Theoria, 2019, 34(2), 277-295
https://doi.org/10.1387/theoria.18298

THEORIA

ISSN 0495-4548 – eISSN 2171-679X

Scientific Models and Metalinguistic Negotiation

(Modelos científicos y negociación metalingüística)

Mirco Sambrotta*
University of Granada

ABSTRACT: The aim of this paper is to explore the possibility that at least some ontological dispute are better understood as what David Plunkett and Timothy Sundell have called 'metalinguistic negotiations'. I will take the debate between the dominant approaches of realism and anti-realism (especially fictionalism) about the ontological status of scientific models as a case-study. I will argue that such a debate is best seen as normatively motivated, insofar as a normative and non-factual question may be involved in it: how ought the relevant piece of language to be used? Even though I will generally assess the prospects for a broadly deflationist approach, I shall outline a sense in which such a dispute can be recast as 'minimally substantive'.

KEYWORDS: scientific models, metalinguistic negotiation, conceptual ethics, ontological disputes.

RESUMEN: *El objetivo de este artículo es explorar la posibilidad de que al menos algunas disputas ontológicas puedan ser mejor entendidas como lo que David Plunkett y Timothy Sundell han llamado 'negociaciones metalingüísticas'. Utilizaré como caso de estudio el debate sobre el estatus ontológico de los modelos científicos entre los enfoques dominantes del realismo y del antirrealismo (especialmente, el ficcionalismo). Argumentaré que este debate puede verse mejor como un debate motivado normativamente, en tanto que una pregunta normativa y no-fáctica aparece implicada, a saber: ¿cómo deben usarse los elementos del lenguaje relevantes? Aunque evaluaré de forma general las perspectivas de un enfoque ampliamente deflacionista, perfilaré un sentido en el que dicha disputa puede verse como 'mínimamente sustantiva'*

PALABRAS CLAVE: modelos científicos, negociación metalingüística, ética conceptual, disputas ontológicas

**** Correspondence to:*** Mirco Sambrotta. Department of Philosophy I, University of Granada, Edificio de la Facultad de Psicología, Campus de la Cartuja, 18011 Granada. España – mirco.sambrotta@gmail.com – http://orcid.org/0000-0001-6962-4207

How to cite: Sambrotta, Mirco. (2019). «Scientific Models and Metalinguistic Negotiation»; *Theoria. An International Journal for Theory, History and Foundations of Science,* 34(2), 277-295. (https://doi.org/10.1387/theoria.18298).

Received: 04 November, 2017; Final version: 20 August, 2018.
ISSN 0495-4548 - eISSN 2171-679X / © 2019 UPV/EHU

This article is distributed under the terms of the *Creative Commons Atribution 4.0 Internacional* License

1. *Introduction*

The general aim of this paper is to explore the possibility of conceiving the ontological dispute between realists and anti-realists about scientific models in terms of what David Plunkett and Tim Sundell (2013) have called 'metalinguistic negotiation'.[1] A useful first step in characterizing scientific models can be to distinguish between model descriptions (the kinds of descriptions appearing in scientific papers and textbooks) and model systems described (mass points, frictionless pendulums, perfect vacuums, perfectly spherical planets, perfectly rational agents, etc.). Model systems are given by model descriptions. When scientists introduce a model they use an identifying description, so what they display in scientific papers and textbooks when they present a model are more or less stylized descriptions of the relevant model systems. In this way, they model a system or structure that they plan to build, by writing a description of it. For instance, scientists can introduce a model of the solar system describing planets as ideal spheres only having shape and mass (disregarding all other properties) and with a rotation-symmetric mass distribution orbiting around a big mass, or they can introduce a model of a population of breeding rabbits describing the population in the model as isolated from its environment and as reproducing at fixed intervals of time. Another example can be the model description describing a point mass bob bouncing on a perfectly elastic spring represents the real ball and spring system; or the liquid drop model of the atomic nucleus which portrays the nucleus as a liquid drop and describes it as having several properties (surface tension and charge, among others).

There is a variety of things that are commonly referred to as scientific models. Some model systems are straightforward physical objects (for instance, Watson and Crick's metal model of DNA and Phillips' hydraulic model of the economy), but many of them, maybe the majority, are not material at all (as there are no concrete perfectly spherical planets, frictionless pendulums, or perfectly rational agents). Therefore, in the latter cases, it seems there are no (concrete) objects that match the identifying descriptions we use to introduce them. Thomson-Jones (2010) calls them 'non-concrete models'. Non-concrete models (and the related descriptions) raised a thorny issue in ontology: what account should be given of these descriptions and what sort of objects, if any, do they describe? If we deny that are any entities which model descriptions refer to,[2] then we are faced with the problem of explaining how we can have true statements involving non-referring terms. On the other hand, if we accept that non-concrete models exist and we take model descriptions at face value, we must explain what sort of things they are (non-existent Meinongian objects, merely possible objects, Platonist or artefactual abstracta, etc.) and what is literally true of them. Among the plenitude of different solutions put forward by anti-realists, one of the most promising seems to be the fictionalist account. According to fictionalists, model descriptions should be thought of as similar to stories, and model systems should be thought of as akin to fictional characters: as Nancy Cartwright puts it "A model is a work of fiction" (1983, 153).

---

[1] Or, in Stojanovic (2011), 'forward-looking disagreement'.

[2] Thomson-Jones (2010, 284) defines them as 'descriptions of missing systems'

In this paper I focused on the dispute between realists and fictionalists about the existence of scientific (non-concrete) models. My challenge here will not be to settle the dispute, but rather to offer an attempt at explaining why it is so persistent and yet worthwhile. My conclusion will be that such a dispute can be better understood as a case of what David Plunkett and Timothy Sundell have called 'metalinguistic negotiation' (2013). First of all, I will try to sum up the different standpoints of both parties involved in the debate, or at least some of the most influential ones. Then, I will argue that Plunkett and Sundell's considerations might be carried over to this debate. I will maintain that ontologists have no substantive grounds to choose one view or the other, so they are in a sense 'free' to choose between the competing standpoints for practical purposes. In spite of this, I shall finally explain in what sense the dispute can still be regarded as 'minimally substantive'.

2. *Realists*

Realists hold that there is something that scientific models correctly describe. Given the successful use of these devices, they claim that our *prima facie* commitment to entities described in models is justified. Yet, as already mentioned, in most cases there are no concrete objects that possess the properties ascribed in models. The possible strategies advance by realists are roughly twofold: either to take model systems to be Meinongian nonexistent objects (Parsons 1980), or to conclude that they are abstract objects (Zalta 1983, Wolterstorff 1980) which in some sense have properties that fit the model descriptions.

