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**Natural Language Ontology**

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**Introduction**

Natural language ontologyis the study of the ontology (ontological categories, structures, and notions) implicit in natural language. As such, it is a sub-discipline of both philosophy and linguistics, more specifically, of natural language semantics and metaphysics. Natural language ontology is a relatively new discipline that has emerged with the development of natural language semantics over the last decades. At the same time, it can be considered a practice that philosophers have engaged in throughout the history of philosophy when they have drawn on language in support of a metaphysical argument or notion. The ontology of natural language is the ontology competent speakers implicitly accept in their use of a language. As such, it is to be distinguished from an ontology speakers accept on the basis of philosophical or naïve reflection or reasoning, as well as from cognitive ontology in general.

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**1. Natural language ontology as an emerging discipline and practice**

**1.1. Natural language ontology as a discipline**

Natural language ontologyis the study of the ontology (ontological categories, structures, and notions) reflected in natural language. As such, it is a sub-discipline of both philosophy and linguistics, more specifically, of natural language semantics and metaphysics. Natural language ontology had been suggested as a discipline first by Bach (1986), who uses the term ‘natural language metaphysics’. The term ‘natural language metaphysics’ is in a sense more adequate than ‘natural language ontology’ in that ontology is often taken to be narrower than metaphysics, dealing just with what there is rather than with the nature of things. However, ‘ontology’ is increasingly used in the broader sense of metaphysics as well, especially when it has an empirical connection (as with ‘applied ontology’). Also ‘ontology’, as a count noun, is a better usable term than ‘metaphysics’ to denote the subject matter of a particular discipline or, in the plural, the subject matter of different branches of the discipline. Thus, ‘the ontology of natural language’will stand for the subject matter of natural language ontology, and we can talk about different *ontologies* being the subject matter of different branches of metaphysics, and perhaps even of different *ontologies* being reflected in natural language (Section 4.3.)

**1.2. Natural language ontology as a practice throughout the history of philosophy**

Natural language ontology is a developing discipline that is part of both metaphysics and natural language semantics. But in a way 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, thus practicing a form of natural language ontology. Appeals to natural language in the context of metaphysics can often be found in Aristotle and also, often quite explicitly, in medieval metaphysics (Ockham, Aquinus, Buridan), also, though less explicitly, in the phenomenological tradition (Brentano, Husserl, Meinong, Bolzano), and again, very explicitly, in early analytic philosophy (Frege, Twardowski, Strawson, Austin, Vendler, Ryle). What does such an appeal to natural language amount to? For example, it is a standard assumption in both philosophy and linguistics that referential noun phrases (NPs) stand for objects and predicates express properties of objects. The types of predicates acceptable with a particular sort of referential NP then are indicative of the ontological category the NP stands for. Philosophers thus often appeal to (or at least use) particular sorts of NPs when arguing about a particular ontological category, such as the category of properties (*wisdom*), events (*Socrates’ death*), tropes (*Socrates’ wisdom*), facts (*the fact that the sun is shining*), or numbers (*the number of planets*). There are many other ways in which natural language appears to reflect ontology, as we will see.

**1.3. The ontology of natural language and its relation to reality**

The appeal to natural language in the history of philosophy was sometimes based on the assumption that natural language just reflects reality and that natural language thus provides a particularly manifest indication for the way reality should be understood. More recently, however, it has become common among philosophers to suppose that natural language does not in fact reflect the ontology of what there really is, or at least not fundamental reality. Rather, natural language comes with its own ontology, an ontology that may be quite different from the ontology that some philosophers are willing to accept as the ontology of what is real. For example, a lot of referential NPs in natural language seem to stand for entities that many philosophers would not consider real, let alone fundamental. These include ontologically dependent, minor, and derivative objects such as holes, shadows, smiles, homes, and mistakes, as well as construction-driven objects such as pluralities like ‘the stones in the garden’ (Section3.1.1.), functional, variable, or intensional objects like ‘the increasing temperature’, ‘the book John needs to write’ or ‘the gifted mathematician John claims to be’ (Section 3.1.1.), and intentional objects of the sort ‘the house John was dreaming about’ (Section 3.2.). Also categorial distinctions such as the mass-count distinction, which includes a distinction between ‘the water’ and ‘the quantity of water’ as well as between ‘the clothes’ and ‘the clothing’, are not generally taken to reflect real ontological distinction, but, at best, a distinction at a level of ‘grammaticized individuation’ or ‘language-driven ontology’ (Section 3.6.).

 The apparent discrepancy between reality, on the one hand, and the ontology that natural language appears to display, on the other hand, raises important questions in itself. First of all, there is the question of how reality itself is to be understood. Does reality just consist in what is fundamental? And what exactly does that mean? Or does reality also include ordinary objects (and perhaps entities ontologically dependent on them)? Or should reality be understood as consisting of a much greater range of entities, a plentitude of just anything conceivable that meets the conditions for its existence, or perhaps a more restricted plentitude of such things (Eklund 2008, Schaffer 2009)? Should reality include a realm of mere possibilia and perhaps nonexistent, merely intentional objects? Some central issues in natural language ontology bear on the question of how reality and existence is to be understood. One of them is how natural language ontology is compatible with what is widely regarded as a fundamental requirement on semantic theory, namely that of giving truth conditions for sentences. For a sentence about an entity *d* to be true or false, the sentence generally has to involve *d* itself, rather than just a fiction, representation or conception of *d*. Another issue is the question, skeptically addressed in particular by Chomsky, as to whether referential NPs even have as their semantic function to be used to refer to objects as part of reality and thus whether referentialist semantics is even possible (Section 2.2.5.).

