it, we will also disagree on the morality and legality of abortion. Because of it, we will discord on ethics, law, public health policies, and even our attitudes toward specific situations involving abortion or its possibility will also conflict. This case shows that the philosophical discipline that encloses our divergence

on how to understand the concept of a human individual is quite relevant and substantial.

Similarly, with regard to our metaphysical controversy on the relationship between existence and temporal duration, that has led us to discord on whether what I have in front of me is the computer in all its existence or only a temporal part of it; if we show that this disagreement has consequences outside metaphysics, if this conflict leads to other divergences in physics, engineering, or other matters, if it spreads, then we will know that metaphysics is relevant and substantial because we will have shown that metaphysical disagreements have consequences that go beyond their own theoretical limits.

Thus, we will have answered the above question (1) in a way that guarantees substantiality and relevance to metaphysics if we answer affirmatively to the following question:

- (2) *Do metaphysical disagreements have consequences that go beyond the theoretical limits of philosophy?*

Metaphysics will not be an irrelevant loss of time if we show that our disagreements over metaphysical questions spread and have consequences in other areas outside their own theoretical scope. However, in order for an affirmative answer to question (2) to work also as an answer to question (1) that guarantees substantiality and relevance to metaphysics, we first need a criterion for deciding when a particular disagreement should be considered as having a metaphysical nature. Before answering question (2), we must then answer the following question:

- (3) *What characterizes a specific proposal as belonging to metaphysics and a particular disagreement as a metaphysical disagreement?*

My goal is to use the criterion that entitles this article, *no metaphysical disagreement without logical incompatibility*, as a characterization

of metaphysical proposals and controversies that answers question (3) in a way that leads to an affirmative answer of question (2) and, therefore, to a response of question (1) that assures relevance and substantiality to metaphysics. The foundation of this criterion is the idea that the logical principles of inference constitute (or are counterparts of) metaphysical principles, and that any particular metaphysical proposal is inseparable from a specific logical proposal so that there can be no genuine metaphysical disagreement without there being a logical divergence or incompatibility. Clarifying this criterion and its foundation, and presenting some logical and metaphysical justifications for its adoption, as well as some examples of its application, are the objective of this article.

So far, we have seen only that an affirmative answer to question (2) conveys to a solution to question (1) which ensures substantiality and relevance to metaphysics. Before ending this introduction, let us finish our argument against metaphysical deflationism, showing how the adoption of the criterion of logical incompatibility in response to question (3) gives an affirmative answer to question (2). In other words, let us see how the logical incompatibility of metaphysical disagreements guarantees that they will have consequences outside their theoretical limits and will, therefore, be substantial and relevant.

Suppose, then, that you and I have a metaphysical disagreement and that the metaphysical doctrine you support is incompatible with classical logic and leads you to adopt an intuitionistic logic that rejects the principle of the excluded middle. Conversely, my favourite metaphysical doctrine drives me to adopt classical logic. Then our metaphysical disagreement meets the criterion of logical incompatibility and prompts us to make inferences according to different and incompatible logics. Now consider the following two sentences, where “drinking” means “drinking an alcoholic beverage”.

(4) *If I am drinking and I am driving, then I am breaking the law.*

- (5) *If I am drinking, then I am breaking the law, or if I am driving, then I am breaking the law.*

Sentence (4) is true in the vast majority of countries. It is forbidden to drink and drive. Whenever I'm drinking and driving, I'm breaking the law. Yet, sentence (5) does not seem to be true, because (5) is a disjunction of two conditionals, and none of them seems to be true. The first conditional of (5), "If I'm drinking, then I'm breaking the law" is not true because in the case I'm at home, having a glass of wine in a hard day's night, I'm surely not breaking the law. Also the second conditional of (5), "If I'm driving, then I'm breaking the law" is not true because when in the next morning I'm driving to work and I'm not drinking nor have drunk in the last 8 hours or so, I'm not breaking the law either.

However, it turns out that the argument that has sentence (4) as the only premise and sentence (5) as the conclusion is valid in classical logic. This means that the truth of (4) justifies the truth of (5) for all who reason through classical logic. So I, who support a metaphysical doctrine that leads me to reason according to classical logic, am obliged to consider sentence (5) also as true, even though it doesn't seem so to us. I would be inconsistent if I did not accept the truth of (5).

Yet, this same argument, with (4) as the premise and (5) as the conclusion is not valid in intuitionistic logic. This means that the truth of (4) is not a sufficient intuitionistic justification for the truth of (5). That is, you, who support a metaphysical doctrine that drives you to reason according to the intuitionistic logic, can very well accept the truth of (4) and reject the truth of (5).

Here, our genuine metaphysical disagreement, that requires us to reason according to different and incompatible logics, is making us disagree on the truth value of sentence (5). Both of us agree that sentence (4) is true, but only because we reason through different logics, we disagree on the truth value of sentence (5). You can accept the common sense assessment of (5) as a not true sentence.

I, in contrast, cannot and must give some explanation for its truth, however strange and technical it might be.¹

In general, whenever we reason according to different and incompatible logics, we use different standards to justify the truth-

¹ Of course, there is a classic explanation for the truth of (5), whenever (4) is true. Though it is technical and defies the most common interpretation the expressions “and”, “or”, and “if...then” have in natural language. Regarding my driving and drinking attitudes, there are only four possibilities: (a) *I'm drinking and driving*; (b) *I'm drinking but not driving*; (c) *I'm driving but not drinking*; (d) *I'm not drinking, neither driving*. In situation (a), I'm breaking the law, because (4) is a true sentence. Then, both conditionals of sentence (5) ‘*If I'm drinking, then I'm breaking the law*’ and ‘*If I'm driving, then I'm breaking the law*’ will have the antecedent and the consequent both true, which makes (5) also true. In situation (b), the second conditional of sentence (5) ‘*If I'm driving, then I'm breaking the law*’ is classically true, because it has a false antecedent. Then sentence (5), which has this true conditional as one of its disjuncts, is also true. In situation (c), the first conditional of sentence (5) ‘*If I'm drinking, then I'm breaking the law*’ will be classically true, because it has a false antecedent. Then, again, sentence (5), which has this true conditional as one of its disjuncts, will also be true. In situation (d), both conditionals of sentence (5) are true by having false antecedents. Then (5) is also true. So, according to classical logic, whenever (4) is true, (5) is also true.

Our natural tendency to regard sentence (5) as not true is because it is not at all true when we read its two conditionals not as indicative or factual conditionals, but as subjunctive conditionals, which may be counterfactual. When we read (5), we tend to understand it as saying (5') ‘*Whenever I'm drinking, I'm breaking the law, or whenever I'm driving, I'm breaking the law*’. According to this subjunctive understanding, sentence (5') is clearly not true, for the exact reasons we gave earlier in our common sense assessment of (5). Moreover, it is interesting to note that the compatibility of (5') (the subjunctive reading of (5)) with the intuitionistic logic is neither incidental nor innocent. The famous Godel-McKinsey-Tarsky translation between intuitionistic logic and the modal logic S4 shows the capacity of intuitionistic logic to harbour counterfactual situations. In contrast, the notorious oddity of the classical truth table for the conditional shows that classical logic forces an unnatural construal of this operator that forbids any subjunctive reading, which renders classical logic incapable of dealing with counterfactual situations. It is also interesting to note the metaphysical aspect of this logical divergence. The admission or rejection of the possibility that counterfactual circumstances can distinguish and characterize actual individuals is a metaphysical attitude with logical consequences. The admission of this possibility is compatible with intuitionistic logic and incompatible with classical logic.

value of sentences. If $P_1, \dots, P_n \vdash A$ is a valid argument according to the logic that I use, but invalid according to the logic that you use, and if we both agree with the truth of all premises P_1, \dots, P_n , you and I still may disagree on the truth of A . For me, A must be true, for P_1, \dots, P_n justify its truth according to the logic that I reason, but for you A may not be true, because P_1, \dots, P_n are not sufficient to justify A 's truth according to the logic you reason. Our disagreement about A 's truth-value, then, is rationally authorized by our logical disagreement. A can be any sentence of any subject. So, our logical disagreement may breed disagreements on any subject, from the most sophisticated to the most ordinary. Thus if what characterizes a controversy as genuinely metaphysical is the logical incompatibility of the opposing views, then any metaphysical disagreement may spread through logic and will have consequences in all matters upon which we reason. Metaphysical disagreements will, therefore, be substantial and relevant.

So if we eventually come across the literature with supposedly metaphysical debates that have no consequence beyond their own limits, this can only have occurred because the opposing positions are not logically incompatible. However, in this case, according to our criterion, this will not be a genuine metaphysical debate. Undoubtedly, the metaphysical literature is replete with examples of this kind, and one of the main motivations of our proposal is precisely to separate these merely verbal discussions from genuinely metaphysical debates.

The criterion I propose here is strongly inspired by the works of two leading philosophers of the twentieth century. Willard van Orman Quine and Michael Anthony Eardley Dummett. This inspiration is both positive and critical. On the one hand, I take advantage of many of their ideas and, on the other hand, in recognizing the problems that more recent literature has pointed out in the approaches of each of them, I construct the criterion as an answer or reaction to these problems.

In the remainder of this article, in Section 2, before properly clarifying and justifying the criterion of logical incompatibility, I reflect on its limits and on the dual role it plays as a thesis in philosophy of logic and as a metametaphysical thesis. In Section 3, I briefly present Quine's methodological approach for ontology. His ideas of regimentation and ontological commitment represent the first inspiration of my proposal and constitute its first steps. In Section 4, I clarify a limitation of the Quinean method and start the more detailed explanation of the criterion as a means to overcome it. In Section 5, I discuss Dummett's way of dealing with the various instances of the realism vs anti-realism debate, which will provide both an example of a successful application of the criterion of logical incompatibility and some metaphysical motivations for its adoption. Dummett's approach to metaphysical debates represents our second main source of inspiration. In Section 6, I criticize the traditional thesis of the separation between logic and metaphysics and deepen the arguments in favour of the interpretation of the quantificational theorems of logic as metaphysical principles. In Section 7, I argue for the thesis of absolute generality as a criterion of demarcation of logic and reinforce, with logical arguments, the conception of logical principles as metaphysical principles. In Section 8, I apply the criterion to a specific controversy between Kris McDaniel and Peter van Inwagen on whether there are only one or multiples modes of being. We will see that in this case, the dispute is not a legitimate metaphysical disagreement. Finally, in Section 9, I end the article with a few brief final remarks.

2 Reach and Limits: philosophy of logic and metametaphysics

From the first half of the twentieth century on, the idea of a supposed metaphysical neutrality of logic gained strength and adherents. It was already present in Edmund Husserl's *Logical Investigations* (Husserl, 2015) and earned notoriety with the theses Ludwig

Wittgenstein (2014) raised in his *Tractatus Logico-Philosophicus*, stating that “the world is the totality of the facts, not things”, and that the logical truths inform nothing about the facts, having no factual content. Later, Rudolf Carnap (1969) gave definite form to this idea and used it to isolate and protect logic from the heavy deflationary criticisms that he and other logical positivists directed to metaphysics. Finally, with the adoption of first-order classical logic and Alfred Tarski’s conceptions of truth and logical consequence (Tarski, 1944) as the orthodox standard among logicians and philosophers, the thesis of the metaphysical neutrality of logic has become hegemonic and ubiquitous.

To illustrate this thesis, I usually tell my students the fable of a local newspaper meteorologist who, on the first day of work, did not want to risk her job with a wrong weather forecast and published in her bulletin: “Tomorrow, in our city, it will rain, or it will not rain.” Her prediction was right, but she lost her job anyway. The forecast “it will rain, or it will not rain” is so general that it is a logical truth impossible to be false. Rain or shine, it is correct. However, what is the use of a weather forecast that, although true, does not help us to decide whether or not to take an umbrella or a raincoat when we leave the house in the morning? By gaining generality, the forecast lost information, and the poor meteorologist, her job.

Because they are compatible with all possibilities in which facts can occur, logical truths such as “it will rain, or it will not rain” would be separate from them and from reality and would, therefore, be merely analytical truths. They would not touch the facts and would not help us know what will or will not happen. By informing us nothing about reality, the logical truths would be metaphysically neutral.

