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NATURAL LANGUAGE ONTOLOGY

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Natural language ontology is the study of the ontology (ontological categories, structures, and notions) reflected in natural language. It is a subdiscipline of both philosophy and linguistics. More specifically, natural language ontology is part of both natural language semantics and metaphysics.

Natural language ontology is a new discipline that has emerged with the development of natural language semantics over the last decades. It has been suggested as a discipline first by semanticists (Bach 1986).[1] Research in natural language semantics falls under natural language ontology when it deals with semantic issues that involve metaphysical notions, such as event and trope reference, plurals, the mass-count distinction, tense, aspect, and modality. Research in philosophy (or the philosophy-linguistics interface) falls under natural language ontology when it deals with metaphysics as reflected in linguistically manifest intuitions.

Natural language ontology, however, is not just an emerging discipline. It has also been a practice throughout the history of philosophy. Philosophers throughout history, at times more often than others, have appealed to natural language to motivate an ontological view or notion, and when they did so, it is fair to say, they practiced natural language ontology. Such an appeal to natural language can be found already in Aristotle and very explicitly in medieval metaphysics (Ockham, Aquinus, Buridan), in the phenomenological tradition (Brentano, Husserl, Meinong, Bolzano, Twardowski), as well as in early analytic philosophy (Frege, Strawson, Austin, Vendler, Ryle).

The appeal to natural language in the history of philosophy had often been based on the assumption that natural language just reflects reality. More recently, though, the view has established itself among philosophers that natural language does not in fact reflect the ontology of what there really is, but rather comes with its own ontology, an ontology that may be quite different from the ontology of the real.

Natural language ontology as a subdiscipline of both linguistics and philosophy raises the following general questions that this chapter will address:

1   How does the semantics of natural language involve ontology and thus in what sense is natural language ontology part of linguistics?
2   How does natural language ontology situate itself within metaphysics and thus is a branch of metaphysics?

3 What sorts of linguistic data reflect the ontology implicit in language, and how is that onto-
logy itself to be understood?

4 What is distinctive about the ontology of natural language and what sorts of conditions does
this impose on an ontological theory?

1 The role of ontology in the semantics of natural language

1.1 Ways of the reflection of ontology in natural language

How does natural language reflect ontology? The semantics of natural languages involves enti-
ties of various ontological categories, ontological structures, and ontological notions on the basis
of syntactic roles of expressions, syntactic categories and features, and lexical words.

First of all, entities may play various roles in the semantic structure of natural language sen-
tences, though, of course, in what way exactly may depend somewhat on particular semantic
theories about relevant constructions or expressions. Most importantly, entities play a role as the
semantic values of referential noun phrases (NPs) as well as the things that quantificational NPs
range over. Moreover, entities play a role as arguments of predicates. Natural language contains
a wealth of expressions referring to or quantifying over entities, and it comes with a wealth of
expressions that express properties of entities (or relations among them). Thus, in *John owns the
building*, the referential NPs *John* and *the building* stand for entities, and *own* is a predicate express-
ing a relation among entities that is attributed to them in that sentence.

The notion of a referential NP is equally important in linguistics and in philosophy. Refer-
ential NPs generally are considered occurrences of NPs in sentences that have the function of
standing for objects. Proper names and definite NPs can serve as referential NPs, as can specific
indefinites and certain determinerless (bare) plurals and mass nouns. There are various syntactic
and semantic criteria for referential NPs. For philosophers, since Frege, they include (very
roughly) the ability of an NP to support anaphora, to be replaceable by quantificational NPs,
and to serve as arguments of ordinary (i.e., extensional) predicates (Frege 1892; Hale 1987). For
syntacticians, referential NPs also must satisfy certain syntactic conditions (having the more
complex structure of a DP, that is, a determiner phrase, rather than just an NP, the category of
predicative NPs) (Abney 1987; Borer 2005).

The notion of a referential NP (or 'name' as it was called at the time) already played a central
role in Frege's (1892) philosophy of language and provided *a syntactic criterion for objecthood*: for
Frege, an object is what can be the semantic value of a referential NP (using the contemporary
term). Standing for an object is the contribution of a referential NP in the context of a sentence
(Frege's Context Principle) (Wright 1983; Hale 1987).