**1.4. The ontology of natural language and truth conditions**

There are approaches to natural language semantics where natural language ontology may be pursued, but not with the aim of giving truth conditions (whether it is set aside or abandoned). On one such approach, natural language semantics should care only about our cognitive representation of things in cognition, and not what there really is (Chomsky 2000, Pietroski 2018). On another approach, suggested by Bach (1986), natural language semantics should be agnostic with respect to the entities it posits with their structures and relations, both regarding their ontological and cognitive status, as long as they are motivated by empirical generalizations and theoretical linguistic considerations.

 If the aim of semantics, however, is that giving truth conditions, then the question arises how to make sense of the apparent discrepancy between the ontology displayed by natural language and what there really is. There are various options, each of which may be adopted for just some part of the ontology reflected in natural language. One option is that natural language displays ontological notions or items that simply fail to be real, and thus speakers making use of them in their utterances are in error. Second, entities in the ontology of natural language may have the status of fictional entities, which can mean that a sentence involving them may not be able to be ‘really’ be true unless it are in the scope of a suitable fiction-introducing operator (unless the sentence predicates something of the fictional character externally, e.g. with the predicate *is a fictional character*). Third, entities in the ontology of natural language may be considered derivative and thus not fundamental, which would allow sentences involving reference to such entities to be true. Finally, the discrepancy may consist in the fact that natural language is selective as to the sorts of ontological notions and items it makes use of. This option, while being able to allow for truth conditions, requires a suitably rich conception of reality.

**1.5. The ontology of natural language and cognition**

Sometimes the ontology of natural language is taken to be just the ontology implicit in cognition, in particular the ontology of ordinary objects. While there are without doubt important connections and significant overlap, the ontology that is reflected in natural language needs to be distinguished from the ontology reflected in cognition, that is from ontology that is based on language-independent intuitions and is tied to perception and other forms of language-independent cognition. The ontology of natural language need not always align with that ontology. To give an example, it is generally agreed that the ontology of ordinary objects is not closed under sum formation: the things in my room intuitively do not form an entity and neither does the Eiffeltower and the Dalai Lama. But natural language appears to allow for unrestricted sum formation with definite plurals and conjunctions (*the things in my room*, *the Eiffeltower and the Dalai Lama*). There are at the same time significant interactions between the ontology reflected in cognition and the ontology of natural language, most obviously in the area of lexical semantics. In fact, often researchers pursuing natural language ontology take research in cognitive science into account or pursue interdisciplinary research in both areas at once (see, for example Wellwood et al. 2012, Wisniewski et al. 1996).

 The ontology implicit in cognition needs to be distinguished from the ontology that non-philosophers (‘the folk’) naively accept when thinking about what there is; latter is the subject matter of folkmetaphysics, the analogue of folkphysics and folkbiology, which are based on naïve reflection rather than implicit acceptance. This distinction has a language-related analogue: the ontology implicit in natural language needs to be distinguished from the ontology that is accepted on the basis of naïve ontological theorizing using language (Section 5). There is thus a fundamental distinction to be drawn between ontology based on (linguistic or language-independent) intuitions and ontology based on reflection or reasoning.

**1.6. The relevance of natural language ontology for philosophy**

Why should natural language ontology be pursued? Moreover, why is its pursuit relevant to philosophy? The answer to the first question is simply that such pursuit comes with the need to recognize the ontology of natural language as an important field of study in itself given the development of theoretical linguistics over the last 70 years and the existing practice of natural language ontology on the part of philosophers and linguistics. Theoretical linguistics provides a wealth of relevant semantic and syntactic generalizations and theoretical considerations, permitting a more systematic study of the ontology implicit in natural language. And it may set its own ambitions regarding universals, its alignment with syntax, its relation to lexical semantics, and its connections to cognitive ontology.

To address the second question, there are specific reasons for a philosopher to pursue natural language ontology. First of all, natural language ontology has an important contribution to make to descriptive metaphysics, metaphysics that aims to uncover the ontology reflected in common sense intuitions (Section 2.1.). Natural language ontology makes a distinctive contribution to this branch of metaphysics, as it allows as to make our common sense intuitions manifest, by establishing stable judgments about the acceptability of natural language sentences. Natural language ontology, in fact, has often been pursued precisely for that purpose when discussing a range of ontological issues. Some examples are material constitution (Fine 2003), existence (Fine 2006), and the nature of truthbearers (Frege 1918/9, Twardowski 1911).