Despite the predominance of this thesis for much of the twentieth century, the leading philosophers throughout history, from Aristotle to Russell, including the medieval ones, Leibniz, and Frege, did not regard logic as metaphysically neutral. To the surprise of many contemporary logicians, the principles of identity, contradiction, and

the excluded middle, which are contemporaneously known as the three Aristotelian principles of classical logic (D'Ottaviano & Feitosa, 2003), were not presented by Aristotle as logical principles or principles of reason. They were presented as “the most certain principles of all things” (Metaphysics, 1005b10-35) (Aristotle & McKeon, 1941). That is, they were presented as metaphysical principles. An indicator of this fact is that these principles were proposed and explained not in the logical texts of Aristotle, grouped by the ancient commentators in the *Organon*, but in *Book 4* of *Metaphysics*. There they appear as the first principles of the science of being as being (metaphysics) and hence of all other sciences (Smith, 2019).

We can also find traces of this metaphysical conception of logic in Frege's works. He thought that it would be possible to justify the conception that the laws of logic are prescriptive laws of thought only if we understand them more fundamentally as laws of truth or laws that establish what is. To explain himself he distinguished two meanings for the word “law”. In a sense, that of the laws of nature, a law establishes what is. All factual occurrences always conform to the laws of nature. However, in another sense, that of moral or civil laws, a law is a prescription stating what it ought to be. Not all factual occurrences conform to moral or civil laws. As thought is a mental process, the laws about how thinking is are in the realm of psychology, not of logic. So when we say that the laws of logic are laws of thought, the only possibility is to understand them as prescriptive laws of thought.

Yet, what gives logic the power to prescribe the laws of thought? Frege's answer was to identify the laws of logic with the laws of truth, laws which in the most general possible context establish what is.

Any law asserting what is, can be conceived as prescribing that one ought to think in conformity with it, and is thus in that sense a law of thought. This holds for laws of geometry and physics no less than for laws of logic. (Frege & Furth, 1967, 12)

Thus, what gives logic the right to prescribe the correct thinking is, for Frege, the fact that logical laws are laws about what is. So, for Frege, as for Aristotle, the laws of logic are the most general laws about all things. They are metaphysical laws.

Nowadays, with the explosion of proposals of non-classical logics, the thesis of the metaphysical neutrality of logic, although still accepted and influential in many circles, has been regularly and increasingly confronted.² We may perhaps consider that the present survival of the thesis of the metaphysical neutrality of logic is one of the last and strongest influences of logical positivism in contemporary philosophy.

The criterion I intend to present, motivate and exemplify and which is the title of this article assumes the exact antithesis of the metaphysical neutrality of logic. More than its metaphysical non-neutrality, I want to support the opposite view that logical principles of inference are also metaphysical principles and that any specific metaphysical proposal is inseparable from a specific logical proposal. So, it is not possible to have a metaphysical dispute without the company of a logical disagreement.

Before clarifying and exemplifying its content, let us reflect a little on how to understand the dual philosophical nature of the criterion I propose. It includes both a thesis in philosophy of logic and a metaphysical thesis, or metametaphysical, as some philosophers prefer to call theses that deal with the nature and methodology of metaphysics (Tahko, 2015). In the scope of the philosophy of logic, the thesis that our criterion carries is rather simple. It follows the tradition of Aristotle and Frege and represents the antithesis of the metaphysical neutrality of logic. The logical principles of inference are not metaphysically neutral. Instead, they are metaphysical principles. By *prescribing* the rules of thought, logical principles establish obligations and prohibitions in force on all beings and can be

² A prime example of this trend is Williamson (2015).

interpreted as metaphysical principles *describing* the most general structure of reality.

In its metametaphysical aspect, in turn, our criterion address two fundamental issues. First, it answers affirmatively to the question of the substantiality of metaphysics, as we have already seen in the introduction, defending metaphysics against deflationist attacks and also separating it from merely verbal and irrelevant disputes. Second, it also proposes that the methods of logic can be fruitfully included among the means of metaphysical inquiry. Here, however, we have to be very careful. On the one hand, the criterion is bold enough to assert that any proposal that deserves the label of “metaphysical” must have a logical specificity, so that every specific metaphysical position is related, as a counterpart, to a particular logic. This no doubt gives logic a privileged methodological role in metaphysical research. Yet, this privileged role should not be confused with exclusivity. By no means I am proposing the end of metaphysics and its substitution by logic, nor do I intend to legislate on the legitimate methods of metaphysical inquiry. Metaphysical proposals are produced and argued by philosophers in various ways and through diverse styles and traditions. These proposals and arguments can be forceful and convincing enough to garner supporters, supplant rival alternatives, and resolve issues without any need for explicit appeal to logic. This healthy methodological freedom, however, does not prevent anyone from applying our criterion to access, interpret, and provide the logical counterpart of any metaphysical proposal, and in doing so obtain sufficient insight and understanding to judge, evaluate, decide, complete, and even rectify the original proposal in its own vocabulary. This same methodological freedom also does not prevent anyone from searching for the specific metaphysical counterparts of the current myriad of specific logical systems produced with the most varied motivations, which in most cases do not have the most remote connection with metaphysics. In doing so, one could extract metaphysical content from these logical developments.

We can, by way of illustration, compare the relation between logic and metaphysics raised by our criterion with the isomorphism that Descartes showed to exist between algebra and geometry, when he introduced the Cartesian coordinate system, laying the foundations of analytic geometry. The emergence of analytic geometry did not destroy either of the two disciplines in which mathematics was divided. After Descartes, algebra continued to be algebra and continued to be developed independently of geometry, having the most varied drives and applications. Similarly, geometry continued to be geometry and continued to be produced separately from algebra. However, analytic geometry made possible the use of algebra for the solution of geometric problems and the use of geometry for the resolution of algebraic problems. Analytic geometry assures us that every geometric fact has an algebraic counterpart and vice versa. It even allowed us to broaden the horizons of geometry beyond the three dimensions of our spatial intuition, which had profound and fruitful consequences in its applications in physics, for example.

The criterion I propose here is based on a hypothesis that can be understood as the admission of an isomorphism between logic and metaphysics similar as the isomorphism between algebra and geometry that the Cartesian coordinate system gives us. Logic, then, would be for metaphysics the same as algebra is for geometry. The development of logic is guided by the agenda that logicians give to their discipline in the same way that the development of algebra is governed by the agenda that algebraists give to their subject. Among the many motivations and applications that guide the work of algebraists today, there are also the geometric ones. Similarly, if the hypothesis of isomorphism between logic and metaphysics is correct, then we must find metaphysical applications in the developments already made in logic, and we may include in the agenda of future research in logic also metaphysical motivations and applications.³

³ Throughout the text I will use the expression “*criterion of logical incompatibility*” to refer to the criterion of characterization of the genuinely metaphysical disagree-

I am in no way proposing the end of metaphysics and its conversion into logic. Nor am I proposing that all justifications and motivations for research in logic be restricted to metaphysics. Yet, I am proposing that we can look at the metaphysical theses searching for their logical counterparts and that in finding them we will obtain elements that may improve our understanding of these theses and may help us to distinguish genuinely metaphysical controversies from merely verbal divergences or other kinds of disputes.⁴

Given the immense breadth and generality of the metaphysical inquiry and of the developments that are now considered to be part of the logic, I am aware of the enormous difficulties that the criterion I propose faces. I still have no answers for most of them. Neither do I hope to garner the sympathy of the metaphysicians who are averse to proposals founded on formal regimentation, nor from those involved in debates that, according to our criterion, would not be classified as genuinely metaphysical. To the former, I reinforce that I do not propose the substitution of metaphysics for logic, but only the use of a logical criterion for the identification of the substantiality of metaphysical debates. This criterion, far from replacing metaphysics and its methods, from attacking it, reforming it, or decreeing its end, is, on the contrary, a defence of its centrality and importance. By linking themselves to specific logical positions, metaphysical views guarantee their relevance and influence outside their own limits, reaching all other subjects on which we reason. To the second ones, those philosophers involved in debates that would

ments that entitles this article, and I will use the phrase “*isomorphism hypothesis*” to refer to this isomorphic relation between logic and metaphysics that I propose as the basis for the criterion of logical incompatibility.

⁴ Another consequence of the admission of the isomorphism hypothesis is that it incites us to do the inverse research of the present one as well. That is, we can look at the logical systems searching for their metaphysical counterparts and, if we find them, we will obtain elements that may improve our understanding of these systems, helping us to clarify, justify and classify them. The criterion opposite to our title, *no logical disagreement without metaphysical incompatibility*, also deserves our attention and research. But this is subject for another article.

not be genuinely metaphysical according to the criterion of logical incompatibility, I add that not being classified as metaphysical is not, in general, a demerit. For most people, most of the time, it's the exact opposite of that, a virtue. The debate can be scientific, religious, cultural and, in these cases, will almost always be relevant. Even if the debate is merely verbal, it can still have relevance in clarifying certain uses and abuses of words. Perhaps the very thesis that I advocate here is ultimately a merely verbal proposal on what should or should not be included under the concept of metaphysics. Even if this is the case, the criterion would not be irrelevant and meritless for that alone.

I am also aware that the criterion I propose involves methodological and thematic choices on how to deal with each of the two disciplines, which will undoubtedly displease many. Logicians and metaphysicians may claim that both logic and metaphysics are very diverse or broader than what I include under the hypothesis of isomorphism. My only solace on this point is negative. The issues of disciplinary demarcation are extremely controversial, and as far as I know, no proposal of demarcation of these two disciplines has raised hegemonic adherence. The only I believe to be able to offer by now is nothing more than an adequate definition of the criterion, some clarification of its meaning, its philosophical commitments and presuppositions, together with a set of both logical and metaphysical motivations for its adoption, in addition to a few examples of its application.

3 Quinean Metaontology: ontological commitment

To affirm that what characterizes a proposal as metaphysical is its logical specificity, that there is no metaphysical disagreement without logical incompatibility, evidences a strong commitment to formalization and links our approach to a tradition that has in Quine's methodological proposal for ontology its paradigmatic model. But what is ontology, after all? For most philosophers ontology is a sub-

area of metaphysics. Metaphysics deals with aspects of the most general structure of reality. What things or kinds of things exist is one of these aspects, and is the theme of ontology.⁵ As our criterion is linked to the methodological proposal of Quine and uses many of its elements, this section's task will be to present the broad outlines of his approach to ontology.⁶

What we take as true commits us. Quine took advantage of this platitude to propose a naturalistic methodology for ontology. He introduced a criterion to identify what are the *ontological commitments* of the theories we accept, and proposed that our ontology must contain exclusively the entities that correspond to these ontological commitments drawn from our best scientific theories. According to him, in assuming a theory as true, we commit ourselves to the existence of certain entities which are the ontological commitments of the theory:

we are convicted of a particular ontological presupposition if, and only if, the alleged presupposition has to be reckoned among the entities over which our variables range in order to render one of our affirmations true. (Quine, 1963c, 13)

For example, a theory commits itself ontologically with biological species when the non-inclusion of them among the entities that are values of the variables of the theory's sentences makes some of these sentences false.

Following the tradition pioneered by Frege and Russell, Quine links existence with quantification. This binding causes these entities (the ones which have to be among the values of the variables

⁵ The distinction and delimitation between ontology and metaphysics is also a controversial subject. I am provisionally assuming the hegemonic position among philosophers. Ontology is a subarea of metaphysics that answers the question about what things exist. In the following sections we will have more to say about the distinction between metaphysics and ontology.

⁶ In Berto & Plebani (2015), van Inwagen (2009) and Durante (2014) there are detailed and accessible expositions of the various elements that make up Quine's methodological proposal.

of the sentences of our theories for them to be true) to be revealed in the existential assertions. He explicitly states, “Existence is what existential quantification expresses. There are things of type F if and only if $\exists x F(x)$ ” (Quine, 1969, 97). So a theory commits ontologically to biological species only if the assertion of the existence of biological species is one of the sentences of the theory. In general, a theory \mathbf{T} undertakes ontological commitment with entities of type P if and only if the assertion that there are P s is among the statements of the theory. In symbols:

$$\mathbf{T} \text{ commits ontologically with } Ps \iff \mathbf{T} \vDash \exists x P(x)$$

Another important fact to Quine’s proposal, often neglected, is that the bearers of ontological commitments are not sentences taken in isolation, but *theories*. And by theory, Quine understands its usual logical definition. A theory is a set of sentences closed by the relation of logical consequence. That is, given any set of sentences \mathbf{T} , the theory \mathbf{T} will contain in addition to the sentences of \mathbf{T} all their logical consequences.⁷ So treating a given discourse as a theory, that is, adding to the discourse all its logical consequences, provides us with the ability to identify in the existential affirmations of this theory all the ontological commitments of discourse.