The Meinongian approach to scientific models is parallel to the neo-Meinongian view of fictional character. According to them, the truth of sentences like "A perfect sphere of uniform mass density would produce a gravitational field of uniform magnitude at all points on its surface" must be taken literally. Here, the perfect sphere is taken to be a non-existent object: the non-existent object truly described in that sentence and which turn out to have all of the properties ascribed to it. The immediate consequence of this account is that it makes possible to quantify over entities that do not exist and to distinguish existence from quantification. A distinction, however, many philosophers claim to find incomprehensible.[3] Among others, Bertrand Russell famously stated: "Meinongian objects are apt to infringe the law of contradiction" (1905, 205). Nevertheless, modern versions of Meinongianism made an effort to provide possible solutions. Terence Parsons (1980), for instance, tries to avoid contradictions by distinguishing two kinds of properties: *nuclear* properties ('length', 'period', etc.) and *extra-nuclear* properties ('existing', 'being possible', etc.). Object's nuclear properties are supposed to constitute the object's 'nature' (a non-existent objects may naturally possess the nuclear properties which are ascribed to it in the model), while extra-nuclear properties are supposed to be external to the object's nature (like 'existence'). The latter are properties that an object has outside the scope of the model in which it appears; in other words, properties that the object has in virtue of the way the world *really* is and not properties that it has in the given model.

Another view along similar lines takes models systems to be (existing) *abstract* objects of some sort. However, this approach also faces some problems. One difficulty of such an

[3] In particular, see van Inwagen (2004, 126-138).

account is that it describes model systems as having properties that abstract entities cannot have. Indeed, abstract objects cannot be thought to literally have properties (like 'length' or 'period') commonly ascribed to model systems and it seems to be just a category mistake to think them as bearing those properties:

> [...] The simple pendulum described in a model is said to have a certain length and to move through space over time in a certain way, but abstracta of course cannot do that. (Thomson-Jones 2010, 13)

A move that was advanced to avoid the puzzle is to claim that abstract objects possess the properties ascribed to them in the model, but possess them in a 'special' way. Edward N. Zalta (1983) develops this idea distinguishing two modes of presentations: *encoding* and *exemplifying*. On Zalta's account, an abstract entity encodes all of those properties ascribed to it, but does not exemplify them. An Ideal pendulum, for instance, cannot exemplify a certain length and period, but it can encode them. Similarly, Héctor-Neri Castañeda (1989) appeals to the distinction between *internal* and *external* mode of predication of properties, while William J. Rapaport (1978) talks of properties that are *constituents* of objects and properties that are *exemplified* by them. Nicholas Wolterstorff's (1980) advocate a different standpoint. According to him, abstract entities are not objects of a certain kind, but *object-kinds*. Or better, authors when they construct scientific models delineate a certain kind of object by describing certain sets of characteristics. Therefore, the frictionless pendulum, for example, turns out to be not an object, but a certain kind of object, or *object-kind*. Finally, in a more radical way, Ronald Giere takes the objects described in model-descriptions, such as the linear harmonic oscillator, as "Abstract entitie*s* having all and only the properties ascribed to them in the standard texts" (1988, 78).

In sum, choosing one of the previous route, it could be possible, in principle, to avoid contradictions. Nonetheless, in any case, the original attractions of the realist account would be undermined, namely the idea that model descriptions can be straightforwardly compared (for isomorphism) with the real-world target systems (Thomson-Jones 2010, 15). In fact, embracing, for instance, Zalta's stategy, we end up to take the relevant abstracta to bear some other different kind of relation to their properties (encoding them), from the one borne by the target systems (exemplifying them).

3. *Anti-realists*

These difficulties of realism have led some to defend an opposite view about scientific models. According to anti-realists we are wrong to take statements about model systems literally, as genuine descriptions of certain (kind of) objects. They hold that some parts of the scientific enterprise do not correspond to anything in reality.[4] Among the plenitude of different prospects inside the anti-realist realm, let me first mention the 'paraphrase view' and 'the negative free logic view'. According to the former, following Russell (1905) and Ryle

[4] Some, like van Fraassen (1980), would say that if by chance the abstract terms used by scientists did denote something real, we have no way of knowing it.

(1966), statements about model systems must be paraphrased in a way that avoids the apparent reference; that is to say, they must be paraphrased as talking about what is true 'according to the model description'. However, nominalistic paraphrases are often considered too cumbersome for everyday purposes, or for the purposes of the science. On the other hand, negative free logic views, fallowing Sainsbury (2005) and Burge (1974) treat nonexistence claims involving the objects which model descriptions refer to as literally true, since they are considered simply the negations of existence claims that are false on account of reference failure. But they face a different problem, since, even though in many contexts such nonexistence claims seem true, in others they seem to be obviously false.

Anyway, to date, one of the most promising reaction to the realist account of scientific models is to adopt a so called 'pretense view', according to which we do not need to posit any kind of objects at all, but we just pretend that there are. We do not need to think of statements about model systems literally, as accurate descriptions of a certain (kind of) object, instead we should take such statements as props in games of make-believe. In short, model systems usually are presented to us by way of descriptions and such "[...] model descriptions should be understood as props in games of make-believe" (Frigg 2010a, 260). In particular, Frigg (2010a, 2010b) applies Walton's theory of fiction to scientific models. Walton (1990, chap.2) maintains that, when we read a fictional text, we are supposed to imagine things according to certain rules. In the same way, Frigg treats scientific models as imaginary creations. As "[...] fictional propositions are ones for which there is a prescription to the effect that they have to be imagined" (Walton 1990, 39), model descriptions must be taken as prescriptions to imagine that there are certain objects with the relevant properties:

> It is fictional that the model system has these properties, roughly, if the model-description, together with the appropriate rules of generation, enjoins us to imagine that there is a system that has these properties. (Frigg 2010c, 268)

Therefore, as well as Walton's renounces the postulation of fictional entities, a theory of scientific modeling based on this account is free of ontological commitments to any Meinongian or abstract objects, and so there is no ontology of them to give (Frigg 2010a, 264). In conclusion, on Frigg's proposal, scientific models turn out to be ontologically like works of fiction: model descriptions give rise to model systems, which are "Akin to characters and places in literary fiction" (Frigg 2010b, 100). For example, when a model description reports that "An ideal tuning fork vibrates at just one frequency", it is not describing a concrete object (the ideal tuning fork) that does not exist, nor it is committed to the existence of an abstract object as having properties it could not have (a vibration). Instead, according to the pretense view, the model-description of the ideal tuning fork serves as a prop in a game in which we have to imagine that there is a concrete object, which vibrates at just one frequency.