Entities may play also the role of implicit arguments (that is, as arguments of predicates
without at the same time being the semantic values of a referential NP). Thus, on Davidson's
(1967) influential analysis, the sentence *John walked slowly* states that there is an event which is
an argument of *walk* (together with John) and of which *slowly* is true (*slowly* now being treated
as a predicate of events). The very same arguments that lead Davidson to posit events as implicit
arguments apply to adjectives and motivate tropes (particularized properties) as arguments of
adjectives.[2] Thus, *John is profoundly happy* will then state that there is manifestation of happiness
(a trope) that, together with John, is an argument of *happy* and of which *profoundly* is true (Mol-
tmann 2009, 2013a).

Another important semantic role of entities in the semantic structure of natural language
sentences is that of a parameter of evaluation. The standard semantic view takes a sentence to be
true or false not absolutely, but relative to a time and a (possible) world. Possible worlds are

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generally treated as parameters of evaluation for the semantics of modals and conditionals, and times often for the semantics of tenses and temporal adverbials. In the more recent development of truthmaker semantics (Fine 2017b), situations play somewhat similar roles for the semantics of conditionals and modals, but now as exact truthmakers of sentences.[3]

Natural language reflects also ontological categories, namely with some of its syntactic categories or features. Thus, verbs are generally taken to reflect the category of events (Szabo 2015). Adjectives generally reflect the category of qualities or tropes (that is, particularized properties or concrete property manifestations) (Williams 1953; Woltersdorff 1970; Moltmann 2009). The category singular count noun conveys unity or singularity, the category plural noun plurality. Natural language moreover reflects metaphysical notions of various sorts, such as part–whole relations (Moltmann 1997), constitution (Fine 2003), causation (Swanson 2012; Ramchand 2018), (time- and space-relative) existence (Fine 2006; Moltmann 2013b), and existence of the past (the presentism debate) (Szabo 2007). Besides syntactic categories or features, natural language displays particular types of expressions conveying ontological notions, such as modality (*may, must*), existence or ways of being (*exist, occur, obtain*), ontological dependence (*have*), part–whole relations (*part of, whole, partially, completely*), causation (*make*), and truth (*true, correct*).

1.2 The connection between ontology and compositionality

The ontology that natural language reflects is intimately linked to compositionality, the chief tenet of natural language semantics. Whether and how entities play a role in the semantic structure of natural language depends very much on the way the contribution of occurrences of expressions to the composition of the meaning of the sentence is conceived. Generally, the contribution of referential NPs is taken to be that of standing for an object and the role of expressions acting as predicates that of taking objects as arguments and yielding truth values. Without positing entities as semantic values of referential NPs and without positing properties of entities or relations among them as semantic values of predicates, compositionality is hardly possible, or so it seems.[4] The same predicates should (generally) express the same property with different referential NPs, and the same referential NP should (generally) stand for the same entity with different predicates.

1.3 Derivative and language-driven entities as semantic values of referential NPs

The ontology reflected in referential NPs has been subject to the most controversy, raising questions whether natural language could possibly be viewed as a guide to ontology and whether referential NPs even refer to entities. The general observation is that referential NPs display a great range of highly derivative entities, many of which philosophers may not be willing to accept. Yet, NPs that appear to stand for such entities satisfy the very same criteria of referentiality as NPs standing for less controversial entities or 'ordinary referential NPs,' as one may call them. In particular, they go along with the same sorts of predicates as ordinary referential NPs, support anaphoric pronouns, and can be replaced by quantificational and pronominal NPs.

First of all, referential NPs allow reference to *derivative entities* that are ontologically dependent on others such as artifacts of various sorts, collections that come with a structure or function (classes, groups, teams, orchestras), kinds (with definite NPs of the sort *the Siberian tiger*), as well as 'disturbances' such as shadows, holes, folds, and tropes (particularized properties). Natural language displays a particularly rich ontology of tropes or trope-related entities, which include complex manifestations of various sorts of non-natural properties (John's happiness, Socrates' wisdom) as well as tropes such as strengths and weakness as distinct order-constituted tropes and

quasi-relational tropes such as John's tallness, as distinct from the ordinary quantitative trope John's height (Moltmann 2009, 2013a).