However, this is a logical and formal criterion. Neither natural language nor even semi-formalized scientific languages explicitly contain existential quantifiers and variables. So, before searching for the ontological commitments of a theory, one must regiment it into a formalized language.

The Quinean method for ontology, thus, requires three steps:

⁷ In symbols: $\mathbf{T} = \{\varphi / \mathbf{T} \vDash \varphi\}$. I use the notation \mathbf{T} , written without serif, to denote any set of sentences (a discourse), and the notation \mathbf{T} , in **boldface**, to denote the deductive closure of \mathbf{T} . That is, \mathbf{T} denotes the whole theory of which the sentences of \mathbf{T} are the axioms. In this way, the definition of ontological commitment presented above could also be given by:

$$\mathbf{T} \text{ commits ontologically with } Ps \iff \exists x P(x) \in \mathbf{T}$$

1. Regiment the best scientific theories into a formal language.
2. Use the criterion defined above to list all ontological commitments (given by the existential affirmations) of these regimented theories.
3. Include in your ontology only the entities corresponding to these ontological commitments and nothing else.

Quine's proposal for ontology is naturalistic. Philosophy works together with science. Ontology, by the way, comes after science. First, give me our best scientific theories, then I'll give you my ontology, says the philosopher engaged in the Quinean methodological proposal.

This philosopher does not have any freedom on steps 2 and 3. They are fixed and correspond to mere applications of pre-established procedures. The space for philosophical debate over ontology then occurs exclusively in step 1 of the strategy, the stage of regimentation in the canonical notation. Different paraphrases can lead to different ontological commitments. However, as according to Quine we must always respect Occam's razor, then our ontology should always be the one that commits itself to fewer entities. We will include in our ontology only those entities that are *indispensable*.

An ontological debate about whether a particular type of entity P exists would always be a debate on P 's indispensability. Let T be the scientific theory that deals with P s. And let T_1, \dots, T_n be all formal regimentations available for T . If all T_1, \dots, T_n have among their logical consequences the existential affirmation $\exists x P(x)$, that is, if for all $1 \leq i \leq n$, $T_i \models \exists x P(x)$, then the entities P are indispensable and must enter into our ontology. If there is some regimentation T_j , $1 \leq j \leq n$ where $\exists x P(x)$ is not one of its logical consequences, that is, there is some j such that $T_j \not\models \exists x P(x)$, then the entities of type P are not indispensable and should not enter into our ontology.

The ontological debate restricts itself in Quinean methodology to the contentions of philosophers as to whether or not different

proposals of regimentation are successful in paraphrasing the whole content of scientific theories. Given two successful regimentations in this regard, the one that takes on fewer commitments and is more ontologically economical wins the debate.

For example, if it is possible to present formal regimentations of our best scientific theories related to biological species that do not have among their logical consequences the affirmation of the existence of biological species (such as $\exists x \text{BioSpecie}(x)$), then this will demonstrate that biological species are not indispensable and should not be in our ontology. Regarding the numbers, however, Quine included them in his ontology, for he saw them as indispensable. Many of our best scientific theories commit themselves ontologically to them by requiring that numbers be among the values of the variables quantified in their existential affirmations. Numbers should, therefore, be part of reality and be among the things that there are.

However, for an ontological debate of this kind to be rationally conducted, its participants must first agree on some important key issues:

- a) The philosophers participating in the debate have to agree on which are our best scientific theories, those that deserve the consideration of the philosophy.
- b) They also have to agree on what is the formal language in which the regimentations are done. What are the formal resources that can be used in our regimented paraphrases?
- c) Finally, they have to agree on which logic governs all theories. After all, different logics will point out different sentences among the consequences of a given theory, which may lead to distinct ontological commitments.

The prescriptions of the Quinean methodology for these agreements are quite specific and restrictive. According to him, scientists, not

philosophers, are responsible for the agreement (a). In Quinean naturalized ontology there is no room for *a priori* philosophical speculation about what exists. The work of philosophers begins only after the scientific agreement on what our best theories are.

Concerning agreement (b), Quine stipulates that regimentation must be done in the language of first-order logic, with identity, without individual constants, treating names via Russell's theory of definite descriptions. This formal language in which the regimentations of all scientific theories must be made so that their ontological commitments can be revealed became known as Quine's *canonical notation*. Finally, concerning agreement (c), the only legitimate possibility for Quine is first-order classical logic, with the possible complement of his first-order set theory NF (Quine, 1963b; Durante, 2011).

This proposal of Quine for the methodology of the ontology has many merits. His general notion of ontological commitment together with the requirements of formal regimentation and indispensability have helped to clarify some questions, such as the alleged contradiction of non-existence statements (Quine, 1963c). However, his prescriptions for agreements (a), (b) and (c) have never gained hegemonic adhesion.

Regarding agreement (a), although there is a broad consensus that the ontological commitments of scientific theories should be seriously considered in any ontological proposal, many philosophers with a less naturalistic aptness are not willing to accept that science has exclusivity in dictating the agenda of ontology. More serious than this dispositional divergence are the limitations that Quine's prescriptions for agreements (b) and (c) impose on his approach. In the next section, I will explore one of these specific limitations and propose a way of transposing it that will conduct us directly to the clarification of the criterion of logical incompatibility and the isomorphism hypothesis.

4 Beyond Ontology: metaphysical commitment

Suppose we are interested in investigating whether the numbers exist independently of our thinking or whether they are constituted exclusively by our mental activity. This question can be understood in two distinct ways, either as a narrower ontological question about whether or not numbers exist and form part of reality; or as a broader metaphysical question about the role of the mind in the constitution of mathematical reality.

For example, some people may say that if the numbers are constructs that only exist in our thinking, then they are not part of the objective reality and do not exist. For these people, thoughts are entirely separate from reality, and therefore, what is only in our thinking does not exist. For them, then, the disagreement over whether the numbers are mental constructs or are independent of our thinking will not be a broad metaphysical question about the structure of reality, but a restricted ontological question about whether or not the numbers exist. If they are mental constructs, they do not exist. If they are independent of our thinking, they exist.

Under this ontological reading, our question is treatable by Quine's methodology, which will help us answer it in one of two possible ways: or numbers exist because they are among the existential assertions of the regimentations of our best scientific theories and are therefore indispensable; or they do not exist because we have succeeded in producing alternative regimentations of the scientific theories that do not assume ontological commitments to numbers. Quine admitted the indispensability of numbers and included them in his ontology. Yet for him, as much as science, ontology and all philosophy are also revocable. If one day we come to produce alternative and successful regimentations of our best scientific theories that do not assume ontological commitments to numbers, on this same day we must withdraw the numbers of our ontology. Some philosophers, such as Field (2016), have adopted this agenda and have been achieving remarkable partial results.

Whatever the answer, this ontological interpretation of the question is based on a more general assumption about the structure of reality: what exists only in our mind, what is constituted only by our thought, is not part of reality, does not exist. Then the ontological interpretation of the question of whether or not the numbers exist independently of our thought commits itself to the following metaphysical thesis about the role of the mind in the general structure of reality, which we could call *realist thesis*:

(1) *The mind is separated from reality.*

The other possible interpretation for the question of the relation of numbers to thought does not treat it as a restricted ontological question about the existence or not of numbers, but as a broad metaphysical question about whether or not the mind has a role in the constitution of mathematical reality. Some people may not accept the realist thesis (1) and therefore consider that being constituted by our mind is part of the admissible traces of the structure of reality. That is, for these people one of the general characteristics of reality is that the mind can have a constitutive role in at least some part of it, sustaining the existence of some of the things that we consider real. For them, then, to assert that numbers are mental constructs does not mean that they do not exist, it means instead that they exist, and that the mind has a constitutive role in their existence.

Even if I disagree with this position and want to debate it, the debate I will pursue will not be ontological. It will not be a debate about whether or not the numbers exist, but a metaphysical contention on the role of the mind in the structure of reality. The two possible answers to this interpretation of the question are: either our mind has no part in the constitution of mathematical reality, and the numbers, if they exist, they do so independently of our thinking; or our mental activity has a constitutive role in reality and the numbers, if they exist, they are made up from our mental activity, having their existence inseparable from our thinking. The first answer represents

a commitment to the realist thesis (1) that the mind is separate from reality, at least in the case of mathematical reality, and the second answer represents a compromise with the opposing thesis, which we might call *idealist thesis*:

(2) *The mind is not separate from reality.*

Take sides in this debate, however, does not necessarily compromise us with any ontological thesis about whether the numbers exist or not. Answering it by denying any role to the mind in the structure of mathematical reality leaves unanswered the question of whether or not numbers exist. Responding to it, on the contrary, assigning a constitutive role to the mind in the structure of reality, brings us closer to a commitment to the existence of numbers. But not to the point of rendering incoherent a position that assumes the idealist thesis (2) and at the same time denies that the type of mental activity related to numbers is of the ontologically constitutive nature.⁸

Since this is not ontological, but a metaphysical debate about the role of the mind in the structure of reality, Quine's method of ontological commitment will not help here. Assuming or avoiding ontological commitments to numbers will not bind us to either side of this debate. Is there something that binds us? Is there anything, any pattern or indicator that would do in the case of metaphysical debates like this one the same role that ontological commitments do in the case of ontological debates? Is there anything we could call a *metaphysical commitment* of a discourse or theory? We bet that there

⁸ The foundation of this position is the fact that some of our thoughts simply may not meet the criteria we consider sufficient for them to constitute reality. Even if the mind creates reality, it does not necessarily mean that all our casual thoughts should create reality. It may be that only thoughts that meet certain criteria do so. Concerning mathematical entities, this would be a bizarre position, since we do not think casually about them, but in a very structured way that is governed by mathematics. We might ask ourselves: if our mathematical thoughts do not meet the standard for constitute reality, what other thoughts would meet? Strange though it is, this is not a logically untenable position.

is. Just as the existential assertions of theories express their ontological commitments, the system of logic we take to regulate a given theory or discourse would express its metaphysical commitments.

The idea is that if we accept the foundation of the notion of ontological commitment, that is, if we accept that “existence is what existential quantification expresses” (Quine, 1969, 97), then we must also accept that the logical principles that regulate the behaviour of quantifiers and other connectives are metaphysical principles that express a concept of existence and delimit the most general structural aspects of reality. This fact is the primary basis of our hypothesis of isomorphism and of the criterion of logical incompatibility. If the existential sentences of a theory express the entities with which this theory commits itself ontologically, then the logic that regulates the more general aspects of these existential sentences and all the other assertions of the theory expresses the metaphysical commitments of this theory.

Quine himself was not unaware of this fact. In “Existence and Quantification”, reflecting on the differences between classical and intuitionistic logic, he somewhat reluctantly admits:

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

In this same text, a few pages earlier, Quine had already stated that

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

Quine explicitly admits here that the difference between classical and intuitionistic theories of quantification, that is, between first-

order classical and intuitionistic logics constitutes a difference between two distinct conceptions of existence, a classical and an intuitionistic one. Because classics and intuitionists disagree on what are the valid logical principles, they also differ in how they conceive the structure of reality and understand the very meaning of existence.

Despite this recognition, Quine was not willing to discuss metaphysics in these terms. He was not interested in testing the metaphysical hypotheses produced arbitrarily and *a priori* by philosophers. His interest in the subject was limited to his naturalistic ontological method described in the previous section. The agenda of ontology would be given by our best scientific theories that should be regimented and evaluated according to first-order classical logic. So the metaphysical doctrine of Quine, the only structure of reality that he was willing to accept is the one given by the concept of existence that supervenes on first-order classical logic, which he considered adequate and sufficient to deal with all ontological questions posed by scientific theories. Quine's method is therefore limited to what we have called the ontological interpretation of metaphysical questions, and his metaphysical doctrine is limited to the commitments of first-order classical logic.

However, what exactly is the metaphysical doctrine linked to the concept of existence given by first-order classical logic? As well as it makes sense to say that in regulating the more general behaviour of quantifiers, logical principles constitute metaphysical principles, it makes the same sense to ask what is the metaphysical image that these principles give us. After all, metaphysicians do not usually present their proposals through logical principles of inference, but through more pictorial propositions such as the realist (1) and idealist (2) theses, for example. Here the analogy with analytic geometry proposed in Section 2 helps again. The logical principles and theorems would be like the algebraic equations and the metaphysical position attached to them would be like the geometric figures described by the algebraic equations. For example, the equation " $x^2 + y^2 = 4$ " is bound to a circumference of center (0,0) and radius 2. We can

similarly ask what metaphysical position is linked to the theorems and principles of first-order classical logic. More generally, we can ask ourselves how to extract the different metaphysical theses given by the concepts of existence of different logical systems.