Second, many topics in metaphysics have evolved around linguistic facts, generally used as manifestations of common sense intuitions or just reality. One example is the existence and nature of universals. Linguistic facts have played an important role in the debate surrounding universals at least since the middle ages: is *wisdom* a term that picks out an abstract universal or just its various instances? Another example is the existence and status of propositions, a topic where appeal to linguistic facts have played a central role in the debate at least since Frege (1918/9): are *that*-clauses singular terms standing for abstract propositions, truth bearers that are both meanings of sentences and objects or contents of thought? In addition, Frege’s (1884) use of apparent number-referring terms such as *the number of planets* and bare numerals like *eight* has been influential in the debate of the existence and nature of numbers, in particular in apparent identity statements such as *the number of planets is eight*. If *the number of planets* stands for a number as an abstract object, are numbers obtainable from concepts, the concept of a planet, as the term seems to suggest? Is *eight* in that sentence really a number-referring term or does it still retain its adjectival meaning even in referential position (Hofweber 2016, Moltmann 2013)? Is *the number of planets* really a number-referring term or does it rather stand for a question about how many planets there are (Romero 2005)? When metaphysical arguments rely on linguistic data, those data need to be subject to linguistic examination as well and thus of natural language ontology.

Third, metaphysical issues that relate to language may obtain a novel solution based on research in natural language ontology. For example, Twardowski (1911) argued for a novel category of products (as opposed to actions) based on a distinction between two sorts of nominalizations of attitude verbs (in English *judgment* vs *judging*, *claim* vs *claiming*, *request* vs *requesting*, though Twardowski used data from Polish, German, and French in three versions of the same article). Products like judgments, for Twardowski; are concrete, mind-dependent entities that enter similarity relations on the basis of being the same in content. Based on linguistic data, Twardowski argued for products being the bearers of truth or satisfaction conditions and proposed a novel cognitively realistic yet not psychologistic account of the content of attitudes as well as the subject matter of logic and even the humanities in general.

Fourth, natural language ontology may show that certain widely held identity theories are mistaken, if at least one of the items is part of the ontology of natural language. For example, using the methods of natural language ontology, it has been argued that artifacts cannot be identical to the matter they are made of (Fine 2003) and that events cannot just be space-time regions (Goldman 1977). One may also view Chomsky’s (1995) observations to the effect that water is not H2O, as showing that a substance that is part of natural language ontology (water) is not identical with a substance in the ontology of chemistry (H20) (Section 2.2.5.).

**2. Natural language ontology as a subdiscipline of both linguistics and philosophy**

Natural language ontology as a subdiscipline of both linguistics and philosophy raises a number of general questions. First, how does natural language ontology situate itself within metaphysics and how is it to be understood as a part of metaphysics? Second, how exactly does the semantics of natural language involve ontology and thus in what sense is natural language ontology part of linguistics? Third, what sorts of linguistic data reflect the ontology implicit in language, and how is that ontology itself to be characterized? In what follows, these questions will be addressed in turn.

**2.1. Natural language ontology as part of descriptive metaphysics**

How can natural language ontology be part of metaphysics, when the ontology of natural language may diverge from what is considered real? To answer this question requires clarifying how metaphysics itself is to be understood. One dominant view of metaphysics is that it is to be understood in term of its subject matter, its subject matter being that of fundamental reality: the task of metaphysics is, in Plato’s words, to ‘carve nature at its joints’. But if the subject matter of metaphysics is fundamental reality, then natural language ontology will have no place in it.

 This is not the only way of conceiving of metaphysics, however. There is an alternative conception which does not define it in terms of its subject matter (fundamental reality) and within which natural language ontology can be situated. On this alternative conception, metaphysics, at least in part, has as its subject matter the general nature of things *as reflected* in a particular range of ‘data’. Those data may consist in common sense intuitions or ordinary judgments, experiences (as in phenomenology), or in linguistic data (natural language ontology). On such an approach to metaphysics, it is left open what such data may reflect, whether it is physical reality, a realm of actual but derivative entities, entities constituted by the experience itself, or a realm of conceived reality. Older traditions of metaphysics that fall under the approach include the Kantian tradition, which deals, for example, with ontological categories, but as preconditions of accessing the world, rather than as categories of how things really are, as well as the phenomenological tradition (Brentano, Husserl, Ingarden), where ontology was also pursued, but based on how things appear, rather than assumptions about a mind-independent reality (and the way things appear in turn was sometimes taken to be constitutive of objects themselves). In contemporary analytic philosophy, Strawson’s (1959) notion of descriptive metaphysics most clearly focuses on what is reflected in data. The subject matter of descriptive metaphysics is what Strawson calls our ‘shared conceptual scheme’. The notion of descriptive metaphysics, though, is now more commonly taken to have as its subject matter the ontology reflected in shared commonsense intuitions or ordinary judgments. That is because metaphysics is not about representations or concepts, but things and their nature. Strawson contrasts descriptive metaphysics with what he calls ‘revisionary metaphysics’, which does not aim to uncover the ontology reflected in the data, but rather aims to develop a better conceptual scheme. Strawson does not elaborate how ‘better’ is to be understood, but it is likely meant to be metaphysics that better carves nature at its joints, or perhaps provides a better foundation of the natural sciences, or else perhaps whatever the standard may be that a given revisionary metaphysician may have in mind.