Derivative entities of this sort also appear to be part of the naïve ontology of ordinary speakers (non-philosophers) (see Section 3.1). This may not be so, however, for another part of the ontology that natural language displays, namely what one may call a *language-driven ontology*, which consists of entities that go along with the constructional semantics of particular natural-language constructions. Referential NPs for entities in that ontology may include, for example:

1 definite plurals, which stand for (unrestricted) pluralities of entities:
   the students, Quine, and the Eiffel Tower
2 definite mass NPs, which stand for (unrestricted) quantities:
   the water and the wine, the water in this area
3 bare (determinerless) plurals and mass nouns that stand for unrestricted kinds:
   empty seats, *clean water*
4 definite NPs that stand for variable objects:
   the water in the container, the book John needs to write
5 definite intentional NP, which may stand for merely conceived (nonexistent) entities:
   the building mentioned in the guide, the trip John is planning

The dominant view about the definite plural *the students* is that it stands for the sum of the contextually restricted extension of the noun *students* (Link 1983; Moltmann 1997; Champollion/ Krifka 2016). Similarly, on that view, *Quine and the Eiffel Tower* stands for the sum of the two individuals. Definite plurals exhibit criteria of referentiality in that they share predicates with singular NPs and come with plural-specific collective predicates, support anaphora, and can be replaced with ordinary quantificational NPs.[5] The definite mass NP *the water in this area* likewise satisfies criteria of referentiality and thus, on the standard view, stands for the sum of the extension of *water in this area*. Sum formation as involved in the semantics of plural and mass NPs is unrestricted since, given the standard view, any definite plural or mass NP and any conjunction of definite NPs will stand for a sum.

It is a widely accepted view in semantics that bare plural and mass NPs stand for kinds (for example in *empty seats are rare* or *clean water is important*) (Carlson 1977). Again formation of kinds in this sense is rather unrestricted since any bare nominal, whatever its conceptual content, can act as kind-referring term in that sense.

The definite NP of the sort *the water in the container* (as in *the water in the container has increased*), it has been argued, stands for variable quantities that have different manifestations as particular quantities at different times (Fine 1999). Similarly, *the book John needs to write* will stand for a variable object that has different manifestations as particular books John has written in possibly only counterfactual situations Moltmann (2013a, forthcoming a). Finally, the construction *the building mentioned in the guide* may have a semantic value that is a merely intentional (nonexistent) entity (*the building in the guide does not exist*) (Moltmann 2015).

The NPs in (1)–(5) all act as referential NPs. But they stand for entities in a language-driven sort of constructional ontology, an ontology ordinary speakers are not likely to accept when thinking about what there is. Such cases make particularly clear that natural language involves its own ontology, an ontology that is in part language-driven and clearly distinct from the ontology of what there ultimately is.

2 How can natural language ontology be situated within metaphysics?

The observation that natural language ontology involves a rich ontology of highly derivative entities has led many philosophers to reject natural language as a guide to ontology. The subject matter of metaphysics, on that view, is fundamental reality, not the ontology reflected in language. Given such a view, natural language ontology no longer has a place within metaphysics.

This is not the only way, however, of conceiving of metaphysics. There are alternative conceptions of metaphysics which are not just focused on fundamental reality and within which natural language ontology can find its place.

First of all, there are older traditions of metaphysics that are not focused on the ontology of the real. One of them is the Kantian tradition, which deals with ontological categories, for example, but as preconditions for accessing the world, rather than as categories of how things really are. Another is the phenomenological tradition (Brentano, Husserl), where ontology was pursued based on how things appear, rather than assumptions about a subject-independent reality (the way things appear being taken to be constitutive of the things themselves).

In the mid-twentieth century Strawson (1959) introduced the distinction between descriptive and revisionary metaphysics, a distinction best understood as one based on whether ontology is reflected in particular 'data' or not. Descriptive metaphysics thus concerns itself with the ontology that is reflected in our shared intuitions or ordinary judgments, or in fact natural language. By contrast, revisionary metaphysics pursues a 'better' ontology, not reflected in such data (but more suited, say, for the development of the natural sciences). Given that distinction, natural language ontology clearly is a branch of descriptive metaphysics.