Unfortunately, we do not have a general formula to answer the questions of this kind altogether. The analogy with analytic geometry reaches its limit here. Algebraic equations are individually linked to the geometric figures given by their Cartesian graphs. Yet we do not intend to link one by one the principles of inference with their supposed metaphysical images. I do not think there is such a one-on-one link. In the same way that Quine argues that the bearers of ontological commitments are not individual sentences, but theories (sets of sentences closed by the relation of logical consequence), I support that the holders of metaphysical commitments are not the logical principles or theorems taken individually, but full logical systems. Different logics would represent distinct concepts of existence and would be linked to distinct metaphysical proposals about the structure of reality.

The methodological approach I suggest, then, for this task of looking for the metaphysical positions linked to the various logical systems consists of the logical analysis of metaphysical proposals and debates. The criterion of logical incompatibility states that a specific debate will be metaphysical only when different logics govern the opposing positions. We must then search the literature for the supposedly metaphysical debates, and we must make a logical analysis of the opposing positions trying to identify which logical systems are compatible with the inferences actually employed on each side of each debate. When eventually we find a logical system that is compatible with the logical inferences used by the defenders of a specific metaphysical proposal, then we can link this proposal to the compatible logical system founded. In doing so, we will be linking a specific metaphysical thesis, defended by one side of the debate, with one particular logical system, the system compatible with the logical inferences actually used by the defenders of this metaphysical thesis.

When we apply this approach to numerous debates, we can, little by little, form a network of metaphysical positions linked to the various logical systems.

This methodological approach, however, needs to be applied with caution. In the next section, we will discuss the reasons for this caution in more detail. We will use Michael Dummett's proposal to deal with the various instances of the debate between realism and anti-realism both as an example of an application of this methodological approach and as a case of successful use of the criterion of logical incompatibility.

5 Different Reality Demands Different Logic

As we have suggested in the previous section, by limiting itself to the ontological interpretation of metaphysical questions, Quine's method commits to the metaphysical position given by the realist thesis (1), that the mind is apart from reality. Moreover, we have also seen that by restricting itself to first-order classical logic, Quine's method is also committed to the metaphysical position linked to the concept of existence expressed by first-order classical logic. Putting together these two compromises, we could conclude that one of the metaphysical commitments of first-order classical logic is the realist thesis (1).

If this is indeed the case, then in any metaphysical debate, all who restrict the logic that governs their position to first-order classical logic will, simultaneously, assume the realist thesis (1) that states that the mind is separate from reality. More importantly, anyone who disagrees with the realist thesis and wants to defy it will have to give up first-order classical logic and will need to adopt an alternative logic. Michael Dummett, who for reasons wholly different from Quine's, also argued that different logics equate different metaphysical positions (Durante, 2011), pointed out that the constructivist mathematicians of the Brouwer school were the first to realize that

to reject a realist metaphysical thesis, they would also have to reject classical logic (Dummett, 1991, 9).

The criterion of logical incompatibility for metaphysical debates is based both, on the linkage of existence with quantification, which is the foundation of Quine's criterion of ontological commitment and on Michael Dummett's proposals for a theory of meaning, which would give *The Logical Bases of Metaphysics*, that is the title of his seminal book. One of Dummett's major metaphysical concerns was to seek a unified methodology for dealing with the multiple instances of the debate between the various possible forms of the realist and idealist theses (1) and (2).⁹

Dummett deemed the ontological interpretation of these debates to be misleading. For example, he argues that a debate between a phenomenalist and a realist about the physical world is not a narrow ontological debate about whether or not material objects exist, but rather a broad metaphysical debate about what role sensory experience plays in the constitution of physical reality. Our knowledge of the physical world is given by the senses, by our sensory experiences. To the realists, these sensory experiences would have no part in the structure of reality. They would be completely separate from the reality they inform us and would be neutral vehicles of informa-

⁹ Dummett preferred to call anti-realism the perspective of the various theses I am generically labelling here as idealists, of which the thesis (2) is only one instance. He favoured this terminology because the term idealism is heavily loaded with interpretations from the history of philosophy with which he wanted to avoid unnecessary approximations. Some of the views he classified as anti-realists, such as formalism in the philosophy of mathematics, are, in fact, quite distant from the traditional understanding of idealism. As he considered the traditional approach to metaphysical questions to be misleading and made a reformist methodological proposal, he preferred to use a new jargon. I have chosen, by contrast, to maintain the traditional vocabulary just to help to mark the fact that I do not intend the criterion of logical incompatibility to be a reformist methodological proposal. If successful, the maximum it can provide is an analytical tool to aid the understanding of metaphysical debates, both the traditional and the contemporary ones. In the context of the examples I use here, the labels anti-realism and idealism can be understood as interchangeable without significant problems.

tion about the physical world. The version of the realist thesis, in this case, would be:

(1') *Reality is separate from sensory experiences.*

For the phenomenals, on the other hand, our sensory experiences would not be neutral vehicles of information about the physical world but would have a constitutive role in physical reality, taking part in its structure. Phenomenalism is a version of idealism, and the specific idealist thesis it supports would be:

(2') *Reality is not separate from sensory experiences.*

Likewise, the opposition between Platonists and constructivists over mathematical entities is not an ontological dispute about whether numbers (and other mathematical objects) exist or not, but a metaphysical disagreement on the role of the mind in the constitution of mathematical reality.

Dummett thought the ontological interpretation to be misleading because he did not see how these debates, treated as ontological questions, could be solved. He did not share Quine's confidence in the naturalistic method founded on the ontological commitments of scientific theories, nor did he accept the traditional ontological and *a priori* proposals of philosophers, which he called *top-down*. He argued, in contrast, for a *bottom-up* approach that would be obtained by proposing a theory of meaning for the part of the language comprising the lexical terms of the metaphysical debate. This theory of meaning would be made without any fundamental metaphysical presuppositions and would be based only on the inferential role of the linguistic expressions, that would be achieved by an analysis of their uses. By understanding, through an analysis of the use of language, the inferential role of expressions related to a specific metaphysical position, we would understand the meaning of these expressions, given by the logic and the meaning theory that govern the discourses of this part of language. From this understanding, a

metaphysical image of the situation would emerge in a supervening way. Metaphysics, for Dummett, would be limited to this supervenient image that emerges from logic and meaning theory.¹⁰

Debates should be dealt with on a case-by-case basis, and a realist (or idealist) position concerning a specific instance would not compromise anyone with the same realist (or idealist) position in the other instances. Though arguing for the independence of the various instances of debate, Dummett has identified, in his quest for a methodological unification, that what links all realist approaches on the one hand and all approaches against realism on the other is a disagreement in the concept of truth.

Whatever conception of truth and reality we adopt, what we take as true must be an expression of reality (Chateaubriand, 2001, 16). If, furthermore, according to the realist thesis, reality is separated from mind (or sensory experience), then truth is also so. That is, truth cannot depend on our mind or our sensory experiences. So, for a realist, an assertion will be true or false regardless of our mental or sensory abilities to verify its truth or falsehood. Dummett has shown that the main feature that unites all realistic approaches is that according to them, *truth is transcendent to verifiability*.

For the realists, then, a given declarative statement P must be true or false, regardless of whether there can be any evidence against or in favour of P. Realism, according to this conception of Dummett, can then be understood as a defence of the epistemological neutrality of truth. To a realist, the truth or falsity of a statement is independent of any restriction that may exist for the recognition of this truth or falsehood.

On the other hand, for an idealist (or anti-realist in Dummett's jargon), the mind or sensory experiences are not separated from reality, but on the contrary, they are part of its constitution and are inseparable from it. So, being the truth an expression of reality, what is

¹⁰ A recommendable presentation of this methodological proposal is found in the introduction of Dummett (1991), whose other chapters elaborate it in detail.

true will also be inextricably bound up with our mind or our sensory experiences, and therefore there can be no truth or falsehood where they cannot be mentally or sensitively recognized. That is, for an anti-realist, there is no truth or falsehood where there are no conditions of verifiability. According to Dummett, then, the main feature that unites all anti-realist approaches is that according to them, *truth depends on the verifiability*.

A sentence *P*, then, can only be true, for an anti-realist, in virtue of evidence favourable to *P*, and can only be false in virtue of evidence contrary to *P*. So anti-realism represents, for Dummett, a defence of the epistemological dependence of truth. For an anti-realist, the truth and the recognition of the truth are not different notions. They are, on the contrary, inseparable. There can be no truth or falsehood where there can be no recognition of truth or falsehood.

Let us take a quick example. We do not know for sure whether the statement “the universe is infinite” is true or false. There are diverging theories on this issue, and there is no definitive evidence to assure either its truth or its falsity. Moreover, we do not know whether the kind of evidence needed to decide the truth or falsehood of this statement may someday be obtained. That is, there is no clarity about whether or not it’s possible to be any evidence to decide the truth of such an assertion. To take these uncertainties about the verifiability of the assertion that the universe is infinite as sufficient reason to consider it as neither true nor false is, according to Dummett, to adopt an anti-realist stance on the question of the infinity of the universe. On the other hand, to admit that the statement has to be true or false independently of the very possibility that someday there will be evidence favourable or contrary to it is, also according to Dummett, to adopt a realistic attitude on this question.

This semantic characterization is compatible with our more traditionally metaphysical or pictorial characterization of the debates, represented by the realist and idealist theses. If we accept the realist thesis and consider that the reality of the universe is separate from our mind or sensitiveness, then either it is finite or it is infi-

nite, regardless of whether or not there is a possibility that someday we will obtain evidence for the recognition of the truth or falsity of the affirmation of its infinity. On the other hand, if we accept the idealist thesis and consider that the reality of the universe depends on our mind or sensitiveness, and if we recognize together that the present situation of our scientific, philosophical and empirical considerations about the universe does not give us enough evidence to decide on its finitude or infinity, nor does it guarantee whether there can ever be such evidence, then we must also recognize that the assertion that the universe is infinite is neither true nor false, because this point of reality has not yet been constituted by our sensitiveness or thought, remaining an open point. In this case, according to the idealist thesis, there would be no matter of fact in virtue of which the sentence declaring the infinity of the universe would be true or false. And if there is no fact in reality about the infinity or finitude of the universe, then there is no truth or falsehood tied to the assertion that the universe is infinite.

However, if for the realists any declarative sentence P must be true or false, regardless of the evidence, then for any statement P

$$(P \vee \neg P)$$

which is the well-known logical principle of the excluded middle, will be true. After all, when P is true, $\neg P$ is false, and when P is false, $\neg P$ is true, and a disjunction of a truth and a falsity is always true.

On the other hand, if truth depends on verifiability, as anti-realists believe, then there may be a sentence Q that lacks both favourable and contrary evidence. In this case, Q is neither true nor false. But whatever the reason for the lack of evidence of the truth or falsity of Q , it will also be a motive for there being no evidence for the truth or falsity of $\neg Q$, which also will be neither true nor false. Since both Q and $\neg Q$ are neither true nor false, their disjunction $Q \vee \neg Q$ will not be either. In particular, $Q \vee \neg Q$ will not be true. That is, not

all instances of the excluded middle will be true, and therefore the excluded middle will not be a logical principle for the anti-realist (Dummett, 1978; Durante, 2011).¹¹

Only for the realists, then, the excluded middle will be a logical principle impossible to be false. The anti-realists have no reason to accept the unrestricted validity of the excluded middle. On the contrary, they have reason to reject it. The most general conception of the structure of reality which they assume, in which mind or sensitivity has a constitutive role and truth depends on verifiability, gives them grounds for denying the universal validity of the excluded middle. However, if realists and anti-realists disagree on the validity of a logical principle, then the logical systems that regulate the inferences accepted by each group are also different. In rejecting the excluded middle, the anti-realists also reject all arguments whose validity depends on it, and the two groups will thus have incompatible standards of inference given by different and incompatible logics (Durante, 2011, 39).