 Given the Strawsonian distinction, natural language ontology clearly belongs to descriptive metaphysics, in the sense that its subject matter is the ontology reflected linguistic intuitions regarding the truth conditions or acceptability of natural language sentences.

A distinction somewhat similar to the Strawsonian distinction between descriptive and revisionary metaphysics has recently been made by Fine (2017a). Fine distinguishes between what he calls ‘naïve metaphysics’ and ‘foundational metaphysics’. Naïve metaphysics is interested in the general nature of things, without regard for whether they are real, with our ordinary judgments being an important guide. Not distinguishing between appearance and reality, Fine also calls it the ‘metaphysics of appearances’ (Section 3.2.). The subject matter of foundational metaphysics, by contrast, is the ontology of what therereally is, namely, for Fine, fundamental reality. Foundational metaphysics is defined in terms of its subject matter, not in terms of its deviation from naïve metaphysics. What is novel in Fine’s distinction is how the relation between naïve and foundational metaphysics is understood. For Fine, foundational metaphysics must take naïve metaphysics as its starting point: naïve metaphysics cannot be skipped in favor of foundational metaphysics. Foundational metaphysics presupposes the notions and results of naïve metaphysics and has as one of its aims the attempt to explain them in more fundamental terms. Naive metaphysics, by contrast, should be pursued without regard to foundational considerations.

Given the Finean distinction, natural language ontology is clearly part of naïve metaphysics. The term ‘naïve metaphysics’ is potentially misleading, though, when applied to natural language ontology. The ontology implicit in natural language needs to be distinguished from the ontology of what non-philosophers (‘the folk’) naively think there is. The latter is the subject matter of folk metaphysics. The ontology of natural language, by contrast, it is the ontology that competent speakers of the language implicitly accept, whether philosophers or non-philosophers and whether they would naively or not so naively agree with it upon reflection. For that reason, I will stay with the better established and less misleading Strawsonian term ‘descriptive metaphysics’, properly understood.

The view that descriptive metaphysics is to be pursued without foundational considerations also has applications for natural language ontology. The decision whether to posit entities of particular ontological categories as semantic values, say of particular types of referential NPs, should not be made based on assumptions about what is fundamental or what really exists, but rather on the grounds of the semantic behavior of expressions, a guiding principle that actual research in natural language ontology does not always adhere to.

 Can natural language ontology be guided by linguistically expressed intuitions alone? May purely ontological considerations also come into play, or would this mean perhaps mistakenly imposing a sophisticated metaphysics on the ‘folk’ (competent speakers that are non-philosophers)? When addressing that question it is important to distinguish the ontology speakers accept upon reflection from the ontology they implicitly accept when using language (Section 4.). It is not clear that natural language ontology can be pursued, just as a form of ‘metaphysics of appearances’ without foundationalist considerations. Considerations as to what is more fundamental certainly enter considerations as to how to understand derivative entities as semantic values. More importantly, considerations regarding truth play a central role in semantics as well as natural language ontology. The guiding principle for natural language ontology should perhaps better be that of giving priority to linguistic intuitions over foundationalist considerations, when linguistic intuitions are available.

 We will see that distinctions need to be made from among our linguistic intuitions between data, from the ‘core’ of language in a particular sense, and data from the ‘periphery’ of language, that is, roughly ‘technical’ uses of language involving reflection (Section 5). Only the former, not the latter, are indicative of the ontology of natural language.

**2.2. How does natural language reflect ontology?**

It is a guiding assumption of natural language ontology that natural language reflects ontology. That is, the semantics of natural languages involves entities of various ontological categories, ontological structures, and ontological notions on the basis of syntactic roles of expressions, syntactic categories and features, and lexical words. The following will elaborate some of the ways in which natural language involves ontology.

**2.2.1. Entities in different semantic roles**

First of all, entities may play various roles in the semantic structure of natural language sentences, though in what way exactly may depend somewhat on particular semantic theories about relevant constructions or expressions.

**2.2.1.1. Semantic values of referential NPs and variables**

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. Entities also 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). The standard view is that with the utterance of a simple sentence like *that thing is red, red* expresses a property of entities and that property is attributed to the entity the speaker refers to with *that thing*.

 The notion of a referential NP is equally important in linguistics and in philosophy. Referential NPs generally are considered occurrences of NPs in sentences in which they 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. Only certain syntactic positions are reserved for referential NPs, such as the subject and the object position of extensional predicates, as opposed to intensional predicates like *need*, intentional predicates like *imagine*, and existence predicates like *exist* and *occur*. There are various syntactic and semantic criteria for referential NPs. For philosophers, since Frege, they include 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: they are generally taken to have the more complex structure of a determiner phrase (DP) rather than just that of what syntacticians take to be an NP, NPs being able to be used only predicatively (Abney 1992, Borer 2005).

 The notion of a referential NP (or *Eigenname* ’name’ as it was called at the time) already plays a central role in Frege’s (1892) philosophy of language and even provides a syntactic criterion for objecthood. For Frege, an object is what can be the semantic value of a referential NP. Standing for an object is the role of a referential NP in the context of a sentence.