However, attempts at treating scientific models as work of fiction present at least two sorts of worries. Firstly, Frigg treats all discourses about scientific models as implicitly involving games of pretense. Not just the 'internal' discourse about the objects as described in the model (for instance, when we say: "*A point-mass has no dimension*"), but also 'external' ones in which we seem to refer, without pretense, to model systems themselves (critical and historical claims; for instance, when we say: "A model of DNA was proposed by Watson

and Crick's in 1953").[5] But a more difficult task is to explain how model systems can represent target systems in the world if, as fictionalists apparently hold, there are no model systems. Toon makes this point clear:

> If we were to understand model-systems in the same way that Walton understands fictional characters then it seems that we would conclude that there are no model systems. [...] If there are no model-systems then there can be no facts about them and we cannot establish an object-to-object [representation] relation between model-systems and the world. (2012, 58)

Frigg attempted to handle this difficulty by suggesting that we analyze 'transfictional' statements (the statements which compare the model systems with the target system) as comparisons of properties, which are unproblematic (Frigg 2010a, 263). For example, saying that some actual rabbit population behaves like a population in a model, we are taking the fiction to have certain properties which can be compared to the properties of a real rabbit population. But, as Godfrey-Smith promptly replied,

> It is not clear that giving an explanation of modeling in terms of un-instantiated properties is more down-to-earth than giving one in terms of non-existent objects. (2009, 114)

4. *Metalinguistic Negotiation and Conceptual Ethics*

So, what is the moral? The moral here is not that such views cannot be made coherent: as I tried to briefly show, they perhaps can be, in a way or another. Instead, the moral is that difficulties in ways we think and talk about scientific models are easily resolved neither by holding that there nor by holding that there are not description-fitting objects. At least in some metaphysical disputes, we have enough (theoretical) justifications for believing either side, so it is not clear at all that we can ever find grounds for settling them. The same goes for the ontological debate over scientific models. Consider some odd features of metaphysical disputes in general:

— They are typically not resolvable by empirical means.
— Disputants deny they could resolve them even if work in linguistics or lexicography showed definitively how the relevant terms are used in our community.
— Disputants are not simply interpreted as talking past each other.

These odd features are also the hallmarks of what David Plunkett and Tim Sundell (2013) have called 'metalinguistic negotiations' (albeit their target was not meta-ontology, but meta-ethics). Debates understood as metalinguistic negotiations are debates that concern a distinctive normative question: how best to use the relevant terms relative to

[5] In this respect, a possible alternative is the so called 'artifactualist' view: an hybrid position according to which model systems are abstract objects created by scientists, mind-dependent social and cultural objects such as laws and nations, stories and symphonies. The key point of the artifactualist approach is to allow that in external discourse we may refer to model systems and say true things about them (for further discussions about artifactualist views of fiction, see especially: Kripke (2013), Searle (1979), Salmon (1998), Stephen Schiffer (1996), Thomasson (2010).

the context at hand. They are "Debates that involve negotiating the appropriate use of a piece of language" (Plunkett and Sundell 2013, 15) and that reflect disagreements about how (or whether) those very terms ought to or should be used in a given context. Following Stojanovic, perhaps this may also be characterized as a special case of faultless disagreement,[6] a so called 'forward-looking disagreement':

> Now, a further suggestion that I have advanced is that the two parties' claims are not to be viewed so much as truth - apt claims, but rather, as proposals to how to extend the future uses of the concept under debate. (Stojanovic 2011, 13)

We can sum up some hallmarks of metalinguistic negotiations which make them particularly persistent and hard to resolve as follows (Plunkett and Sundell 2013, 3); Plunkett 2015, 847):

1. The disagreements cannot be resolved just by adding empirical information. They do not go away even if the disputants agree on all 'facts', nor any further discoveries might resolve things one way or the other
2. They do not go away even if disputants recognize that they are using the relevant terms in different way.
3. They do not go away even if the disputants agree about how the word is *actually* used.

It is important to notice that the extent of the relevant negotiations involved vary greatly. Metalinguistic negotiations are not confined to gradable adjectives or other context-sensitive expressions, but they can even concern words that are seemingly quite fixed in their meaning. They may simply involve pressing for one way of precisifying a vague term (or a term that is indeterminate in some of its areas of application), or involve advocating more substantial changes in the ways a term is to be used (or whether it is to be used at all).

Consider, for instance, the case originally introduced by Peter Ludlow in his paper *Cheap Contextualism:* a radio debate about the status of racehorse Secretariat as an athlete (Ludlow 2008); Plunkett and Sundell 2013, 16). The debate concerned a list of the greatest athletes of the 20th century, and the question of whether that list should include the racehorse Secretariat. Simplifying, we can imagine one of the contenders to claim: "Secretariat is an athlete" and the other to reply: "Secretariat is not an athlete". Or, borrowing an example from Stojanovic (2011), suppose that Didi and Naomi are debating whether to hire Khaled. Didi says, "Khaled has a strong publication record, with over 20 publications" and Naomi replies, "Oh no, he has less than 20 publications":

> Then their disagreement turns precisely on the question of what one ought to count as a publication. To put it differently, whether an online conference working paper should or shouldn't fall in its extension. Given this indeterminacy, a practical issue will arise for Didi and Naomi (and, more generally, for their academic community) to decide whether or not to extend the concept of 'publication' in such a way as to include among its instances a certain kind of "new" objects, namely, online conference working papers, or not. (Stojanovic 2011, 12)

[6] Take as faultless disagreement, roughly those in which (i) the two parties truly disagree, (ii) they are both right (from their own perspectives), and (iii) they both believe that the other is wrong.

Note that unlike the cases of metalinguistic sharpening involving gradable adjectives, there is little reason to think that the relevant linguistic expressions here ('athlete' and 'publication') are semantically context-sensitive. Moreover, in these two examples, there is little reason to think that the disputes concern straightforward factual matters about the topics at hand. The speakers mutually know all of the facts about Secretariat's speed, strength, etc., and what races, awards, metals he won, etc., and in the same way, Didi and Noemi know all about Khaled's academic history. Instead, these disputes are best seen at the pragmatic level as being metalinguistic negotiations; that is to say, disputes about which of the senses of 'athlete' and 'publication' are best to use.

The exchange between realists and fictionalists about the existence of scientific models may be understood in a similar way. If we take the meaning of a word to be the concept it expresses in a context, such a kind of dispute reflects a disagreement about which among some set of competing concepts should be used in the context at hand. Therefore, on the assumption that the given exchange is a metalinguistic negotiation, the immediate topic of disagreement in that exchange turns out to be one in 'conceptual ethics'. Burgess and Plunkett introduce the idea as follows:

> These normative questions about thought and talk—how should we use our words? which concepts should we use? how should we use them? —are questions in what we will call *conceptual ethics.* (2013a, 1091)

Fictionalism can be helpfully undestood as a position in conceptual ethics insofar as fictionalists advocate the distinctly normative view that we ought to use the relevant concept(s) within the scope of some sort of pretense. We can distinguish two sorts of questions in conceptual ethics:

i. Should we use a given concept?
ii. And if so, how should we use it exactly?