It is important at this point to make clear the distinction between Dummett's approach and our proposal for the criterion of logical incompatibility. Dummett wanted to reform metaphysics. For him, any metaphysical proposal made in traditional terms, such as theses (1) and (2), would be only a supervenient image of a theory of meaning whose logical bases would constitute the only true meta-

¹¹ Both in the realist argument for the acceptance of the excluded middle and in this idealist argument for its rejection, I am making logical inferences. One could then accuse me and Michael Dummett of begging the question, after all, we make use of logical principles to justify and criticize a logical principle. From a more general perspective, there is no way out of this dilemma. We are doomed to make logical inferences in our arguments, so any justification of a logical principle will in some way be circular. However, in our defence here, I can argue that the logical principle of the excluded middle, whose validity is being defended by realists and attacked by idealists, was not used in either case. We used only logical principles that we could classify as more fundamental, related to the behaviour of negation and disjunction in connection with the presence and absence of the truth-values 'true' and 'false'.

physical proposal. He was suspicious of the traditional metaphysical debates and aimed to replace them with logical and semantic analysis. Then, to understand any instance of the realism vs anti-realism debate, he would need to produce a complete theory of meaning for that part of the language that contains the lexical terms of the debate. This task proved to be very demanding and a weighty burden. I believe that the reason for this difficulty in applying Dummett's method lies in the fact that our metaphysical theses and presuppositions are almost always incomplete and poorly detailed, leaving many open points which would be necessary for the production of a complete theory of meaning in Dummett's moulds. By not being fully detailed and possessing openings, our metaphysical ideas that influence our use of language are subject to be completed differently by different philosophers, which would lead to multiple possibilities of discordant theories of meaning. Perhaps this practical difficulty in applying Dummett's method explains why his approach, though insightful, has gained so few adherents among contemporary philosophers.

Our proposal for the criterion of logical incompatibility, however, is far less pretentious. In the examples of debates we have presented, we do not describe in detail the positions of either side. We only mention generically the crucial aspects that clarify the disagreements. For example, in the debate between phenomenalism and realism of the physical world, the crucial point is that a phenomenalist is someone who supports thesis (2') that our sensorial experiences are a constitutive part of physical reality and a realist understands, on the contrary, that sensorial experiences are separate from physical reality, supporting the thesis (1'). What matters in this debate is only this crucial divergence. All the details of the various possible ways of completing a phenomenalist or realist position are dispensable. Therefore, given the incompleteness and the bias of our understanding and descriptions of the positions on either side of the debate, we do not aim to define what logic would represent all the metaphysical commitments of each side. I do not

know or need to know what are all the metaphysical commitments of the phenomenals and the realists in order to apply the criterion of logical incompatibility in a successful way. To recognize that this is a genuine metaphysical debate, I only need to know that whatever logic expresses all the metaphysical commitments of one of its sides, this logic is different and incompatible with the logic that expresses all the metaphysical commitments of the other side. And I know that. We have seen that the excluded middle is a sentence logically valid for the realists, but only contingent for the phenomenals. So, whatever logic expresses all the metaphysical commitments of the realists, it is incompatible with the logic that expresses all the metaphysical commitments of the phenomenals.

The only requirement to successfully apply the criterion of logical incompatibility to a specific disagreement is then that we find some logical feature of the position of one side that is incompatible with the other. For the various instances of the debate between realism and anti-realism, Dummett has shown that the principle of excluded middle is one of these features.

We must, however, resist the temptation of hastily say that the logic of realism is the first-order classical logic, and the logic of idealism is the intuitionistic logic. We can safely only say that the idealist theses are incompatible with first-order classical logic, and all who stands for an idealist position cannot accept first-order classical logic as the logic underlying their position. Heiting's intuitionistic logic, some intermediate logic (between the intuitionistic and the classical), even the modal logic S4 could be compatible with instances of idealism. Similarly, we can also safely say that the realist theses are incompatible with the intuitionistic logic and with all logics compatible with the rejection of the excluded middle. Any stronger statement in this regard would be hasty and unnecessary for a successful application of the criterion of logical incompatibility.

The most well-developed example of these debates between anti-realism and realism is the disagreement between Platonist and constructivist mathematicians about the role of the mind in the consti-

tution of mathematical reality, which we discussed in Section 4. In this specific example, we have a more forceful linkage of first-order classical logic as the logic that expresses all the metaphysical commitments of the realist position assumed by the Platonist mathematicians and the linking of intuitionistic logic as representing the metaphysical commitments of the constructivists. This better-developed state of the recognition of the logic that represent the metaphysical commitments on each side of this specific debate is due to the distinctive feature of mathematics, which makes the logical inferences employed in its development quite explicit. But even here there is a margin for multiple interpretations. There is no agreement as to which version of intuitionistic logic is best suited to express the metaphysical commitments of constructivists, whether Heyting's intuitionistic logic, or Johansson's minimal intuitionistic logic, a little more restrictive, or even the positive intuitionistic logic or other yet more restrictive versions of it such as Vredenduin's logic of negationless mathematics. However, in the vast majority of metaphysical debates, the positions on each side are not so detailed and precise, and the most we can hope for is the identification of some logical incompatibility between the opposing views that would give us a guarantee that the view represented on each side are, in fact, metaphysically divergent.

We exemplified in this Section a case of successful application of the criterion of logical incompatibility, and we analyzed in some detail what the requirements for such a use are and what information it gives us. We have seen, through Dummett's semantic arguments about the disagreement in the concept of truth, that the various instances of the debate between realism and anti-realism, when not interpreted in a restricted ontological way, are genuine metaphysical debates because the opposing views are logically incompatible. The realist side accepts the excluded middle as a logical validity, and the anti-realist side rejects, treating it as a contingent sentence that may be false in some circumstances. In the next Section, we will criticize the traditional thesis that there would be a fundamental separation

between logic and metaphysics. According to this thesis, there would be a separation between the formal and material aspects of reality; logic would be responsible only for the former while metaphysics would take care exclusively of the latter.

6 The Formal Meets The Material: logical principles as metaphysical principles

The barber paradox is well known and can be expressed in this way: imagine a small village where lives and works only one barber who shaves all and only the inhabitants in whom beard grows and that do not shave themselves. This simple situation is paradoxical because we can ask the following tricky question: does this barber shave himself? If we assume that he does, we will conclude that he does not, because by shaving himself, the barber does not satisfy the condition characterizing the inhabitants he shaves. We said that he shaves only those who do not shave themselves. On the other hand, if we assume that the barber does not shave himself, we will conclude that he does, because by not shaving himself, he satisfies the condition that characterizes the inhabitants he shaves. We said he shaves all those who do not shave themselves. We have, therefore, a paradox, because any attempt to attribute truth or falsity to the statement “the barber shaves himself” fails, because, as we have stated, the assumption of its truth implies its falsity and the assumption of its falsity implies its truth.

Nathan Salmon¹² presented a rather interesting solution to the barber paradox. He said that there is no paradox because a logical theorem, which he called *Russell's law*, guarantees that there can be no barber who shaves everyone and only those who do not shave themselves.

Russell's law is a theorem of first-order classical logic, that is, it is a logical principle, a statement true in any interpretation. It states

¹² In a lecture given at the IX International Congress of Analytical Philosophy, held in Fortaleza, Brazil, in May 2014.

that there is no individual x nor relation R where x relates through R to all and only the individuals y that do not relate to themselves through R . In formal language:

$$\neg \exists x \forall y (R(x,y) \leftrightarrow \neg R(y,y))$$

Now consider the following interpreted binary relation:

$$\text{Shaves}(x,y): x \text{ shaves } y.$$

If Russell's law is true for any relation R , it is, in particular, true for the relation Shaves . Then the following sentence, an instance obtained from Russell's law replacing the generic relation R by the specific and interpreted relation Shaves , is also a theorem of first-order classical logic:

$$\neg \exists x \forall y (\text{Shaves}(x,y) \leftrightarrow \neg \text{Shaves}(y,y))$$

However, this sentence states precisely that there is no individual who shaves all and only those who do not shave themselves. That is, the statement saying that there is no such a barber is a logical truth; a theorem of first-order classical logic that cannot be false. So, says Salmon, the laws of logic prohibit the existence of this paradoxical barber. It is logically impossible for a barber to shave all and only those who do not shave themselves, for the statement of his non-existence is a logical theorem, a true sentence in all possible circumstances. If there is no such barber, there is no paradox, which is solved by the powers of first-order classical logic.

This ingenious solution to the barber paradox proposed by Salmon assumes two indissociable commitments:

- (i) It assumes that whatever logic governs our inferences about cities, barbers and other everyday facts of life, this logic is compatible with first-order classical logic, in a way that the theorems of first-order classical logic will also be theorems of this logic.

- (ii) It also assumes that whatever thing its existence is forbidden by first-order classical logic, such as our paradoxical barber, this thing does not exist at all. That is, there cannot be a thing which a theorem of first-order classical logic denies its existence.

(i) is a commitment to first-order classical logic and (ii) is a commitment to the concept of existence tied to first-order classical logic. In justifying the non-existence of the barber by claiming that it follows from a logical theorem, Salmon is using this theorem as a metaphysical principle, which makes explicit a fundamental feature of all beings. To know: *there is no, and there can be no individual which relates to all and only those which do not relate to themselves*. This feature is a characteristic of all individuals and all relations, and is, therefore, a metaphysical principle.¹³

Similarly, we can consider that all universal logical theorems, with the form

$$\forall x \alpha(x)$$

represent *necessities* or *obligations* imposed on all beings, and the theorems with the form of negations of existential sentences

$$\neg \exists x \alpha(x)$$

¹³ The barber paradox is just a toy version of Russell's paradox, which led mathematicians to abandon the schema of unrestricted comprehension, $\exists x \forall y ((y \in x) \leftrightarrow \varphi(y))$, along with the naive set theory. If we instantiate ' $\varphi(y)$ ' by ' $\neg(y \in y)$ ', we obtain $\exists x \forall y ((y \in x) \leftrightarrow \neg(y \in y))$, whose negation is an instance of Russell's law with ' \in ' instead of ' R '. Thus, not all meaningful properties expressible in the first-order language define a set. The property "it's not a member of itself", which, in addition to being meaningful is expressible by ' $\neg(y \in y)$ ', is forbidden by Russell's law of existing as an individuality given by the set of its extension. This restriction means that properties cannot be indiscriminately treated as individual things that exist. Russell's law shows us that this fact is not a limitation of set theory, but a characteristic of the structure of reality given by classical logic, that is, a metaphysical commitment of all who reason according to the first-order classical logic.

such as Russell's law, represent *impossibilities* or *prohibitions* imposed upon them. The set of theorems with these two forms of a given logic L quite explicitly characterizes the most general behaviour of the beings according to this logic and, in so doing, compose a detailed metaphysical explanation of the structure of reality and the concept of existence linked to L .

For example, the classical theorem

$$\neg \exists x (P(x) \wedge \neg P(x))$$

establishes a feature of all beings admissible by those who reason according to classical logic, which constitutes the prohibition or impossibility of any individual to satisfy and not satisfy any property P . The classical theorem

$$\forall y (P(y) \vee \neg P(y))$$

establishes a feature of all the beings admissible under classical logic that constitutes the obligation or necessity of any individual to satisfy or not satisfy any property P .

In describing what is impossible (or forbidden) and what is necessary (or obligatory) to all beings, without exception, these and the other quantificational theorems of classical logic constitute a characterization of the most general structure of reality, imposed on all beings, which makes classical logic a metaphysical doctrine.

Presented in these logical terms, however, this metaphysical doctrine lacks the pictorial appeals of traditional presentations of metaphysical propositions. The quantificational theorems of a logical system are like the algebraic equations that analytically describe a geometric situation that also has a pictorial description given by the equations' graphs. Yet just as the Cartesian isomorphism showed that algebraic equations and geometric figures are but two different ways of presenting and understanding the same facts, our isomorphism hypothesis assumes that the metaphysical doctrines linked to

logical systems are only a different analytic mode to present metaphysical theses.

On the one hand, our inferential practices such as the one exemplified in Nathan Salmon's solution to the barber paradox corroborate the metaphysical weight we give to the quantificational theorems of logic. On the other hand, philosophers do not usually recognize or label as metaphysical the structure of reality that the quantificational theorems of logic compel us to accept. They generally label it *formal* structure and tend to separate the formal domain of logic from the *material* realm of metaphysics.

Two factors might explain this separation. The first is the ubiquity that the thesis of the metaphysical neutrality of logic has struck in the contemporary orthodoxy. The second factor, related to the first, is that when traversing the history of philosophy we see that the dominant conception has always been that there is only one logic, which has improved over time, but until very recently remained the only logic, while metaphysical proposals have always been multiple and motive of controversies since ancient philosophy. If there is only one logic but many metaphysical proposals, it would not make much sense to label as metaphysical the demands that this unique logic imposes on the structure of reality. Logic was, then, traditionally viewed as prior to metaphysics and neutral to the various controversies of this discipline. The demands that logic makes on the structure of reality were labelled, then, as formal, in contrast to the demands of metaphysics that were regarded as material. However, the proliferation of proposals of alternative logical systems, since the second half of the twentieth century, has provided us with the theoretical opportunity to reflect on the nature of the different demands on the structure of reality made by different logical systems and to challenge their classification as merely formal requirements. That is what we are doing in this article.