 Entities also play a role as semantic values of variables and thus quantifiers. Ontological commitment has been tied to the role of semantic values of variables by Quine, who put forward the dictum ‘to be is to be the value of a variable’. This was meant to apply not so much to natural language, though, but to regimentations of it, in particular in formal theories of science. Yet being the semantic value of whatever may correspond to a variable in natural language (or being in the domain of a quantifier) has become a well-established criterion for objecthood in the practice of natural language ontology.

 Some caution needs to be applied to both the Fregean and the Quinean criterion of objecthood. There are apparently referential NPs whose function is not that of standing for an object, such as the subjects of existential statements (*Santa Claus does not exist*), and arguments of intentional verbs (*John is thinking about Santa Claus*). There are moreover views according to which referential and quantificational NPs do not always range over objects, but may just have an inferential role (Hofweber 2016). Moreover, not all quantificational NPs have the same semantic role, ranging over entities that will also act as arguments of the embedding predicate. Quantificational NPs of the sort *something, everything*, and *several things* in English, which can take the place of predicative complements as well as other nonreferential positions, have been argued to have a nominalizing function introducing a new entity into the semantic structure of a sentence (Moltmann 2013) or, as non-nominal quantifiers, to range over the same higher-order over entities that are the semantic values of the expressions they may replace (Rosefeld 2008).

 The notion of a referential NP also plays a central role in the tradition of Montague Grammar, where referential NPs are taken to be of type *e*, the type of entities (Thomason 1970). Montague himself, though, proposed type-lifting referential NPs to the type of individual concept. This allows for semantic uniformity with respect to entities that have been taken to stand for individual concepts, such as *the rising temperature*, *the golden mountain* and *the mathematician John claims to be* (but see Section3.1.1.). This move, however, blurs the distinction between the ontological and the conceptual, with the category of referential NPs no longer providing a criterion for what is in the ontology of the language.

**2.2.1.2. Implicit arguments**

Another role entities may play in the semantic structure of sentences is that of implicit arguments, that is, as arguments of predicates that are not the semantic values of a referential NP. For example, on Davidson‘s (1967) influential analysis, the sentence *John walked slowly* states that there is an event which, together with John, is an argument of *walk* and of which *slowly* (now treated as a predicate of events) is true (∃e(walk(e, John & slowly(e)). The very same considerations that lead Davidson to posit events as implicit arguments apply to adjectives and motivate tropes (particularized properties) as arguments of adjectives. *John is profoundly happy* will then state that there an instance of happiness (a trope) that, together with John, is an argument of *happy* and of which *profoundly* is true (∃t(happy(t, John & profoundly(t)). Instead of tropes, degrees have been used widely as implicit arguments of adjectives (Kennedy 2007, Wellwood 2015). Other implicit arguments proposed in the literature are implicit location arguments for weather predicates (*it is raining*) and implicit taste parameters for predicates of personal taste (McFarlane 2014). Generally, implicit arguments are motivated by observations about expressions (such as adverbials) acting as predicates targeting an entity for which there is no overt noun phrase.

 The semantic role of implicit arguments raises the question whether there is a difference in ontological status between entities that are implicit arguments and entities that are semantic values of referential NPs. In fact, the two sorts of roles are treated differently in the practice of natural language ontology. Davidson’s arguments for events seem to be considered stronger arguments for events being part of the ontology of natural language than the fact that there are referential NPs denoting events. The reason may be that referential NPs can be part of the ‘periphery’ of language, which means that their semantic values need not belong to the ontology of language (Section 5). This would not be an option for implicit arguments of verbs. There are alternatives to Davidsonian event semantics, though, which do not posit such implicit arguments (Kim 1976, Copley / Harley 2015).

**2.2.1.3. Parameters of evaluation and truthmakers**

Another important semantic role of entities in the semantic structure of natural language sentences is that of a parameter of evaluation for the truth of sentences. The standard semantic view takes a sentence to be true or false not absolutely, but relative to a time and a (possible) world. This gives first of all justice to the intuition that sentences can be true or false in actual as well as counterfactual circumstances. Moreover, there are natural language expressions that have been considered operators shifting a parameter of evaluation. Tenses and temporal adverbials are standardly taken to act as operators shifting the time of evaluation and modals as operators shifting the world of evaluation. Also conditionals are generally treated as potentially shifting the world of evaluation for antecedent and consequent.

 Entities as parameters of evaluation raise an important issue, namely whether there is a difference in ontological commitment between parameters of evaluation on the one hand and semantic values of referential terms and implicit arguments of predicates on the other. A common view is that parameters of evaluation are mere posits in the semantic theory, not involving an ontological commitment on the part of the language user. Only under particular circumstances are parameters of evaluation taken to involve an ontological commitment. One criterion is of course if the object language also offers referential expressions referring to the entities that can act as parameters evaluation. For example, there are generally lots of referential expressions in natural languages referring to times (*today, that day, that moment* etc), but not for worlds, at least not from the core of language (Section 5). Frege’s criterion of objecthood of course does not apply to parameters of evaluation (and it did not even apply to implicit arguments).