Unlike eliminativists, fictionalists answer the first question affirmatively; but unlike realists, they invoke a kind of make-believe to answer the second. Even if, according to them, there are not any objects which scientific models refer to, there may still be good reasons to continue thinking and talking 'as if' there were. Fictionalism is usually motivated by the desire to strike a compromise between the theoretical value of representing the world correctly and the practical value of exploiting whatever conceptual resources help us get by (Burgess and Plunkett 2013a, 1103).

However, in order to interpret model talk as implicitly in the context of such a pretense, a sort of revisionary work seems to be needed: revisions to the face-value understanding of discourses about model systems. As stated by Toon:

> When scientists appear to talk about theoretical models as objects [...] we *should not* take this talk too seriously. (Toon 2012, 131-2)

Therefore, in order to avoid endorsing what they consider false or defective thoughts, fictionalists construe (or suggest to construe) discourses about models as falling within the scope of an (high-order, intensional) operator like: 'imagine', 'assume', or 'consider', to the effect of remarking that they are not literally true. Indeed, in Walton's words, "[...] fic-

tional propositions are ones for which there is a prescription to the effect that they have to be imagined" (Walton 1990, 39), prescriptions to imagine that there are certain objects with the relevant properties. Adding qualifications to what would otherwise be an assertion (or a series of assertions), which have the effect of cancelling the assertoric force, fictionalists get exactly the revisions that are needed to treat such discourses pretensefully. In this way, they try to give readings that do not threaten "To force mysterious entities on us" (Walton 1990, 416), engaging in "Voodoo metaphysics" (Walton 1990, 385).

5. *Ontological Debates*

While it seems plausible to apply metalinguistic negotiation to at least some classical debates in metaphysics,[7] it might nonetheless be questioned whether also ontological debates can be understood in such a way.[8] A possible answer is to consider philosophical debates about existence as reflecting disagreements not about *how* the term should be used, but rather about *whether* the term should be used at all. In this respect, Burgess and Plunkett suggest that "[...] certain forms of eliminativism can be understood as the position that we ought to stop using a given term or concept" (2013b, 1103). Thus, for instance, some eliminativists about numbers might be seen as suggesting not to think numbers in the realm of things. Similarly, at least in in some cases, fictionalists may be seen as suggesting to revise a concept by changing or removing certain associations or even conceptual/inferential roles. Indeed, fictionalists, taking the position that we ought to use a set of terms within the scope of a pretense, might be seen as suggesting to stop thinking of models in the realm of things, so that some aspect of their conceptual/inferential role has to go.

But, can this account also apply to the dispute between realists and fictionalists about the existence of scientific models? In principle, such a debate cannot be resolved neither through empirical work (by appealing to facts or evidence of any kind), nor using standard analytic/conceptual methods (such as mathematical reasoning and proof).[9] Accordingly, a first attempt can be to conceive it as a 'verbal dispute':[10] fictionalists as taking discourses about models inside the scope of a pretense, so as falling within the scope of an (intentional, high-order) operator (like 'imagine', 'assume', 'consider") and realists, on the contrary, as taking them at face value, so literally true without the need to have such operators on board. However, since scientists use indiscriminately both linguistic forms and scientific practice appears not to support one over the other, it turns out to be quite indeterminate which of the two linguistic resources is the correct one. As a result, differing ways of talking about scientific models should not be taken as expressing genuine conflict.

---

[7] See, for instance, Belleri (2017) for a way of understanding the debate between endurantists and perdurantists as a case of metalinguistic negotiation. Plunkett (2015, 842) also argues that «Some (perhaps many) philosophical disputes are metalinguistic negotiations» (2015, 853), focusing on questions of ground, supervenience, and real definition rather than the existence questions.

[8] As ontological debates, I take into account here the philosophical debates about existence that are typically thought not to be 'settled' even when the disputing parties agree about the empirical facts.

[9] For instance, questions about the existence of prime numbers between twenty and thirty may be resolved appealing to Euclid's Theorem that there are infinitely many prime numbers.

[10] For other definitions of verbal dispute, which I will not discuss here, see Jenkins (2014) and Chalmers (2011).

The alternative is therefore to understand the fictionalist's ontological claim ("The objects described in scientific models do not exist, they are just fictional objects") and the realist's claim ("The objects described in models exist—in some form") as normative claims, i.e. as proposals to adopt one linguistic form or the other, hence as proposals of how we should talk about models (whether within the scope of a pretense operator or not). Specifically, they do so in a metalinguistic way: not describing one use rather than the other, but directly illustrating them. For example, the fictionalist uttering: "Imagine a mathematical pendulum to have a certain length and to move through space over time in a certain way...", and the realist: "The mathematical pendulum of a certain length moves through space over time in a certain way...". These sentences must be taken as illustrative examples which pick out linguistic rules,[11] as paradigms or paradigmatic applications of how to use words.

In this way, even though realists' and fictionalists' claims about the existence of scientific models seem to express ontological commitment to reality being a particular way, they turn out to express practical commitments to the adoption of some linguistic forms or others.[12] Indeed, the use of their ontological statements may imply a distinctive kind of metalinguistic expressive function.[13] Not the function of stating facts or describing something in the world, but rather that of expressing commitments to use the terms at hand in certain ways. The expressive function characteristic of their ontological statements is to make explicit such commitments. Along these lines, what they are doing in making ontological claims (the realist claiming "The mathematical pendulum exists" and the fictionalist claiming "The mathematical pendulum does not exist, but let imagine that exists") is endorsing linguistic rules that allows words to be used in specific ways. So understood, their statements differ fundamentally from straightforward descriptions of reality. They turn out to be prescriptive statements, rather than descriptive ones that commit speakers to a way reality is. In this sense, expressing the acceptance of a certain linguistic rule, each disputant in the debate advocates and defends her adoption and presses the other party to adopt the same linguistic rule.

But, on what grounds can we advocate changes in the way our terms or concepts ought to be used? The point I wish to outline here is precisely that such changes in the ways the relevant terms are to be used (or which concepts we ought to use) are often advanced not in the light of metaphysical discoveries, but rather on practical grounds. That is to say, the grounds for pressing one view or another are, after all, practical. According to the circumstances, by choosing one linguistic form or another may help scientists better describe the model in question and, as a result, better express their scientific theories and reason through their consequences. 'Better' in each case presumably means better in terms of greater clarity, precision, avoidance of difficulties (better on practical grounds). Moreover, appeals may be made to practical advantages in simplifying calculations and predictions in

[11] Roughly, by 'linguistic rules' I mean both semantic and syntactic rules.