We can, for instance, reflect on the fact that one of the demands that first-order classical logic makes on the structure of reality and

which is not made by intuitionistic logic is that according to classical logic everything that exists must satisfy the following obligation:

$$\forall y (P(y) \vee \neg P(y))$$

The structure of reality linked to classical logic is more rigid than that related to intuitionistic logic because the former makes more demands than the latter. All intuitionistic theorems are classical theorems, but not the opposite. The above formula, a first-order variation of the excluded middle, is a classical but not an intuitionistic theorem. Many other formulas are like this, classical but not intuitionistic theorems. Then the concept of existence given by classical logic demands from every existing thing that it satisfies or does not satisfy any property P . However, the concept of existence given by intuitionistic logic does not make this requirement. The structure of reality given by intuitionistic logic admits beings that neither satisfy nor don't satisfy some specific properties. So the reality, according to intuitionistic logic, has more possibilities than the reality according to classical logic. Its structure is less rigid because it has fewer rules than the reality described by classical logic. There are facts admissible to beings conceived according to intuitionistic logic that are inadmissible to beings when they are conceived according to classical logic.

If we recall our discussions of the previous Section that relate the acceptance of the excluded middle to the realist theses and the rejection of the excluded middle to the idealist theses, this less rigid structure linked to intuitionistic logic makes perfect sense. If the mind or our sensory experiences play a constitutive role in reality, as idealists argue, then reality is more malleable than if it were completely independent of our capabilities. If the mind, for example, plays a constitutive role in reality, we can imagine the beings to be subject to transformations or processes made possible by our mental activity that would be forbidden to beings when their existence is conceived as independent of our mind. Our mind could produce real

facts that would be impossible or inconceivable when we dissociate existence from our mental activity, as do the realists.

These considerations suggest that there is no *a priori* motive for separating the structural features of reality given by logical theorems such as $\forall y (P(y) \vee \neg P(y))$, as being of a formal and diverse nature from the structural characteristics of reality given by principles that we have historically called metaphysical, such as the realist and idealist thesis. Those who espouse this separation often appeal to the notions of possibility and necessity. They say that there are logical possibilities that are not metaphysically possible and that there are metaphysical necessities that are not logically necessary.

For example, one could argue that it would be logically but not metaphysically possible to exist an individual with the magical power to transform any material object into any other instantaneously and effortlessly. To say that the existence of this individual is logically possible means to say that the admission of her existence does not imply any logical contradiction. While to say that the existence of this individual is not metaphysically possible means to say that the assumption of her existence, although not implying any logical contradiction, oppose some principle that we take as a metaphysical principle.

However, this separation between the nature of what is logical and what is metaphysical is arbitrary. It starts from the assumption that logic is prior and broader than metaphysics. Yet, we find no more robust justification for this assumption than the fragile historical reasons previously mentioned, related to the view long held in the past that there would be only one logic but many metaphysical proposals. There is, on the other hand, a strong enough reason to deny this separation and to bet on the hypothesis of the isomorphism between logic and metaphysics. It is constituted by the fact that the main characteristic of both the principles traditionally held as metaphysical as well as of the logical principles, usually characterized as formal, is that these two kinds of principles are absolutely general. The most fundamental aspect that would characterize both logic and

metaphysics as philosophical disciplines would be the absolute generality of the principles of these two areas.

In the next Section, I will argue in defence of this thesis of the absolute generality of logic and in doing so I will present some logical motivations for the (isomorphism) hypothesis that logical principles are metaphysical principles.

7 Logic Does Not Separate: absolute generality

Our adopted textbook definition of metaphysics, as the discipline that deals with the characterization of the most general structure of reality, reveals its absolute generality. Nothing escapes from the most general structure of reality. But what does it mean to say that the principles of logic are absolutely general? When I say that the principles of logic have absolute generality, I mean by this that the quantificational theorems of logic do not divide or separate reality. They do not refer to specific beings or part of them. They always refer to all beings. By saying that the principles of logic are absolutely general I intend to mean that it is not possible to affirm anything particular through a logical theorem, but only to make utterly inclusive statements which, precisely for this reason, constitute metaphysical principles that characterize the most general structure of reality.¹⁴

¹⁴ The expression “absolute generality” is often used in the literature related to the domain of quantifiers and has, in that context, a different meaning to what I use here. The detractors of the thesis of the absolute generality of the domain of quantification take the position that is incoherent to admit that there can be an absolutely general domain of quantification, which includes absolutely everything, without any restriction. The domains of all quantificational sentences would always be restricted to some class. On the other hand, the proponents of the thesis of absolute generality assume that there is no problem in admitting an utterly generic domain of quantification, which includes absolutely everything (Santos, 2013). My use of the expression “absolute generality” in this text is not related with this debate. When I say that a given quantified sentence *S* is absolutely general (or generic), I mean by this that for any domain of quantification *D*, what *S* states applies to all individuals in *D* and not to just a few. So if *S* is an absolutely generic sentence, given any domain of quantification *D*, *S* does not separate the

I am not here referring to a characteristic of classical logic or some specific logical system, but a feature that I consider fundamental to any logical system. So fundamental that it would serve as one of the necessary criteria to characterize logic. Therefore, there cannot be a theorem with a demonstration that assures that all logical systems meet the standard of absolute generality. We may even enunciate and demonstrate some restricted versions of such a theorem, but they will always be specific to some particular system or set of logical systems. It is a philosophical matter of disciplinary demarcation, and many logicians may disagree with this proposal. The best we can do is to present arguments and motives for the acceptance of this criterion, hoping that we are not as arbitrary in this respect as those whom we accuse of arbitrarily classifying logic as anterior and neutral to metaphysics.

In addition to the arguments already presented in the previous Sections that led us to the proposition of the absolute generality of logic, I will reinforce the motivation for its adoption by arguing that classical and intuitionistic first-order logic satisfy the standard of absolute generality.

We have said above that all logical theorems with the forms

$$\forall x \alpha(x) \quad \text{and} \quad \neg \exists x \alpha(x)$$

are metaphysical principles that establish obligations and prohibitions that characterize the most general behaviour of beings. But what about the other logical theorems, such as the propositional ones? What is their relation to metaphysics?

elements of \mathbf{D} between those that satisfy it and those that do not. S is absolutely general because it is satisfied by all individuals of the domain. The typical example of an absolutely general statement is a universal statement $\forall x \alpha(x)$. Yet there are absolutely general statements with other logical forms, hence the need for a specific name. When I say that a logical system satisfies absolute generality, I mean something very close to the assertion that all its quantificational theorems are absolutely generic statements, with some additions that will be clarified throughout this Section.

All theorems of a logical system relate to one another so that given any propositional theorem, it is always possible to find quantificational versions of it that will also be theorems. The quantificational classical theorems

$$\forall y (Q(y) \vee \neg Q(y)) \quad \text{and} \quad \neg \exists x (P(x) \wedge \neg P(x))$$

which we saw earlier are quantificational versions of the classical propositional theorems

$$(Q \vee \neg Q) \quad \text{and} \quad \neg(P \wedge \neg P).$$

Because of this relationship between logical theorems, divergences in propositional theorems have consequences in the quantificational ones. The difference between classical and intuitionistic logic is propositional, but this propositional difference has consequences in quantificational theorems. Exactly because excluded middle ($Q \vee \neg Q$) is not a theorem of intuitionistic logic, this quantificational version of it ($\forall y (Q(y) \vee \neg Q(y))$) will not be either.

Precisely because propositional divergences have quantificational consequences, we do not have to limit the criterion of logical incompatibility to the quantificational theorems. For a specific logic to provide a concept of existence, it must have quantifiers and be at least a first-order logic. However, since propositional divergences have quantificational consequences, any logical divergence, even at the propositional level, connects with quantificational divergences and thus characterizes a metaphysical disagreement. It is also because of this interconnection between logical theorems that we have previously stated that what expresses metaphysical commitments are the logical systems understood in their totality and not isolated logical principles.

A rather direct way of demonstrating that a particular logical system **L** satisfies the criterion of absolute generality would be to show that **L** has no existential statements among its theorems. That is,

the absolute generality of \mathbf{L} would be ensured if none of its theorems had the form $\exists x \alpha(x)$. This is because the existential sentences are precisely those that divide reality, that affirm specificities and peculiarities of some but not all beings. When I say, for example, that ghosts exist, through the sentence ' $\exists x \text{Ghost}(x)$ ', I am dividing reality between the individuals who satisfy it and those who do not; I am affirming a particularity, a specific aspect of reality and not a general feature of it. By affirming particularities and specificities applicable only to some individuals, existential affirmations do not describe the most general characteristics of all beings; they are not absolutely general. So, if I argue that a fundamental feature of any logical principle is its absolute generality, no logical principle should have the form $\exists x \alpha(x)$, and hence no logical system should have existential statements among its theorems.¹⁵ The problem is that this is a false assumption.

The existential statement $\exists x (P(x) \vee \neg P(x))$, for example, is a first-order classical theorem. In general, if α is a propositional theorem, then $\exists x \alpha(x)$ is also theorem and hence classical logic is loaded with existential statements among its theorems. There is, however, hope for this situation. When α is a propositional theorem, not only $\exists x \alpha(x)$ but also $\forall x \alpha(x)$ is a quantificational theorem. That is:

$$\vdash \alpha \Rightarrow \vdash \exists x \alpha(x) \Rightarrow \vdash \forall x \alpha(x)$$

Then the existential statements ' $\exists x \alpha(x)$ ' which are theorems because the subformula in the scope of the existential quantifier ' $\alpha(x)$ ' has the

¹⁵ It is worth noting that existential affirmation is precisely the logical form of the sentences that point out the ontological commitments of a theory. Curiously, the logical form of the statements that express the ontological commitments of a theory is the same logical form that does not meet the standard of absolute generality and could not take part in a metaphysical characterization of the reality. That reinforces the distinction between metaphysics and ontology that we have assumed. Ontology gives the things that exist, which completely fill up reality, whose most general characteristics are provided by metaphysics, which, in doing so, defines the meaning of existence.

logical form of a propositional theorem ' α ' do not threaten the absolute generality of classical logic, since the particularity they claim, $\exists x \alpha(x)$, is due to a generality, since ' $\forall x \alpha(x)$ ' is also a theorem.

However, not all the existential affirmations that are theorems of classical logic are so because they share part of their logical form with a propositional theorem. In a system with identity and individual constants, for any constant ' c ' the existential statement $\exists x (x = c)$ is a theorem, but the corresponding universal statement $\forall x (x = c)$ is not.

This fact, however, does not threaten the absolute generality of classical and intuitionistic logic. In spite of the existential form, the only particularity of the sentence $\exists x (x = c)$ is linguistic, given by the constant ' c '. Sentences with the form $\exists x (x = c)$ state only that one of the linguistic conventions of these logics is that all names (the individual constants) shall denote some individual. If our language has n individual constants c_1, \dots, c_n , then for each $1 \leq i \leq n$, the sentence $\exists x (x = c_i)$ will be a theorem that states that the constant ' c_i ' denotes an individual. These sentences, taken together, express the language convention that the individual constants must denote. They then only regulate the use of individual constants. The only information they give us, beyond this naming convention, is that reality is not empty. There are beings. This fact, however, is not particular, but general. In affirming that there are beings, that reality is not empty, we are stating a general characteristic of the reality assumed by classical and intuitionistic logic and, therefore, respecting the thesis of absolute generality.