**2.2.1.4. Other semantic roles**

Entities play yet other semantic roles, namely within other particular theoretical developments of formal semantics. Situations, in particular have been uses for other semantic roles than that of parameters of evaluation. Thus, in Austin’s (1950) theory of sentence meaning, a speaker, when uttering a sentence, refers to a situation that provides semantic values of context-dependent expressions. Does this mean an ontological commitment to situations? Certainly, an ontological commitment to situations is in place if situations form part of the intention of speakers when using a sentence, as is the case on that theory. This is also the case for various uses of situations for the semantic of definite and quantificational NPs, as well as E-type pronouns (Elbourne 2005). Situations play a role strictly outside the meaning of a sentence in Recanati’s (2010) theory of pragmatic enrichment.

 In the more recent development of truthmaker semantics (Fine 2017b), situations play somewhat similar roles as worlds of evaluation in their role as parameters of evaluation, though truthmakers are based on a relation of exact truthmaking between situations and sentences. Situations in their role as truth maker appear to also play as semantic values of referential and quantificational NPs, namely those with *case* as head noun (Moltmann 2019b), which would amount to an explicit ontological commitment, in both the Fregean and the Quinean sense.

**2.2.2. The connection between ontology and compositionality**

The ontology of natural language 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 what the semantic contribution of occurrences of expressions to the composition of the meaning of the sentence is taken to be. Generally, the contribution of referential NPs is taken to be that of standing for objects and the role of predicates that of expressing properties that are applied to objects. There are formal alternatives, for example, on which predicates stand for functions that are applied to objects to yield truth values, or on which referential NPs denote higher-level functions (individual concepts) that apply to predicate denotations to yield truth values. What is most important is that the contribution of referential NPs and that of predicates are the same in different sorts of sentences.

 There is also a view according to which the semantic role of expressions reflects ontology. Specifically this view has been held by Frege, for whom predicates stand for concepts, that is, unsaturated entities that need to apply to an object to yield a truth value. (This view, however, is not uncontroversial, cf. Liebesman 2015).

**2.2.3. Ontological categories and syntactic categories, positions, and structures**

Natural language appears to manifest ontology also in its syntactic categories, which often appear to reflect ontological categories. Thus, verbs are generally taken to reflect the category of events (Szabo 2015). Adjectives generally reflect the category of tropes (or Aristotelian accidents) (Williams 1953, Strawson 1959, Woltersdorff 1970). Syntactic categories do not strictly correlate with ontological categories, though. *Be in a hurry*, *be hurried* and *hurry* all are predicates seemingly standing for the same property, but based on the lexical content of a noun, an adjective, and a verb, respectively. Another, mere tendency of a correlation is that of the syntactic mass-count distinction among nouns with the distinction between individuals and stuff (Section 3.6.).

 There is no agreement, at this point, as to the ontological content of syntactic category distinctions. Such correlations make a difficult topic also because there is a lot of crosslinguistic variation as to what syntactic categories natural languages display (Gil1999). Moreover, there are theoretical developments in syntax that put familiar syntactic category distinctions into question and require at least a recasting of the issue. For example, in distributive morphology (Halle/Marantz 1993, Borer 2005), lexical elements (roots) are not associated with syntactic categories in the lexicon. Only when they are inserted in a syntactic structure will they be associated with syntactic categories, which means they cannot owe any ontologically relevant lexical content to a syntactic category Another example is the theory of radical lexical decomposition (Hale/Kayser 2006), which has proposed, for example, that a range of full verbs are derived from combinations light verb – noun e.g. *walk* from *take a walk* (*take* being the light verb and *walk* the noun). This view gives up a close connection between events and the category of verbs, but posits a much greater range of nouns instead that underlie full verbs.

 Ontological categories in natural language may be reflected in other ways than in syntactic categories, such as thematic relations and syntactic positions. On the recent cartographic theory of syntax (Cinque / Rizzi 2010), for example, syntactic positions in a sentence or NP are associated with a sort of semantic content, which often amounts to an ontological notion, for example different positions for adjectival modifiers in an NP are distinguished for modifiers of number, size, shape and color.

 Another correlation of syntactic structure with ontology may concern the types of situations that serve as truthmakers for different types of modal auxiliaries (Ramchand 2019).

**2.2.4. Metaphysically relevant specific expressions and constructions**

Besides syntactic categories, natural language displays particular types of expressions and constructions that appear to convey metaphysical notions. Examples are of course the copula *be* , which conveys identity, predication, existence and perhaps other, related notions, modals that convey metaphysical modality (*may, must, essential, the nature of*), existence predicates that convey existence or ways of being (*exist, occur, obtain*) (Fine 2006, Moltmann 2020b), ontological dependence (which may conveyed by *have* or the possessor construction), part-whole-related expressions (Vieu 2006, Vieu & Aurnague 2007), verbs and constructions of causation (*make, cause*) (Swanson 2012). In addition, there are various nominal constructions that serve to denote entities of particular categories, perhaps introduced in particular construction-specific ways. These include nominalizations of various sorts (for qualities, events, states, facts, tropes, for example) as well as constructions that may introduce entities in virtue of their constructional semantics such as the fact-introducing NPs like *John’s resembling Bill* or *the fact that* John resembles Bill (Vendler1967).