[12] Nevertheless, on this view, commitments articulated by their statements are not practical commitments in the traditional sense of being a commitment to act (moving our bodies towards some end) in accord with some prescriptions. Rather they are commitments to speaking (and consequently, thinking and reasoning) in some ways. Therefore the commitment expressed by one who uses a statement of that sort is not conceived, in the first instance, as an ontological commitment to the way reality is, but rather a commitment to think and reason in a particular way.

[13] Thanks to an anonymous referee for drawing me out on this issue.

the model, or just in simplifying the description and presentation of the model itself. For instance, using the relevant terms not within the scope of a pretense aids scientists in describing models in a concise way and to avoid the cumbersomeness of scientific explanation and prediction if we attempt to use the relevant terms within the scope of a pretense. By speaking literally of a mass point (a body with nonzero mass and with zero volume) or a mathematical pendulum, rather than just speaking within the scope of a pretense, researchers might enhance, for example, their ability to describe model and formulate explanations in terms of simplicity.

On the other hand, the use of fictional/pretenseful discourse for terms like 'point mass' or 'mathematical pendulum' (that enables us to say we are merely pretending that there are point mass and mathematical pendulum) may serve to suggest and highlight important disanalogies between those terms and theoretical terms[14] like 'strings' or 'gravitons'. That is to say, in some circumstances, scientists may find it useful, for the sake of clarity or in order to offer a fine-grained description, to differentiate the former notions (which are idealisations that cannot be physically instantiated in reality), from terms that serve to track or posit theoretical entities that run empirical risk of failure. For even if we think of terms introduced by a theory to play an explanatory role as terms that might turn out to fail to refer, the same does not need to go through for terms introduced by scientific models that are 'physically' impossible and that were never supposed to serve any kind of tracking or positing 'physical' entities that might turn out to fail because of some empirical mistake. Pretending, one may take relevant terms in a model description functioning quite differently from terms for concreta (both observable and theoretical ones), since in the former there is no empirical presupposition that might turn out to fail.[15]

But at any rate, such considerations must be handled on a case-by-case basis. Depending on what is important and what is not for a given purpose (but also depending on the shared background knowledge of the participants in the communication), scientists may shift the focus of attention. By communicating information in a certain way they make clear what is important and what is supposed to be correctable. In short, to choose one way of speaking or the other could be taken as a stipulative enterprise in which the parties aim to decide how the relevant terms in a model description ought to be used, given certain practical interests or purposes.

As a consequence, in the event that parties made their normative statements explicit (the fictionalist explicitly claiming "We should adopt the linguistic rule that allows us to use model descriptions inside a pretense operator" and the realist claiming: "We should not, instead we should take them at face value") the disagreement would soon turn into an instance of 'deep disagreement',[16] namely disagreement over norms (in our case, over linguistic rules). However, which rule to adopt is also a normative issue. Since, as already men-

[14] Theoretical terms are terms that refer to the unobservable entities that scientific theories posit to explain or predict empirical results and which have empirical existence presuppositions. Inaccessible to experience, their claim to conviction derives from the acceptability of the theories in which they figure. Examples of theoretical entities are normally thought to be electrons, fields, and genes, but also entities advanced by theories at the frontiers of physics whose concrete existence is still uncertain, such as strings and gravitons.

[15] 'Vulcan' or 'Phlogiston' are classical examples of empirical presuppositions that turned out to fail.

[16] See Lynch (2010).

tioned, neither of the two rules is unambiguously grounded in scientific practice, neither rule can be deemed as the correct one. Considerations given above, after all, already suggest that the underlying issue is not a matter of what we know or do not know, but of what we should or shouldn't do. It is not a matter of trying to justify our linguistic principles, it is a matter of trying to justify our actions—our employment of a linguistic rule over another.

The root issue at the heart of a deep disagreement is the question of which (linguistic) rules we ought to employ. This problem is distinct from the question of whether it is true that they are. Moreover, it is a not a problem that will be resolved by appealing to epistemic reasons. Deep disagreements are rationally irresolvable and the best explanation for why deep disagreements are rationally irresolvable is that there are no objectively true linguistic rules.[17] One relevant sense of 'rational' here is presumably epistemic rationality. Epistemic rationality trades in epistemic reasons. An epistemic reason is a reason for thinking that some rules are true. Therefore, the debate cannot be resolved by appealing to epistemic reasons. An obvious alternative, though, is appealing to practical reasons; that is to say, it will be solved, if at all, by appealing to practical reasons. What they want is a reason for employing one rule over another and that is a practical matter. Lastly, in light of the above, we can consider a metalinguistic negotiation as a combination of a normative disagreement and a deep disagreement about the adoption of a given linguistic form or another.

Minimal Substantivity

Obviously, the fact that an ontological dispute can be recast as a metalinguistic negotiation undermines its ontological substantivity. Where, it is usually argued that in order to be ontological substantive or significant, an ontological debate must fulfill at least the two following requirements:

i. To have realist or anti-realist ontological commitments.
ii. To contend that one language is objectively more ontologically fitting than the other.[18]

Nevertheless, there is room for an account that may illuminate a 'minimal' (or 'deflationist') sense in which the dispute at stake can be deemed as ontologically substantive. But, how exactly can the ontological relevance of such a debate be rescued? Although reason for certain linguistic choices turns out to be practical (such as, for example, better organizing our thought and talk about scientific models), consequences of those choices are in a sense ontologically significant. Indeed, if we take existential statements as being connected to existential quantifications, the selected language will existentially quantify at the object-level over certain entities, which in turn implies certain ontological commitments (positive in the case of realists, negative in the case of anti-realists or fictionalists). In other words, the decisions we take have, at least in principle, an ontological impact to the extent that the consequences of those choices may consist in ontological commitments to certain

[17] Or better, it perhaps possible to consider objectively true the linguistic rules in force in practice but, as already stated, neither of the two rules seems unambiguously grounded in scientific practice.