A simple way of realizing that the theorems involving individual constants do not threaten the standard of absolute generality is to show that if we replace each individual constant that occurs in them with a variable, and take the universal closure of the resulting formula, we get a theorem. The theorem $\exists x (x = c)$, for example, gives us the theorem $\forall y \exists x (x = y)$. In general, the following result holds for classical and intuitionistic first-order logic:

$$\vdash \alpha(c) \Rightarrow \vdash \forall y \alpha(y)$$

This means that no theorem with the form $\alpha(c)$ threatens the standard of absolute generality, because what they say about 'c' is true for all individuals of the domain of quantification, since $\forall y \alpha(y)$ is also a theorem.¹⁶

So far we have seen that for existential theorems that have the form of propositional theorems, the following rule holds:

$$\vdash \alpha \Rightarrow \vdash \exists x \alpha(x) \Rightarrow \vdash \forall x \alpha(x)$$

If we prove that, regardless of the logical form of α , given an existential theorem $\exists x \alpha(x)$, if we replace the existential quantifier with a universal, the result $\forall x \alpha(x)$ remains a theorem, then we would have a complete argument for the absolute generality. That is, if we demonstrate that, regardless of the form of α ,

$$\vdash \exists x \alpha(x) \Rightarrow \vdash \forall x \alpha(x)$$

this result would guarantee that any particularity that we could assert through an existential theorem $\exists x \alpha(x)$ would be only a partial affirmation of a generality assured by another theorem, given by $\forall x \alpha(x)$, which would ensure the absolute generality.

¹⁶ The demonstration that $\vdash \alpha(c) \Rightarrow \vdash \forall y \alpha(y)$ holds in classical and intuitionistic logic is a mere corollary of Prawitz (2006)'s normalization theorem for systems of natural deduction. For our purposes of arguing in favor of the absolute generality, the elimination of the individual constants given by this result is sufficient and will be assumed in the remaining arguments of this Section. It is interesting to note, however, that the forced elimination of individual constants made by regimentation in Quine's canonical notation, which substitutes them for descriptions, does not constitute a problem only when we restrict ourselves to classical logic. Because it does not bear subjunctive conditionals and counterfactual situations, classical logic protects itself from Kripke (2001)'s celebrated criticism of the descriptive approach to names, which apply only in contexts that admit such conditionals. Intuitionistic logic, however, is vulnerable to Kripke's criticism because its translation into the modal logic S4 demonstrates its capacity to harbour subjunctive conditionals and counterfactual situations.

This result is not generally valid for classical logic, but there is a rather simple proof of it for intuitionistic logic.¹⁷ Intuitionistic logic is therefore absolutely general. All its theorems containing individual constants are mere partial affirmations of universal theorems without constants, and all its existential theorems are special cases of universal theorems. This means that any theorem that makes a particular statement is covered by a universal theorem, showing that that particular statement is only a partial affirmation of a general situation. Intuitionistic logic, then, meets the standard of absolute generality.

In classical logic, in the vast majority of cases where $\exists x \alpha(x)$ is a theorem, $\forall x \alpha(x)$ will also be, and situations supposedly challenging absolute generality are quite rare.¹⁸ Yet there are exceptions. The only ones I know are variations of the following sentence:

¹⁷ In Veloso, Pereira & Haeusler (2012) we can find several related and more general results than this one, which I now present the outline of the proof, that is also obtained as a corollary of the normalization theorem: suppose that we have a normal proof, π , of $\exists x \alpha(x)$ in a natural deduction system for intuitionistic logic. Being a normal proof and having $\exists x \alpha(x)$ as its last formula, the last rule of π is either an existential introduction rule ($\exists I$) or a rule of the intuitionistic absurdity (\perp). As the intuitionistic logic is consistent, the last rule application in π cannot be (\perp), otherwise, if we exclude from π this final rule application we would obtain a proof of absurd without premises, which would be a proof of the inconsistency of intuitionistic logic. Then the last rule application in π is an application of ($\exists I$). We can then replace this last rule application in π by an application of the rule ($\forall I$), which has exactly the same form as ($\exists I$), what resulting in a proof π' whose last sentence will be $\forall x \alpha(x)$. This application of ($\forall I$) respects the rule's constraints because the premise of the last rule of π does not depend on any hypothesis since π is the proof of a theorem (has no open hypotheses) and the application of ($\exists I$) does not discharge any assumption. The proof π' is then a proof of $\forall x \alpha(x)$ correct and with no open hypothesis. Then $\forall x \alpha(x)$ is a theorem of intuitionistic logic.

¹⁸ As the set of classical theorems is infinite, to speak of "vast majority" without any qualification is an abuse of language. We can understand "vast majority" in this context as stating that for any finite limit n in the number of symbols of the formulas (complexity), the number of existential theorems with complexity less than n whose substitution of the existential quantifier for the universal results in a theorem is much higher than the number of existential theorems whose same substitution results in a universal formula which is not a theorem.

$$\exists x (P(x) \rightarrow \forall y P(y))$$

This sentence is a first-order classical theorem, but the sentence $\forall x (P(x) \rightarrow \forall y P(y))$, obtained by replacing the main existential quantifier with a universal quantifier, is not a classical theorem. It is worth noting that since this result is valid for intuitionistic logic, this exception and any other that may exist is an existential affirmation that is not an intuitionistic theorem. That is, $\exists x (P(x) \rightarrow \forall y P(y))$ is a classical theorem, but it is not an intuitionistic one. Let us compare the existential affirmation, which is a classical theorem, with the universal affirmation, which is not a theorem, to try to understand the situation better.

$\exists x (P(x) \rightarrow \forall y P(y))$: there is at least one individual who,
if it is P, then all are Ps.

$\forall x (P(x) \rightarrow \forall y P(y))$: given any individual,
if it is P, then all are Ps.

It may even seem that the first sentence is making a particular statement about some specific individuals, that it is separating reality and that it is not absolutely generic. However, when we try to understand why it is a theorem, why there can be no interpretation in which it is false, we realize that despite its existential form, it does not make any particular statement.

The second sentence is not a classical theorem because we can conceive the circumstance in which some individuals are Ps, and others are not. In this circumstance, when we instantiate the universal sentence with an individual that is P, the conditional $P(x) \rightarrow \forall y P(y)$ will have a true antecedent $P(x)$ and a false consequent $\forall y P(y)$. Then the conditional $P(x) \rightarrow \forall y P(y)$ is false and also the universal sentence $\forall x (P(x) \rightarrow \forall y P(y))$, since it has a false instance.

The first sentence is a theorem because both in the circumstance that some individuals are not Ps, and in the circumstance in which

all are, the sentence is true. When some individuals are not Ps, if we instantiate the existential with one of these individuals that is not P, the conditional $P(x) \rightarrow \forall y P(y)$ will be true for having false antecedent P and false consequent $\forall y P(y)$. Then the whole existential $\exists x (P(x) \rightarrow \forall y P(y))$ is also true for having a true instance. When all individuals are Ps, the conditional $P(x) \rightarrow \forall y P(y)$ is true, for having a true consequent. Then the existential sentence $\exists x (P(x) \rightarrow \forall y P(y))$ is also true because all of its instances are true.

So, in spite of its existential form, the sentence $\exists x (P(x) \rightarrow \forall y P(y))$ is only valid because in each of the possible circumstances it is true. The two possible circumstances analyzed, that some individuals are not Ps and that all individuals are Ps exhaust the possibilities. Viewed in isolation, each of these circumstances represents a particular situation, a specific and distinct possibility in which the facts can occur. But the set of these two possibilities, that is, the assertion of their disjunction, has no particularity and represents an absolutely general characteristic of reality, corresponding to an instance of the excluded middle $(\forall x P(x) \vee \neg \forall x P(x))$.

It turns out that the recognition of the validity of the existential affirmation $\exists x (P(x) \rightarrow \forall y P(y))$ presented above does not tell us which of these two possible circumstances is responsible for the sentence's truth. There are, then, two quite distinct motives that justify the truth of the sentence, and finding that the sentence is valid does not tell us which of these motives is in effect. The sentence's truth may be due to the fact that some individuals are not Ps, and therefore, it can be instantiated so that antecedent and consequent of its conditional are false. Yet its truth may also be due to the fact that all individuals are Ps and therefore any instance of the existential gives both true antecedent and true consequent.

So, there are two distinct circumstances that represent two different ways in which the sentence can be true, and the recognition of its truth does not tell us which of these two is the actual way in which the sentence is true. Moreover, these two circumstances exhaust all possibilities in which facts can occur. Then, although the sentence

has the logical form of a particular existential statement that separates reality, the realization of its truth does not give us any specific information about the world. This particular information suggested by the existential form of the sentence would only be communicated to us if we could know which of the two possible circumstances secures its truth. Since the mere fact of recognizing the sentence as valid does not give us this information, and since the disjunction of these two possibilities is an absolutely general situation that exhausts all cases, then we can safely say that the sentence's truth does not inform us of any particularity about reality and therefore does not challenge the absolute generality of classical logic.

Since the sentence we analyzed, $\exists x (P(x) \rightarrow \forall y P(y))$, is not an intuitionistic theorem, we can be assured that it is not a peculiarity of the argument we presented the fact that the recognition of its validity does not inform us on which of two possible particular circumstances is the one responsible for its truth. Any semantic justification for the validity of this sentence will necessarily depend on some instance of the excluded middle; otherwise, it would be an intuitionistic theorem. In addition, as we know that whenever $\exists x \alpha(x)$ is an intuitionistic theorem, $\forall x \alpha(x)$ also is; then, any other possible candidate to a counterexample to the absolute generality will be similar to this one, in the sense that the recognition of its validity will also depend on the principle of the excluded middle, and therefore it will not challenge the absolute generality of logic, for the same reasons we presented for the present case.

We can finally conclude that even possessing certain existential theorems whose universal counterparts are not theorems, classical logic, as well as intuitionistic logic, respects the standard of absolute generality. Almost all its existential theorems are just partial affirmations of universal statements that are also theorems, and those that are not so, do not make any particular claim but also only utter general ones. The theorems of classical logic, then, do not divide or separate reality. They do not refer to specific characteristics of specific individuals, but only to the general characteristics of all individ-

uals and therefore constitute metaphysical principles that provide us with a characterization of the most general structure of reality.

As we have already mentioned, it is not possible to yield a single argument for the absolute generality of all logical systems, simply because there is no consensus among the logicians about the limits of their discipline. In addition to arguments such as these that I have presented about the absolute generality of specific logical systems, the maximum we can aspire to is a result that would show, for example, what generic formal features logical systems should have in order to respect absolute generality. This exciting investigation, however, goes far beyond the purposes of this text.

In the analysis of the debates realism vs idealism presented in Section 5, we saw an example of a successful application of the criterion of logical incompatibility. That is, we saw an application of the criterion in which the logical incompatibility of opposing positions has shown that that divergence was a genuine metaphysical divergence. For the sake of example, before we finish, let us briefly discuss in the next Section a case in which the application of the criterion of logical incompatibility demonstrates that the dissenting position defended by one of the sides is not, as proposed by its author, a legitimate metaphysical dissent, what characterizes the disagreement as merely verbal.

8 McDaniel vs van Inwagen: the univocity of being

In “Ways of Being”, Kris McDaniel (2009) presents a defence of what he considers to be the Heideggerian version of the thesis that existence is not univocal. There would be, for Heidegger, multiple modes of being: “there are many things which we designate as ‘being’, and we do so in various senses” (Heidegger, 1993, 26). McDaniel quickly mentions some historical roots of the thesis and proposes an interpretation for the Heideggerian version in which the multiple modes of being are identified through the equivocality of meanings present in our uses of expressions such as “being”, “existence”, “exists”, “is

an entity”, “there are”. He classifies these expressions as *analogical*, and defines: an expression is analogical when it “has a generic sense which, roughly, applies to objects of different sorts in virtue of those objects exemplifying very different features.” (McDaniel, 2009, 295). He offers the mereological locution “is a part of” as a paradigmatic model of analogical expression and exemplifies some of its uses:

this hand is a part of that man, the class of women is a part of the class of human beings, this subregion is a part of space, this minute is a part of this hour, this premise is a part of this argument, and so forth. (McDaniel, 2009, 295)

For McDaniel, there is a common idea to these various uses, but it is not this common idea that explains and justifies each one of them. Each specific use applies to objects of very different types and is explained by one particular fundamental relation. Each of these fundamental relations represents a distinct concept of what it is to be a part that is singular to the kind of things to which it applies. Therefore, the reasons why there are parts in each case are also fundamentally different (p. 296). That is, “being a part of” is an analogical expression for McDaniel because there would be several distinct ways in which something is part of something. Likewise, the multiple meanings of expressions related to beings would express the fact that there are many ways of being, and the concept of being would also be analogical. I will use the expression ‘*thesis of equivocality*’ to refer to McDaniel’s position.

At the other end of the disagreement that interests us here is Peter van Inwagen, who supports the contrary thesis that existence is univocal. There are no multiple ways of being but a single one. For van Inwagen, the concept of being would not be analogical, and any existing thing exists in precisely the same way and sense as any other. I will use the expression ‘*thesis of univocity*’ to refer to van Inwagen’s position.