 One might be tempted to add sortals and various underived nouns that convey metaphysical notions (*existence, property, being, event, number*). However, there are reasons to consider such nouns part of the periphery, not the core of language in a relevant sense and thus not indicative of the ontology of natural language (Section 5).

**2.2.5. Chomskyan skepticism about reference to objects in the semantics of natural language**

The view that referential NPs stand for objects is not uncontroversial. It has been the target of critique particularly by Chomsky’s (1986, 1995, 2013), who put forward a range of cases of co-predication as challenges to the traditional notion of reference as a relation to mind-independent, real objects, that is, cases of inconsistent property ascriptions that objects on standard views would not be able to bear. For example, what we refer to as a ‘door’ could be painted, replaced, and walked through, properties that could not be attributed jointly to material objects as standardly understood. Another example is a home, which unlike a house may have peculiar combinations of properties: one can own or sell a home, but not, for example paint a home. Other examples include cites, which can be destroyed and rebuilt at a different location, artifacts, which can undergo complete replacement of their parts, and persons with their relative independence of the bodies. Even terms like *water* do not stand for an external substance, but are individuated in part by their roles in people’s lives (Chomsky 1995). Water, for example, can be polluted, but not so for H20. Sprite has the same percentage of H2O as tab water, but one would not call it water. Chomsky’s conclusion is that natural language does not involve the reference relation, as a relation to real objects. The semantics of referential noun phrases rather involve lexical/conceptual structures deployed by speakers in particular contexts to refer to particular aspects of reality. Instead of a semantics with the (traditional) notion of external reference as its central notion, referential terms should have an internalist semantics, involving another level of syntactic representation, that of lexical-conceptual structure. This view will then require a different conception of compositionality than the standard one: rather than being based on objects and properties, compositional semantics will have to do with concepts only or concepts together with mental instructions (Pietroski 2018).

 Chomsky’s position, which denies that speakers using referential NPs refer to objects on any standard understanding, appears to imply a rejection of natural language ontology as such. There are different kinds of responses to the Chomskyean challenges. First, one may adopt a different conception of reality. Reality need not be conceived as a mind-independent realm of material objects, subject to particular constraints on spatio-temporal location, but may consist in a plenitude of entities, including entities that are individuated by function and purposes. Moreover, reality may include derivative or complex objects that obtain properties from simpler entities in different ways, allowing for apparently contradictory property attributions (Arapinis & Vieu 2015). Another type of response is to revise standard views of predication. One such proposal is to have predicates apply to underspecified conceptual units (‘dot objects’) and only then map them onto real objects (Pustejovsky 1995). Another may be to have predicates attribute properties based on property inheritance (Liebesman / Magidor 2017).

**3. Distinctive features of the ontology of natural language**

**3.1. Complex NPs and constructional ontology**

The pursuit of natural language ontology appears to go along with a view of ontological pluralism, according to which there is not a single ontology, but several ontologies associated with different cognitive or representational functions, in addition to the ontology of what there ultimately is. The following sections will discuss cases that appear to show a discrepancy between the ontology of natural language and the reflective ontology of ordinary speakers, that is, the ontology speakers naively accept when thinking about what there is, an ontology that includes the ontology of ordinary objects. They are just some of examples of the wealth of ‘derivative’ or ‘minor’ entities that referential NPs may stand for and that are likely to be rejected by speakers of the language when thinking about there is. Referential NPs standing for such controversial entities satisfy the very same criteria of referentiality as NPs standing for less controversial entities, for example, by accepting the same sorts of predicates as ordinary referential NPs, supporting anaphoric pronouns and being replaceable by quantifiers.

**3.1.1. Reference to unrestricted sums and kinds**

The first case involves definite plurals and mass nouns as well as conjunctions of definite NPs. The dominant view in natural language semantics is that the semantics of such NPs involves an ontology of unrestricted sums of individuals (in the case of plurals) and of quantities (in the case of mass NPs). That is, *the things in my garden* stands for the sum of the things in my garden, the definite mass NP *the sand in the Sahara* stands for the sum of the sand quantities in the Sahara, and *the Eiffeltower and the Dalai Lama*stands for the sum of the Louvre and the president of the US (Link 1983, Champollion/Krifka 2017, Ojeda 1993). Motivations for that view are that plurals and mass NPs exhibit standard criteria of referentiality and share predicates with singular NPs such as *heavy*, which displays collective readings applying to the entire referent of the definite NP, as in (1b) and (1c):

(1) a. The stone is heavy

 b. The stones are heavy.

 c. The sand is heavy.

A sum of individuals is generally understood on the basis of a part relation specific to plurals and distinct from the part relation applying to individuals (Link 1983, Ojeda 1993).

 Clearly, if definite plural and mass NPs and conjunctions of definite NPs stand for sums, they do not impose any restrictions on the formation of sums, which means that the ontology of natural language displays mereological universalism [see SEP Mereology]. Mereological universalism (or unrestricted sum formation) is generally not taken to obtain for the ontology of ordinary objects, where sum formation (see 1.5.) appears to be subject to conditions of integrity (such as having a form or boundary) that the potential sum must fulfill (Simons 1987) or by teleological conditions of purpose (Schaffer / Rosen 2017). Yet such restrictions need not obtain for sum formation in the ontology of the real, where mereological universalism is a plausible view.