A somewhat related, yet different distinction has recently been made by Fine (2017a), who distinguishes between naïve metaphysics and foundational metaphysics. Fine's notion of naïve metaphysics is basically the same as that of descriptive metaphysics, it is metaphysics whose subject matter is the ontology reflected in our ordinary judgments as well as, more specifically, natural language. However, naïve metaphysics is now contrasted with foundational metaphysics. The subject matter of naïve metaphysics is what Fine calls *the metaphysics of appearances*, which is reflected in our ordinary judgments; the subject matter of foundational metaphysics is the ontology of what there really is. The important point for Fine is that naïve metaphysics cannot be skipped in favor of foundational metaphysics. Rather foundational metaphysics must take naïve metaphysics as its starting point: foundational metaphysics must start out with the notions that naïve metaphysics deals with, in order to possibly explain them in more fundamental terms. Naïve metaphysics itself, Fine argues, should be pursued without foundational considerations.

Natural language ontology then has a place within metaphysics, as part of naïve metaphysics, or as I will call it, staying with the better established and less misleading Strawsonian term, 'descriptive metaphysics.'[6]

Fine's notion of 'metaphysics of appearances' is somewhat misleading in that entities in the ontology of natural language cannot be viewed as mere appearances, but rather a distinction between actual and merely conceived entities is needed: generally only the former contribute to the truth of sentences. Ordinary predicates of natural language (such as sortals) are existence-entailing and presuppose that the object they take as an argument be existent. Only certain non-ordinary predicates can be true or false also of entities that fail to exist. (They include intentional verbs such as *think about, refer to, mention*, as well as *exist*.)

3 Recognizing natural language ontology as a discipline of its own

Natural language ontology has faced serious challenges being recognized as a discipline of its own. There are three reasons for that.

The first is the foundationalist orientation of contemporary metaphysics. While metaphysics has enjoyed a significant revival in the twentieth century, it has to a great extent been focused on foundational metaphysics, pursuing questions of ultimate reality in line with physics and some of the other natural sciences. The pursuit of descriptive metaphysics, as metaphysics focused on the ontology reflected in our ordinary judgments or linguistic intuitions, has not been given the same importance.

The second reason is the formal orientation of Montague Grammar ('English as a formal language'), which had dominated linguistic semantics for the last decades (Thomason 1974). In Montagovian tradition, the purpose of formal semanticists has been considered that of developing logical analyses of parts of natural language that can explain intuitively valid inferences. With that as its main aim, there was little concern in natural language semantics as to the ontological-cognitive status of the formal notions used in model-theoretic semantics (say, the entities and notions posited in the models).

The third reason for the difficulty for natural language ontology being recognized as a discipline is Chomsky's rejection of referentialist semantics. Chomsky (1986, 1998, 2013) took an entirely skeptical stance as to whether language involves reference to entities, and thus did not encourage setting out a research agenda for natural language ontology within generative linguistics. Chomsky's skepticism was based on the view that ontology concerns only mind-independent reality (with the reference being able to relate only to objects in such a reality).

Chomsky's rejection of the involvement of ontology in natural language also had to do with his exclusive focus on referential NPs. For Chomsky, natural language terms, including artifact terms, terms for cities, terms like *the typical student*, cannot stand for objects in a mind-independent reality (or even objects on any standard understanding of the term, including conceived objects, Chomsky p.c.). Chomsky's examples generally involve property attributions associated with a referential NP that violate standard conditions on objecthood (e.g., one can paint a door, but also walk through it).

Chomsky's conclusion that natural language does not involve ontology is in need of review, given the distinction between foundational and descriptive metaphysics ('the metaphysics of appearances') and given the fact that ontology is reflected in many other parts of language than just referential NPs. Moreover, there are promising recent ontological and lexical approaches that permit a reanalysis of Chomsky-style examples), which Chomsky did not take into consideration (variable objects, multi-faceted objects, the generative lexicon, approaches in applied ontology).

Natural language ontology has a well-defined subject matter, a cognitive ontology reflected in natural language, and as such is part of linguistics. This alone makes an important discipline to pursue. However, there are also specific reasons for a philosopher to pursue it.

First, as Fine (2017a) argues, descriptive metaphysics is presupposed by foundational metaphysics, which has as one of its aims the clarification of the notions that descriptive metaphysics deals with. At least for some of those notions linguistic data may be particularly relevant, which thus requires the pursuit of natural language ontology.