The divergence between the theses of univocity and equivocality is apparently a metaphysical divergence on whether in the general structure of reality there is room for different modes of existence, or whether it has only one mode of existence. Our purpose here is to apply the criterion of logical incompatibility to show that, as treated by these two authors, this is not a legitimate metaphysical divergence but only a merely verbal disagreement. Moreover, in this particular case, the criterion will also help us to realize that the cause of this verbal disagreement is a misuse of words by defenders of the equivocality thesis. We will see that the way McDaniel imports the Heideggerian vocabulary about the many modes of being is inadequate and misleading.

Having made these preliminary clarifications, I shall now present a brief summary of the thesis of univocity as advocated by van Inwagen (2009) in “Being, Existence, and Ontological Commitment” and the main points of the equivocality thesis McDaniel (2009) supports in “Ways of Being”. Then I shall present a criticism of the equivocality thesis that van Inwagen (2014) himself does, in “Modes of Being and Quantification” where he performs a formal regimentation of the equivocality thesis in first-order classical logic, the same system in which he also regiments his own thesis of univocity. These regimentations make it possible to employ the criterion of logical incompatibility and to conclude that the disagreement is not genuinely metaphysical. At the end of the Section, we explain what conclusions we can draw from this analysis.

In “Being, Existence, and Ontological Commitment”, van Inwagen presents how he understands that ontology should be practised and what its fundamental theses are. He credits these theses to Quine and labels them as “the five theses to Quine’s meta-ontology”:

- T1) Being is not an activity.
- T2) Being is the same as existence.
- T3) Existence is univocal.

- T4*) The single sense of being or existence is adequately captured by the existential quantifier of formal logic.
- T5*) Ontological questions must be resolved through the method of ontological commitment.

If being and existence are the same (*T2*), then it is also the same talking about the univocity or equivocality of being, and talk about a single one or multiple ways of existing. Moreover, if existence is univocal (*T3*) and its only meaning is captured by the existential quantifier (*T4*), then there is a single and unrestricted domain of quantification that encompasses all that exists, and the logical rules that regulate the existential quantifier exhaust the possibilities for the meaning of existence. These theses authorize van Inwagen to agree with Quine's statement that "existence is what existential quantification expresses. There are things of type F if and only if $\exists x F(x)$ " (Quine, 1969, 97).

Further, since according to *T5*, van Inwagen accepts the ontological method of Quine which we present in Section 2, then the formal logic to which he refers in thesis *T4* is first-order classical logic. That is, the existential quantifier that captures the unique meaning of existence is for van Inwagen the existential quantifier of first-order classical logic.

Van Inwagen's thesis of univocity is then summarized by the acceptance that it is in first-order classical logic that we must gather our theses about being, that there is a unique and unrestricted domain of quantification that is accessed by the existential quantifier, whose rules capture the single meaning of existence.

Let us turn now to the thesis of equivocality. I will focus only on the crucial points sufficient for the understanding of the debate, omitting several of the thesis' aspects and details that are not relevant to our question. After initial accounts of the general idea of the equivocality of being and of several parallel explanations, McDaniel endeavours to explain Heidegger's position through formal

resources as predicates, quantifiers, and variables. He states that although Heidegger argues that “being comes in many flavors”, he acknowledges that there is a general sense of being and says that “the generic concept of being is represented in formal logic by the unrestricted existential quantifier” standard of first-order logic (McDaniel, 2009, 301).

Then he wonders: “what is the best way to formally represent Heidegger’s restricted senses of being?” After quickly refusing the use of individual constants for this task, he considers the possibility of special predicates representing the various modes of being; which he also rules out: “this seems inappropriate, since this procedure assimilates attributing a way of being to a thing to predicating a property of that thing”. And he goes on: “ways of being are not merely special properties that some entities have and others lack, and so are not most perspicuously represented by predicates” (302). Then he makes his crucial suggestion:

A natural thought then is that the specific senses of “being” also are best represented by quantifiers. The notion of a *restricted quantifier* — one that ranges over only some proper subset of that which the unrestricted quantifier ranges — is perfectly intelligible. Heidegger’s senses of “being” are properly represented in a formal system by special restricted quantifiers. [...] So for every special kind of being recognized by Heidegger, there corresponds a restricted quantifier whose domain is a proper subclass of the domain of the unrestricted quantifier, and that ranges over all and only those things that have that kind of being. (p. 302)

Then he makes the following strange statement.

So representing Heidegger’s ways of being by restricted quantifiers — quantifiers that by virtue of their meaning range over only some proper subset of what the unrestricted existential quantifier ranges over — seems like an excellent way to proceed. (pp. 302-303)

The strangeness here is in the assertion that the restricted quantifiers are restricted by virtue of their meaning. The immediate question this statement raises is: what is the meaning of a quantifier? Where, how, and by whom is it established? The only indication McDaniel gives of an answer to this question is a quote from Eli Hirsch (2005, 76), which states that quantifiers would be semantically restricted when “semantic rules implicit in language” establish the restriction of their domain (McDaniel, 2009, 303). However, he ignores this suggestion and leaves completely unanswered the question of how quantifiers get the meaning they have.

To exemplify, he then proposes two types of restricted quantifiers. One that he calls ‘*existenzial*’, whose domain of quantification are entities whose mode of being is to have *existenz*, which is the mode of being of concrete and particular things. The other quantifier is what he calls ‘*subsistentzial*’, whose domain is given by the entities that have *subsistence* as their mode of being, which is the mode of being of abstract things. He keeps insisting that it is by virtue of the meaning of each of these quantifiers that their domain of quantification are specified (p. 303).

We then have three different existential quantifiers; the generic existential quantifier of classical logic, whose domain is absolutely generic, and the restricted quantifiers *existenzial* and *subsistentzial*, whose domains of quantification are restricted respectively to concrete and to abstract beings.

McDaniel argues that, according to Heidegger’s perspective, the *existenzial* and *subsistentzial* restricted quantifiers must be prior in meaning to the generic existential quantifier (p 303). He then states that being prior in meaning, the restricted quantifiers must be semantically primitive, and goes on to investigate how to use these primitive restricted quantifiers to produce and explain the subsidiary general sense of being given by the unrestricted existential. For this analysis, he appeals to the concept of *fundamentality*.

This discussion and the way he presents it seems hasty and ill-formulated. His conclusion is also a merely negative one. He presents

no positive argument to support the priority of meaning of the restricted quantifiers relative to the generic one but only defends this thesis against an argument attacking it. Even if this defence succeeds, the problem of his approach that propitiated van Inwagen's criticism is the fact that, beyond the mere assertion that there are different ways of being, and the labelling of some of these modes, McDaniel does not say a single word that explains, demonstrates, or clarifies in what the distinction of the multiple ways of being consists. If the abstract existence of *subsisting* beings is different from the concrete existence of beings that have *existenz*, what is this difference? In addition to their names, what else distinguishes these two domains of quantification? What features one domain has that the other lacks? In which ways these two modes of beings are different? What is permitted (or possible) to beings of one kind that is forbidden (or impossible) to beings from the other? McDaniel leaves all these questions unanswered. Beyond the postulation of different modes of being, and the enumeration of some of them, McDaniel says nothing to explain how different the various ways of being are. It seems that the two modes of being he exemplified are only two identical copies of the same one.

This absence of any clarification as to how the multiple modes of being are different from each other provided fuel for the criticism of McDaniel's thesis of the equivocality of being that van Inwagen (2014) elaborated on "Modes of Being and Quantification". He took advantage of this lack of explanation and proposed various ways of regimenting the thesis of equivocality into first-order classical logic. Some of them using a many-sorted version of the first-order logic and interpreting the modes of being through restricted quantifiers, in precise accordance with McDaniel's prescriptions (Inwagen, 2014, 20). Some others, however, formalizing the modes of being not as

quantifiers, but as predicates whose extensions would coincide with the beings of each so-called way of existence (Inwagen, 2014, 9).¹⁹

The main point of his reasoning was to show that any argument that was valid (or invalid) when evaluated in accordance to the original thesis of equivocality would remain valid (or invalid) when evaluated in any of the regimentations in first-order classical logic that he proposed. If to this we add his approach to ontology, in which the only sense of existence is captured by the general existential quantifier of classical logic, then the regimented versions he proposed represent a proof that the thesis of equivocality affirms nothing substantial, since it is compatible with the thesis of univocity. By possessing versions regimented in first-order classical logic that behave exactly like the original unregimented thesis, the thesis of equivocality is, because of this, compatible with the thesis of univocity, since, according to van Inwagen, the unique existential quantifier of classical logic expresses and represents the very thesis of univocity. The foundation of van Inwagen's criticism is, then, the inert character of McDaniel's proposal.

Van Inwagen does not explicitly mention anything similar to our criterion of logical incompatibility, nor does he assume our hypothesis of the isomorphism between logic and metaphysics. Yet we can feel here the "strong smell" of the criterion of logical incompatibility. He understands his own argumentation as a victory of univocity over the equivocality, a victory which is provided by the first-order regimented versions compatible with the original unregimented thesis with respect to all arguments which they validate or invalidate.

The interpretation of van Inwagen's criticism given by the criterion of logical incompatibility is, however, slightly different. We do not need, in principle, to assume the Inwagerian thesis that one of the metaphysical commitments of first-order classical logic is the univocity of being. The controversy over the absolute generality of

¹⁹ As many-sorted first-order classical logic is translatable into traditional unsorted first-order classical logic, all van Inwagen's regimentations of McDaniel's equivocality thesis are equivalent and compatible with plain first-order classical logic.

the domain of quantification of classical logic present in the literature (Rayo & Uzquiano, 2009) suggests caution in this regard. In the absence of this assumption, van Inwagen's regimented versions of the equivocality thesis show only that the theses of univocity and equivocality are logically compatible, and therefore, by the criterion of logical incompatibility, the disagreement between them is not a genuine metaphysical disagreement about the most general structure of reality. It is not even an ontological disagreement, as there is no dispute about what exists or not. The disagreement is a merely verbal one. This is the main information we get from the application of our criterion to this debate. However, when we place side by side the Heideggerian discourse and vocabulary attached to the thesis of equivocality and the Quinean discourse and vocabulary of the thesis of univocity and confront them with the most obvious metaphysical commitments that the first-order classical logic seems to assume, it becomes challenging to disagree with van Inwagen.

Perhaps there is a reason to reject also van Inwagen's thesis of univocity, because of arguments connected with the absolute generality of quantifiers or some other motive. However, even if we come to discover that existence is not univocal, the present analysis authorizes us to safely assert that although there might be multiple ways of being, McDaniel's version of Heidegger's thesis of the equivocality of existence would not be an acceptable explanation of this fact.

9 Conclusion

The proposition of the criterion of logical incompatibility was motivated by metaphysical and logical concerns. On the metaphysical side, my first concern was to defend the discipline from the deflationary attacks which it has always suffered from common sense, as well as from scientists and also from philosophers. However, as much as I find these attacks unjustified, I also have always been bothered by the fact that many specific metaphysical proposals and debates in the literature some times seem to give us reason to agree with deflation-

ists. Reflecting on the general structure of reality is a risky, slippery, treacherous activity, and in many specific cases, we, philosophers, seem to stumble in our own words and lose ourselves in incoherent considerations, odd intuitions, and sterile debates.

On the side of logic, I have always been intrigued by the fact that all our logical justifications are based on principles which themselves are not justified. What would ground logical principles? What is the reason for the fact that when we apply them correctly, they lead us to reliable conclusions?

The hypothesis of the isomorphism between logic and metaphysics and the criterion of logical incompatibility for metaphysical disagreements represent my answer to these concerns. Logical principles are reliable because they are an expression of the general structure of reality. They are prescriptions for correct thinking as Frege teaches us because they are laws that establish what is, in its broadest aspect. *Logical principles are logical because they are metaphysical principles.*

Metaphysical proposals, in their turn, as characterizations of the most general structure of reality, are, therefore, supervenient images of the logical principles. They are linked to them as much as the geometric figures are connected to the Cartesian graphs of their algebraic equations. So those supposedly metaphysical propositions but that have no logical specificity are not genuinely metaphysical, while the genuinely metaphysical proposals are not sterile, but rather fertile. Because they possess logical specificity, they influence and spread through all other subjects on which we reason. By influencing and affecting all the subjects on which we reason, they assume the central role expected of a general characterization of reality. *The metaphysical proposals are metaphysical because they are logical.*²⁰

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