[18] For the requirements for an ontological dispute to be substantive see, for example, Sider (2009, 385) and Manley (2009, 4).

objects.[19] However, given the way in which they were reached, commitments of this kind are probably better understood as shallow or 'lightweight' (and the related debate as 'minimal substantive'). Following Chalmers (2009), we can define the corresponding realism as a 'lightweight realism'. Hence, we may oppose a lightweight sense of the quantifier at work in the deflationist's arguments to a more 'heavyweight'[20] sense of it suited for 'proper' (or 'substantive') ontological debates. In a possible connection with Neo-Fregean approaches to ontology, a 'lightweight' notion of existence implies that the existence of the entities in question 'requires nothing from the world'.[21]

Since, according to the deflationist standpoint, one may come to (legitimately) infer the existence of the entities in question regardless of any empirical evidence or metaphysical discovery, those entities could be thought as, in some sense, independent from the empirical world, with a deflated ontological status.[22] Nonetheless, as Thomasson (2015) suggests, a different conclusion is still possible. In *Ontology Made Easy*, she argues that language choices do not create any further objects, but they just provide the linguistic means to say that these exist. What we get out of (positive) language choices is a straightforward simple realism about the entities in question and not a view on which they are 'lightweight' or 'deflated' in their ontological status.[23] We should deny that the entities we are committed to in such a way are ontologically deflated or have some 'second-class' status; that is to say, we should not attribute a difference in ontological standing to them. As she clearly states:

> I will (for brevity) sometimes refer to my view simply as the 'deflationary' position. But of course this term can be and has been used in a variety of ways, and on my view we should *not* say that the *entities* in question are 'deflated'—that is part of the point of the first-order 'simple realism' (Tohomasson 2015, 128-9).

---

[19] Of course, there can likely be some resistance to treating the existence question at hand as a question to be answered in such a deflationary way. For this might seem to some to give us entities too cheaply. Indeed, some might ask: Why should we think that such a method can reveal ontological commitments? This feeling stems, I think, from an impulse to pursue a certain kind of 'deep' ontology, or, as Frank Jackson (1998, 1–5) has called it, 'serious metaphysics'. According to which, the primary role of the ontologist addressing existence questions is not to undertake a certain kind of conceptual analysis, but rather to engage in deep discoveries about what *really* exists, or what things there *really* are. Nonetheless, that relieves us of the epistemological embarrassments that come with a 'serious metaphysical' approach that takes facts about what exists and what modal features objects possess to be discoverable by some special means that is not simply exhausted by of conceptual analysis or straightforward empirical enquiry.

[20] Many different substantive criteria have been proposed and utilized as conditions for what it takes for entities to exist. For instance, the 'Eleatic' criterion: «Everything that exists makes a difference to the causal powers of something» (Armstrong 1997, 41; see also his 1978, vol. 2, 5), promoted by David Armstrong and later endorsed by Kim (1993, 348–49) and Trenton Merricks (2001, chapter 3). Another common proposal worth mentioning is that for things to exist they must be (in some sense) mind-independent, as George Lakoff puts it: «Existence cannot depend in any way on human cognition» (1987, 164); or Jody Azzouni's criterion of ontological independence from «Any psychological or linguistic process whatever» (2004, 113). Still other criteria for existence are sometimes considered, for example, trackability, observability, or other forms of epistemic robustness (Elder 1989, 440).

[21] See especially: Hale and Wright (2001); Schiffer (2003); Rayo (2013).

[22] For instance, Schiffer (2003) defends this idea.

[23] See Thomasson (2015, Chapter 3).

And again:

> I think, however, that we should not suggest that the entities to which we become committed are in general 'thin and inconsequential', 'ontologically shallow', or that their existence is somehow to be understood in a deflationary manner. Instead, we should simply say that such entities exist—full stop—and adopt a simple realist view of them. (Tohomasson 2015, 146)

Thereby, the only difference with more 'heavy-duty' forms of realism lies in the motivations for accepting the entities in question. In fact, she does not argue for them by suggesting that the relevant entities are 'posits' that explain phenomena. Contrary to Platonists, for instance, she does not appeal to explanatory power or the like to justify her acceptance of them.[24] On this view, ontology does not involve any kind of explanation (such as metaphysical discoveries). In other words, we do not need to embrace any kind of truth-maker theory according to which we posit certain entities in order to explain what it is that makes our sentences true: we need in no case to 'posit' an *x* which serves as truth-maker for '*x* exists'.[25] Such a deflationary approach to existence, in contrast with a 'heavyweight' sense of truth-making, matches the deflationary approach to truth, according to which truth should not be thought as a special kind of property possessed by a sentence (Horwich 2010, 299-322).

In short, the view outlined here does not deflate the notion of existence (or at least not necessarily) but rather it aims to deflate debates about existence questions. An ontological debate is deflated insofar it does not aim to select the language that "carves the world at its joints"[26] and the entities that do or do not meet some proposed substantive criterion of existence. Accordingly, this kind of deflationism has to be understood as a meta-ontological position, rather than an ontological one.[27]

The primary advantages of this sort of deflationary approach are epistemological: for we can account of the persistence and difficulty of the ontological debate about the existence of scientific models without implying substantive forms of meta-ontology. That is to say, without appealing to fugitive ontological facts that are detectable neither by direct empirical methods nor by conceptual analysis (requiring nothing 'epistemically metaphysical' (Sider 2011, 187)). Instead, the disputants in such a debate can be seen as engaged in a metalinguistic negotiation (advocating for ways we should employ the relevant terms and concepts), rather than in reporting metaphysical discoveries or reporting discoveries about the world.[28] In this way, its persistence and depth can be understood in terms of

[24] Even if «Introducing the new nominative vocabulary that enables us to refer to new kinds of objects might, however, pragmatically enhance our ability to formulate explanations, and might in that sense aid in explanation» (2015, 157).

[25] See also Agustín Rayo's arguments against what he calls the 'metaphysicalist' position that for an atomic sentence to be true there must be a certain kind of correspondence between the logical form of a sentence and the metaphysical structure of reality (Rayo 2013, 6-11).

[26] See Sider (2011, *passim*).

[27] Thanks to an anonymous referee for asking me to clarify this distinction.

[28] Contrary to what is maintained, among others, by heavyweight metaphysicians in the neo-Quinean tradition, who think of themselves as doing work of a piece with science, weighing up the merits of competing theories about the world just as a scientist does.

the difficulties of working out and reconciling differences in our normative views about linguistic or conceptual tools. Since nothing but normative/conceptual work is needed, thinking of the work of ontologists in this light brings the advantages of dispelling ontological mysteries and clarifying the epistemology of metaphysics. In any case, this normative/conceptual work may be conducted in the object language —not by discussing how to talk about scientific models, but by discussing what scientific models are. Indeed, the point is exactly that debates about whether or not there *really* are the entities in question are perspicuously framed as debates about what linguistic form will best serve our purposes, and debates about what purposes we should adopt or how we should prioritize among them.