Second, natural language ontology may shed a new light on longstanding philosophical puzzles. A great range of philosophical views, for example about ontological categories, about propositions, about truth and truthbearers, about numbers, and about the constitution of material objects, have been motivated, at least in part, by appeal to natural language. Often, however, such an appeal turns out to be based on a naïve, incomplete, or mistaken analysis of linguistic

data. It is hence important to analyze the full range of relevant linguistic data properly in order to uncover the ontology they in fact involve. A deeper linguistic analysis may then provide new philosophical solutions or perspectives on the philosophical issues. An example is difficulties for the notion of an abstract proposition and for abstract objects generally. Philosophers generally take natural language to involve a rich ontology of abstract objects, including propositions. However, a closer examination of the linguistic facts indicates that natural language does not in fact involve abstract propositions in its ontology and that reference to abstract objects more generally is highly restricted (Moltmann 2013a).

4 What sorts of linguistic data reflect the ontology of natural language and how is the ontology of natural language to be characterized?

Natural language ontology has as its subject matter the ontology reflected in natural language, or the *ontology implicit in natural language*. This raises two central questions:

1   How is that ontology to be understood, as it cannot be the ontology of fundamental reality?
2   What sorts of linguistic data do reflect that ontology?

Let us address these two questions in turn.

4.1 Natural language ontology and folkmetaphysics

As a first suggestion one might propose that the ontology of natural language is just the ontology of ordinary people, i.e., non-philosophers. This cannot be right, however: the ontology implicit in natural language cannot be the ontology ordinary people (non-philosophers) *naïvely accept* when thinking about what there is. That is, natural language ontology is to be distinguished from *folkmetaphysics*. Folkmetaphysics takes different sorts of data into account than natural language ontology. One difference consists in that just like folkphysics and folk biology, folkmetaphysics takes into account assertions such as:

6   a   There are artifacts.
     b   Objects are not events.

Metaphysics assertions play no role for natural language ontology. No philosopher or linguist would appeal to assertions such as (8a) when arguing that natural language reflects an ontology of artifacts or assertions such as (8b) when arguing that natural language reflects an ontology of objects being distinct from events. What matters for natural language ontology are not metaphysical assertions, but presuppositions, for example presuppositions of ontological categories carried by referential NPs or quantifiers or other relevant expressions.

There are also linguistic data that natural language ontology takes into account, but not folkmetaphysics, for example sentences that involve ontological commitments not accessible to ordinary speakers such as sentences containing silent syntactic elements with ontological content, as would be the case according to the sorts of syntactic structures posited in generative syntax.[7]

The ontology of natural language thus should be understood as an ontology that speakers *implicitly accept*, not as an ontology speakers naïvely accept when thinking about what there is:

7   Characterization of the ontology implicit in natural language (1st version)

The ontology of natural language is the ontology speakers implicitly accept.

This notion of implicit acceptance is special in that it is a particularly robust one. It is a form of acceptance that resists rejection upon reflection. Ordinary speakers may reject entities in the language-driven ontology that natural language displays, unrestricted pluralities, unrestricted kinds, variable objects, or conceived objects, say. Yet anyone that uses the relevant NPs will use them taking such entities as semantic values, and thus accept them implicitly. Implicit acceptance of the ontology implicit in natural language is mandatory for users of the language. In that sense the notion of implicit acceptance is rather different from the notion of implicit acceptance in ethics. In the context of ethics, what is implicitly accepted (bias) permits rejection upon reflection. The resistance to revision for the ontology of natural language indicates that the ontology reflected in language has the very same status as universal grammar (core syntax in generative grammar), being implicit knowledge that cannot be subject to revision. What distinguishes ontology from syntax, of course, is that ontology is also the subject matter of a particular branch of philosophy and as such should in principle be subject to reflection and revision, but here it is not.

4.2 Natural language ontology and cognitive ontology

The ontology implicit in natural language cannot just be understood as our implicitly accepted cognitive ontology. This would be too broad and in part not correct. The mass-count distinction may illustrate that. Natural language appears to distinguish the semantic values of *the rice, the rice grains*, and *the heap of rice* in terms of their properties, and thus ontologically: the rice grains can be (internally) distinguished, compared, listed, or counted, but not so for the rice or the heap of rice (Moltmann 1997). Carrying different properties, 'the rice,' 'the rice grains,' and 'the heap of rice' thus appear to be distinct entities. In perception, by contrast, the distinction between 'the rice,' 'the rice grains,' and 'the heap of rice' hardly matters. Mass nouns such as *water*, *rice, police force, footwear* appear to stand for distinct entities from those denoted by its plural counterparts such as *water quantities*, *rice grains, policemen*, and *shoes* (the latter can be counted, distinguished, and enumerated, for example, but not the former). Moreover, unrestricted sum formation does not seem plausible as part of our perception-related cognitive ontology, where formation of sums appears restricted by 'gestalt conditions,' perceivable conditions of integrity. The ontology of natural language is at least in part an ontology closely related to language (its language-driven part) and should thus be characterized in this way:

8   Characterization of the ontology implicit in natural language ontology (2nd version) The ontology of natural language is the ontology a speaker implicitly accepts *when* using natural language.

Of course not all of the ontology of natural language is language-driven. There are certainly parts of it that belong to our cognitive ontology in general, as is plausible for artifacts and various ontologically dependent entities mentioned earlier.

4.3 Natural language ontology and the core-periphery distinction

The characterization of the ontology of natural language in (8) is still not correct. The ontology of natural language is not reflected in all of natural language. Throughout history, when appealing to natural language for motivating a particular ontological view, philosophers made use of certain types of expressions or uses of expressions and not others. Thus, philosophers' technical terms or other terms whose use requires a degree of philosophical reflection are not considered indicative of the ontology of natural language, for example *the property of being happy* or *the truth*

value true. Philosophical terms and non-ordinary, philosophical uses of natural language expressions, even though they are part of the legitimate use of natural language, do not reflect the ontology implicit in natural language. Otherwise natural language could reflect any ontology whatsoever that someone may come up with. For example, a particular philosopher may just introduce a technical term for some ontological category, say, that of a platonic universal or that of 'the nothing,' but this does not make that category (platonic universals or the nothing) part of the ontology implicit in language.

The distinction that needs to be made is that between the *core* of language and its *periphery* (Moltmann 2013a, 2017, 2019, forthcoming b). Only expressions in the core reflect the ontology of natural language, not expressions in the periphery. The core-periphery distinction is essential for natural language ontology. It has been relied on by philosophers throughout history when making appeal to linguistic examples, and it likewise guides the practice of contemporary semanticists and philosophers pursuing natural language ontology.

The periphery includes *reifying NPs*, that is, NPs of the sort *the number eight, the property of being happy, the proposition that it is raining*, or *the truth value true*. Reifying NPs introduce objects on the basis of a sortal and possibly non-referential material (*eight, being happy, true, that* S (on a view on which *that*-clauses are non-referential)) (Moltmann 2013a, Chap. 6). Clearly, reifying NPs may introduce entities that need not be considered part of the ontology of natural language (truth values, abstract properties, propositions, and numbers). Philosophers in fact have generally stayed away from reifying NP when appealing to natural language for motivating an ontological category. For example, Frege (1884) did not motivate numbers as objects appealing the presence of the construction *the number eight* in natural language, and he did not motivate truth values as objects by appealing to *the truth value true*. Rather he used expressions like *the number of planets* and *eight* from the core of language when arguing for numbers being objects, and his motivations for considering truth values objects did not come from particular natural language sentences at all. Hale (1987) did not argue for properties being objects on the basis of terms like *the property of mercy*, but simple terms *mercy* (from the core of language). Link (1983) did not motivate sums being part of the ontology of language on the basis of terms like *the sum of the students*, but simple   definite plurals like *the students* (which clearly belong to the core of language).

Clearly then reference to the core-periphery distinction is indispensable for the right characterization of the ontology implicit in natural language (Moltmann 2017, 2019):

9   Characterization of the ontology of natural language (final version)
     The ontology of natural language is the ontology a speaker *implicitly accepts* when making use of the *core* of language.

5 Universals of natural language ontology

The core-periphery distinction is also essential for the quest for universals of natural language ontology. Clearly, the core in the present sense, not the periphery (in that sense) can represent a form of universal cognitive language-related ontology. The existing work in natural language ontology certainly incorporates an implicit restriction to the core of language for generalizations meant to be universal. The core-periphery distinction is used explicitly in the general hypothesis about reference to abstract objects in natural language in Moltmann (2013a):

10   The Abstract-Objects Hypothesis
     Natural language does not involve reference to abstract objects in its core, but only in its periphery.