6. Carnap's Legacy

The idea put forward here does not really differ from Carnap's approach, according to which an ontological question is a matter of "Practical decision concerning the structure of language, not a theoretical question as their formulation seems to suggest" (Carnap 1950, 23), where acceptance of a certain linguistic form is judged according to its expediency and fruitfulness given certain intended aims. Or better, as is well-known, the later Carnap held that there are two different ways of asking and answering questions concerning the existence or reality of entities: internal and external questions.

'Internal questions' are questions that arise *within* a framework and whose nature depends on the framework at hand (where a linguistic framework is, roughly, a system of linguistic expressions and the set of rules governing those expressions).[29] They can be answered straightforwardly, using conceptual and/or empirical methods.[30] According to Carnap, legitimate uses of the terms are necessarily internal to a framework, for it is conformity to the rules of the framework in question that constitutes use. Ontological disputes, taken internally to a framework, can also be regarded as instances of what Plunkett and Sundell call 'canonical disputes': "Any dispute that centers on the truth or correctness of the content literally expressed by the speakers" (Plunkett and Sundell 2013, 6).

On the contrary, 'external questions' are categorial questions asked before (or *outside*) the adoption of a given language; that is to say, 'external' to any linguistic frameworks, "Concerning the existence or reality of the system of entities as a whole" (Carnap 1956, 206). If they are taken as factual or theoretical questions, Carnap suggests, they have to be understood as pseudo-questions; but they can also be construed as "Practical questions about whether we should make use of the linguistic forms in question" (213)

[29] Note that, insofar a framework is understood as a system of noun terms and predicates (and the set of rules governing their use) it is also quite consistent with Carnap's account to endorse the idea that different frameworks do not differ in using quantifier with a different meaning and that the meaning of the quantifier does not vary across different frameworks (see, for instance, Thomasson 2015, Chapter 1.5).

[30] For instance, questions about the existence of prime numbers between twenty and thirty may be resolved by mathematical reasoning. From these we may also make easy inferences to answer more general questions. For if there are primes between twenty and thirty, then there are numbers (Thomasson 2015, 11)

On Carnap's original view, even though they are expressed in object-language terms, what ontologists are doing can be more charitably understood as asking external questions. And they are only legitimately understood as practical in character, i.e. as questions of the form: should we adopt this framework? Would it be useful? Carnap plainly sums up the point as follow:

> Those who raise the question of the reality of the thing world itself have perhaps in mind not a theoretical question as their formulation seems to suggest, but rather a practical question, a matter of a practical decision concerning the structure of our language. We have to make the choice whether or not to accept and use the forms of expression in the framework in question. (207)

These questions should perhaps to be answered within the enterprise of what he called 'conceptual engineering' or 'linguistic engineering' (as opposed to the pure descriptive work in syntax or semantics, generally engaged by linguists). In Carnap's mature conception, different language structures can be chosen as a means to formulate theoretical assertions in a way analogous to how an engineer chooses an instrument:

> I admit that the choice of a language suitable for the purposes of physics and mathematics involves problems quite different from those involved in the choice of a suitable motor fora freight airplane; but, in a sense, both are engineering problems, and I fail to see why metaphysics should enter into the first any more than into the second. (43)

Conceptual or linguistic frameworks are tools, so we do neither have to prove their correctness, nor we do have to agree on which ones to use. But, we can test their suitability for various practical purposes. The acceptance of a linguistic framework may in fact "Be judged as being more or less expedient, fruitful, conducive to the aim for which the language is intended to be used" without the need of "Any theoretical justification, because it does not imply any assertion of reality" (214).

Likewise, in the dispute between realists and fictionalists about the existence of scientific models, each party may use an ontological assertion of that sort to positively or negatively evaluate the adoption of a linguistic form which, in turn, may have certain characteristics, consequences, practical advantages or disadvantages. Their claims have thereby to be understood in terms of practical considerations about which linguistic resource we should choose: for example, the one which is more useful or convenient to adopt by appealing to practical virtues or non-epistemic values (such as, among others, greater efficiency, fruitfulness, simplicity, etc.). In short, the purposes for which a linguistic form is intended to be used will determine which factors are relevant for the decision: the efficiency, fruitfulness and simplicity of the use of the thing language may be among the decisive factors. Of course, the implicit practical purposes which realists appeal to in order to take discourse about scientific models at face value and the implicit practical purposes which fictionalists appeal to in order to talk about scientific models within the scope of a pretense operator can be various and different (among, for instance, efficiency, fruitfulness, simplicity, etc.) and such criteria are to be assessed on the basis of a case-by-case analysis.

7. Conclusion

In this paper I explored the possibility to understand the ontological dispute between realists and anti-realists (in particular, fictionalists) about scientific models in terms of metalinguistic negotiation. I argued that their respective ontological claims have a different function than that of referring; in other words, their work does not consist in representing a certain range of entities in the world or describing pieces of reality, but rather to perform a function that is fundamentally non-descriptive. Indeed, although the disputants seem to be engaged in a factual disagreement, they are best seen as pragmatically advocating ways in which we should think and talk about scientific models. As such, their ontological claims turn out be covertly normative (they carry a normative component) and the dispute, at bottom, normatively motivated. Accordingly, an essential feature of such an ontological dispute is that it is practical; that is to say, it has as a purpose to influence and regulate their behavior. In particular, it may serve them to coordinate with each other in the linguistic practice about scientific models. In this way, it is possible to account for its persistency, which grounds in the difficulty of addressing deep normative questions, without implying that it is pointless and without undermine its depth and importance.

Moreover, I argued that, depending on the circumstances, parties in the debate aim to decide which linguistic form to adopt given certain practical purposes. However, the dispute can be viewed as 'minimally substantive', in the sense that, even though linguistic choices turn out to be largely a practical matter, they can in principle affect our ontological commitments.

REFERENCES

Armstrong, David M. 1978. *Universals and scientific realism*. Cambridge: Cambridge University Press.

Armstrong, David M. 1997. *A world of states of affairs.* Cambridge: Cambridge University Press.

Azzouni, Jody. 2004. *Deflating existential consequence*. New York: Oxford University Press.

Belleri, Daria. 2017. Verbalism and metalinguistic negotiation in ontological disputes. *Philosophical Studies* 174/9: 2211-2226

Burge, Tyler. 1974. Truth and Singular Terms. *Noûs* 8: 309-25.

Burgess, Alexis and David Plunkett. 2013a. Conceptual Ethics I. *Philosophy Compass* 8/12: 1091-1101.

Burgess, Alexis and David Plunkett. 2013b. Conceptual ethics II. *Philosophy Compass* 8(12): 1102-1110.

Carnap, Rudolf. 1950. Empiricism, semantics, and ontology. *Revue Internationale dePhilosophie* 4: 20-40. Reprinted in the Supplement to *Meaning and necessity: A study in semantics and modal logic*. Enlarged Eds. (1956), 205-221. Chicago: Chicago University Press.