On that hypothesis, in the core of natural language, what appeared to be expressions referring to abstract objects (numbers, properties, properties, propositions, degrees, expression types) are in fact expressions referring to particulars, pluralities of (actual or possible) particulars, or variable objects, or expressions that fail to have a referential function in the first place (numerals, clausal complements, predicative complements, complements of intensional transitive verbs). The particulars include tropes, to which natural language displays pervasive reference. (Tropes include quantitative tropes such as John's height or the number of planets (a number trope).) Only in the periphery is reference to abstract objects possible, for example through the use of reifying terms such as *the number eight*, *the property of being happy*, or *the proposition that it is raining*.

The periphery raises questions of its own. The periphery is a legitimate part of natural language, or a legitimate extension of it. As such, it has a semantics and hence comes with an ontology. But that ontology may diverge from the ontology of the core. The question then is, how should the ontology of the periphery be understood, in particular, when it is not part of the ontology of the core of natural language? For answering this question, it is important to keep in mind that ontology in the context of descriptive metaphysics includes ontologies of appearances. Ontology for the purpose of compositional semantics may include merely conceived entities, philosophical entities on some philosopher's conception, not necessarily the ontology of actual entities, let alone real entities.

6 The syntactic core-periphery distinction

The core-periphery distinction raises an important question, namely whether there is a linguistic basis for the distinction. That is, are there syntactic or lexical conditions that determine which expressions (or uses of expressions) will be part of the periphery rather than the core?

The core-periphery distinction recalls the core–periphery distinction that Chomsky's (1981, 1986) introduced for syntax (and which Chomsky (p.c.) still thinks is essential for syntax). For Chomsky, very roughly, the core of the syntactic system of a language represents regularities and in fact universal grammar, whereas the periphery involves exceptions and parts of language added on from outside influences. The question then is whether two separate core-periphery distinctions should be made for syntax and for the ontology of natural language.

At first, the core in the syntactic sense and the core in the ontological sense do not seem to coincide. For example, *the number eight* belongs to the periphery in the present sense, but at the same time seems to belong to the core in Chomsky's sense. However, a different view becomes plausible when the focus is not on entire constructions, but on more elementary parts of language. For Yang (2016), who more recently revived and defended the core-periphery distinction in syntax, functional categories (syntactic categories and features) belong to the syntactic core, but the lexicon to the periphery. Given that, the peripheral status of the reifying NP *the number eight* can be attributed to the occurrence of the sortal *number* in that construction, rather than the construction as such.

Further support for a single core-periphery distinction comes from the ability or inability of an expression or syntactic element to allow for a non-ordinary use or 'conceptual engineering' (Eklund 2015). Lexical categories such as sortal nouns allow for non-ordinary uses, but not so, it seems, functional categories (e.g., (overt or empty) determiners, morpho-syntactic categories (plural, tense), or syntactic constructions).

While it is plausible that functional and structural meaning side with the core (in the present sense), it is not obvious that all of the lexicon belongs to the periphery (in the present sense). For example, the verb *exist* appears to belong to the core (not permitting a non-ordinary use), whereas the non-relational bare noun *existence* belongs to the periphery (Moltmann 2019, forthcoming b).

Thus, while philosophers and non-philosophers are likely to consider 'existence' a univocal notion applying to every actual thing, the predicate *exist* in fact applies only to material and abstract objects, not to events (*the rain still exists* or *the accident existed yesterday* are unacceptable, cf. Hacker 1982; Cresswell 1986; Moltmann 2013b). That holds regardless of a language user's (naïve or not so naïve) philosophical views, which would mean that *exist* belongs to the core. By contrast, the bare nominalization *existence* (on its non-relational use) can easily be used to convey any notion of existence a language use may subscribe to (as in the sentence *existence is a univocal notion*).[8]

7 The ontology of natural language and other ontologies

Given the perspective of descriptive metaphysics, there is not a single ontology of the real, but rather different ontologies reflected in different ranges of data can coexist, including different ontologies reflected in different peripheries of natural language and different ontologies for different cognitive domains.[9] Such a pluralist view of ontology recalls Goodman's (1978) 'ways of worldmaking,' and it requires new formats for ontologies theories. Ontology can now no longer be based on a fixed set of categories and their characteristic properties and relations. Rather, it goes along better with a constructional ontology (Fine 1991), where various onto-logical operations may lead to different ranges of entities for different ontologies.