Cartwright, Nancy. 1983. *How the laws of physics lie.* Oxford: Oxford University Press.

Castañeda, Héctor-Neri. 1989. *Thinking, language, and experience*. Minneapolis: University of Minnesota Press.

Chalmers, David J. 2009. Ontological anti-realism. In David J. Chalmers, David Manley and Ryan Wasserman , eds., *Metametaphysics: New essays on the foundations of ontology,* 77-129. New York: Oxford University Press.

Chalmers, David J. 2011. Verbal disputes. *Philosophical Review* 120(4): 515-66.

Frigg, Roman. 2010a. Models and fiction. *Synthese* 172: 251-68.

Frigg, Roman. 2010b. Fiction and scientific representation. In Roman Frigg and M.C. Hunter, eds., *Beyond mimesis and convention*, 97-138. Springer.

Frigg, Roman. 2010c. Fiction in Science. In John Woods, eds., *Fiction and models: New essays,* 247-87. Munich: Philosophia.
Giere, Ronald. 1988. *Explaining science: A cognitive approach.* Chicago: The University of Chicago Press.
Godfrey-Smith, Peter. 2009. Models and fictions in Science. *Philosophical Studies* 143: 101-116.
Hale, Bod and Crispin Wright. 2001. *Reason's proper study: Essays towards a neo-Fregean philosophy of mathematics*. Oxford: Oxford University Press.
Hirsch, Eli. 2011. *Quantifier variance and realism.* New York: Oxford University Press.
Horwich, Paul. 2010. *Truth-meaning-reality.* Oxford: Clarendon Press.
Jackson, Frank. 1998. *From metaphysics to ethics: A defence of conceptual analysis*. Oxford: Clarendon Press.
Jenkins, Carrie. 2014. Merely verbal disputes. *Erkenntnis* 79(1): 11-30.
Kripke, Saul. 2013. *Reference and existence:* The John Locke Lectures. New York: Oxford University Press.
Lakoff, George. 1987. *Women, fire and dangerous things*. Chicago: University of Chicago Press.
Lynch, Michael P. 2010. Epistemic circularity and epistemic incommensurability. In Adrian Haddock, Alan Millar, and Duncan Pritchard, eds. *Social epistemology,* 262-277. Oxford: Oxford University Press.
Ludlow, Peter. 2008. Cheap contextualism. *Philosophical Issues* 18:104-129.
Manley, David. 2009. Introduction: A guided tour of metametaphysics. In David Chalmers, Ryan Wasserman, and David Manley, eds., *Metametaphysics: New essays on the foundations of ontology*, 1-37. Oxford: Oxford University Press.
Merricks, Trenton. 2001. *Objects and persons*. Oxford: Clarendon.
Parsons, Terence. 1980. *Non-existent objects*. New Haven: Yale University Press.
Plunkett, David and Tim Sundell. 2013. Disagreement and the semantics of normative and evaluative terms. *Philosopher's Imprint* 13/23: 1-37.
Plunkett, David. 2015. Which concepts should we use?: Metalinguistic negotiations and the methodology of philosophy. *Inquiry: An Interdisciplinary Journal of Philosophy* 58/7-8:828-874
Rapaport, William J. 1978. Meinongian theories and a russellian paradox. *Noûs* 12: 153-180.
Rayo, Augustin. 2013. *The construction of logical space*. Oxford: Oxford University Press.
Russell, Bertrand. 1905. On denoting. *Mind* 14/56: 479-93.
Ryle, Gilbert. 1966. Systematically misleading expressions. In Morris Weitz, eds. *Twentieth-century philosophy: The analytic tradition,* 181-204. New York: The Free Press.
Sainsbury, Mark. 2005. *Reference without referents.* Oxford: Oxford University Press.
Salmon, Nathan. 1998. Nonexistence. *Noûs* 32/3: 277-319.
Schiffer, Stephen. 1996. Language-created language-independent entities. *Philosophical Topics* 24/1: 149-167.
Schiffer, Stephen. 2003. *The things we mean*. Oxford University Press.
Searle, John. 1979. *Expression and meaning: Studies in the theory of speech acts*. Cambridge: Cambridge University Press.
Sider, Theodore. 2009. Ontological realism. In David Chalmers, Ryan Wasserman, and David Manley, eds., *Metametaphysics: New essays on the foundations of ontology*, 384-423. Oxford: Oxford University Press.
Sider, Theodore. 2011. *Writing the book of the world*. Oxford: Oxford University Press.
Stojanovic, Isidora. 2011. When (true) disagreement gives out. *Croatian Journal of Philosophy* 32: 181-193.
Thomasson, Amie L. 2010. Fiction, existence and indeterminacy. In John Woods, eds., *Fictions and models: New essays*, 109-148. Philosophia Verlag.
Thomasson, Amie L. 2015. *Ontology made easy.* New York: Oxford University.
Thomasson, Amie L. 2016. Metaphysical disputes and metalinguistic negotiation. *Analytic Philosophy* 57(3): 1-28.
Thomson-Jones, Martin. 2010. Missing systems and the face value practice. *Synthese* 172: 283-99.
Toon, Adam. 2010. The ontology of theoretical modeling: Models as make-believe. *Synthese* 172: 301-15.
Toon, Adam. 2012. *Models as make-believe: Imagination, fiction and scientific representation*. Palgrave Macmillan.

Van Fraassen, Bas. 1980 *The scientific image.* New York: Clarendon Press.
Van Fraassen, Bas. 2000 The theory of tragedy and of science: does nature have narrative structure? In Demetra Sfendoni Mentzou, eds., *Aristotle and contemporary science*, 31-59. New York: Peter Lang.
Van Inwagen, Peter. 2004. A theory of properties. *Oxford Studies in Metaphysics* 1: 107-138
Walton, Kendall. 1990. *Mimesis as make-believe.* Cambridge. Massachusetts: Harvard University Press.
Wolterstorff, Nicholas. 1980. *Works and worlds of art.* Oxford: Clarendon Press.
Zalta, Edward. 1983. *Abstract objects*. Dordrecht: Reidel.

Mirco Sambrotta is a Ph. D. student in the Department of Philosophy I at the University of Granada and actually Visiting Scholar at The Institute of Philosophy of the Slovak Academy of Sciences in Bratislava. His research is focused on ontology and meta-ontology, analytic metaphysics and philosophy of language.

Address: Department of Philosophy I, University of Granada, Edificio de la Facultad de Psicología, Campus de la Cartuja, 18011 Granada, Spain. E-mail: mirco.sambrotta@gmail.com