A constructional ontology is also particularly suited for complex expressions in natural lan-guage that serve the introduction of entities by some form of abstraction, namely reifying NPs of the sort *the number eight* or *the truth value true* (Hale 1987; Wright 1983) or the introduction of pleonastic entities (Schiffer 1996). Reifying terms require a distinction between the accept-ance of an ontological operation interpreting complex NPs expressions and the acceptance of the outcome or actually applying the operation. Syntactic knowledge of the construction of reifying terms will go along with acceptance of the ontological operation of reification inter-preting that construction, but not for with the acceptance of the outcome of that operation, that is, the application of the operation in particular cases.

By contrast, syntactic knowledge of the constructions in (1)–(5) will go along with the acceptance of the ontological operations interpreting them as well as the acceptance of the outcome. Thus, knowledge of English, displaying constructions as in (1)–(5), goes along with a mandatory implicit acceptance of the entities the constructions in (1)–(5) stand for. Their accept-ance cannot be subject to revision upon reflection, just as syntactic knowledge cannot be revised. For the language-driven part of the ontology, then, ontology, based on ontological operations introducing derivative entities, can be considered on a par with syntax.[10]

8 Conclusion

Natural language ontology is a branch of descriptive metaphysics whose subject matter is the ontology implicit in natural language. As such it is a new discipline that is both part of philo-sophy and linguistics, as well as a practice that had been pursued throughout the history of philosophy. Natural language ontology as a discipline on its own not only has a well-defined subject matter. It may also set its own ambitions on a par with that of generative syntax, aiming for a universal ontology associated with the core of language, not subject to revision.

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Notes

1 Bach (1986) uses the term 'natural language metaphysics' for natural language ontology, See also Kratzer 1989; Asher 1993; Pelletier 2011; Chao/Bach 2012). This is in a sense more adequate in that ontology is generally taken to be narrower than metaphysics, dealing with what there is rather than with the nature of things (and both are dealt with by metaphysics). However, 'ontology' is increasingly used in the broader sense of metaphysics as well, in particular when it has an empirical connection ('applied ontology'). Also 'ontology' is more usable when talking about the subject matter of a discipline, in particular since it has a plural: *the ontology of natural language* is the subject matter of natural language ontology, and there are different *ontologies* that are the subject matter of different branches of metaphysics.

2 For the notion of a trope, see Williams (1953) and Woltersdorff (1970).

3 See Moltmann (2018) and Ramchand (2018) for further linguistic applications of truthmaker semantics.

4 There is a recent alternative approach to compositional semantics, though, which aims to do without objects and truth, namely the one of Pietroski (2018). Here semantic composition is based solely on conceptual 'instructions.'

5 There is no universal agreement, however, that definite plurals stand for pluralities conceived as single entities that are sums. Thus, it has been pointed out that that account fails to distinguish the one (singular count) and the many (plural) (Yi 2005, 2006; Moltmann 2016). For example, the semantic value of *the children* below could not be counted as a single entity:

   (i)   John counted the children and the adults (and he counted two: the sum of the children and the sum of the adults).

   (ii) fails to have a reading on which John counted two: the sum of the children and the sum of the adults. Another argument against the mereological account is the reading of the predicate *exist*. *Exist* below cannot apply to 'the children,' stating the existence of the plurality independently of the existence of the individual children:

   (iii) The children exist.

   Such considerations have led to the exploration of alternative views, on which definite mass NPs plurally refer to each child at once (Yi 2005, 2006; Oliver/Smiley 2013; Moltmann 2016).

6 Naïve metaphysics may be taken to be the metaphysics ordinary people (non-philosophers) pursue when naïvely reflecting upon what there is, namely folk metaphysics. However, folkmetaphysics need to be sharply distinguished from natural language ontology and thus part of descriptive metaphysics (Section 4.1).

7 An example is the silent noun theory of Kayne (2005, 2015), which posits various silent nouns such as age, number, height, etc. as part of apparently simpler syntactic structure suggesting that those structures involve reference to ages, numbers, and heights.

8 Another question that arises is whether a separate core-periphery distinction should be made in the conceptual domain, with an invariant conceptual core not permitting conceptual engineering (the 'conceptual fixed points' of Eklund 2015).

9 There is of course also the issue of the universality of the ontology of natural language, touching upon the Sapir-Whorf hypothesis and the controversy surrounding it (Pinker 1994; Hespos/Spelke 2004).

10 Note that on that view the ontology is not representational, since semantic values of referential NPs are not considered representations. Rather it is a constructional ontology of actual, though derivative and possibly mind-dependent entities.

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