 A similar discrepancy is displayed by bare (determinerless) plurals and mass nouns such as *donosaurs* or *water.* Bare plurals and mass nouns English are generally taken to be able to act as kind-referring terms, with predicates conveying properties of the kind as a whole, as in (2a) or properties characteristic of the instances of the kind as in (2b) (Carlson 1977):

(2) a. Water is transparent

 b. Pigeons are widespread.

The referential status of the bare nouns in (2a, b) is supported by the usual criteria for referentiality.  *Water* thus will stand for a kind (substance) whose instances are quantities such as the water in that glass and *pigeons* will stand for a kind whose instances are individuals such as that pigeon. Similarly, in the tradition of Aristotle’s Categories [SEP Aristotle], bare adjective nominalizations such as *wisdom* in (3) can be regarded terms for qualities, universals whose instances are accidents or tropes:

(3) Wisdom is better than cleverness.

‘Wisdom’ will have as its instances tropes such as Socrates’ wisdom or the wisdom of that remark. With bare plurals and adjective nominalizations, English appears to reflect the Aristotelian four-category ontology [see SEP Aristotle] (Moltmann 2013): individuals (primary substances) - kinds of individuals (secondary substances), tropes (accidents) – kinds of tropes (qualities). Like Aristotelian secondary substances, the kinds bare plurals stand for generally inherit their properties of their instances (*Pigeons can fly*) and exist only if instantiated (*Pigeons exists* implies the existence of an individual pigeon).

 The semantics of bare plurals and mass nouns involves a particular notion of kind, though. Kind formation for the purpose of the semantics of bare plural and mass nouns would be unrestricted. Bare plurals like *typographical mistakes*, *old pink buttons* or *cheap red wine* are kind-referring terms of the same sort as *pigeons*, displaying the same semantic characteristic readings of predicates. However, those would hardly be considered kinds in folkmetaphysics or the ontology of the real, where not just any instantiated property corresponds to a kind.

 The view that definite plurals and mass NPs and bare plurals and mass nouns involve reference to unrestricted sums or kinds is not uncontroversial. An alternative view that has been pursued for definite plurals is that of plural reference, according to which the definite plural *the stones* refers to each stone at once, rather than referring to a single plurality (Yi 2005, 2006, McKay 2006, Oliver/Smiley 2013) [see SEP Pluralquantification]. There are various motivations for plural reference. One of them is the intuition that a sentence such as (1b) is about the stones, not a distinct object that is the sum of stones. Another motivation is the applicability of *many* and numerals like *ten* to plurals (*the stones are many / ten*), but not sums (?? *the group / sum of the stones is many / ten*). Plural reference is also motivated by the way the predicates are some of and *is one of* are understood. Thus if *Genie* is the name for the sum of Russell and Whitehad, only (6) will be true, no (5) (Yi 2005, p. 472):

(5) a. Genie is one of Frege and Russell and Whitehead.

 b. Genie is one of Frege and Genie.

Similarly, quantities as denotations of definite mass NPs appear to behave neither as one nor as many and may ultimately require a different account than the standard one based on reference to quantities (Laycock 2006, McKay 2016).

 Similar considerations shed doubt on bare plural and mass nouns referring to kinds as single entities. Thus, just as (6a), unlike (6b), cannot express the existence of a sum independently of the individuals, (7a) cannot possibly used to make a claim about a noninstantiated kind or property (Strawson (1959, Woltersdorff 1970, Chap. 7), as opposed to (7b), which can be used that way:

(6) a. The books exist.

 b. The sum of the books exists.

(7) a. Wisdom exists.

 b. The property of being wise exists.

 With bare plurals and mass nouns other predicates likewise cannot be understood as applying to the kind as a single entity. Predicates like *encounter, look for, is interesting* only have readings applying to instances of the kind, not the kind itself, unlike terms for property objects. There are two alternatives one might pursue for kind terms of the sort of bare plurals and mass nouns, such as positing entities that fail to have properties themselves but have properties strictly on the basis of inheritance from their instances or to extend plural reference to bare plurals and mass nouns, by taking them to plurally refer to all the possible instances (Moltmann 2013). This would mean that definite plural and mass NPs and bare mass nouns won’t involve unrestricted sum formation and thus do not necessarily show a discrepancy between the ontology of natural language and the reflective ontology of speakers.

 There are other complex NPs, though, that may better show such a discrepancy. One example is NPs that have been analysed as standing for variable objects, entities that may have different manifestations as ‘ordinary entities’ at different circumstances,such as *the water in the container* (which has been replaced), *the rising temperature*, *the people that can fit into the car*, or *the book John needs to write* (Fine 1999, Moltmann 2013). This ontological analysis diverges from that of Montague (Thomason 1974), who took *the temperature* to stand for a functional concept, and Grosu / Krifka (2007), who took the related NP *the gifted mathematician you claim to be* to stand for an individual concept.

**3.1.2. Introduction of objects by abstraction**

An important way of introducing abstract objects that has been discussed in the philosophical literature is that of abstraction from concepts (Frege 1884, Wright 1983, Hale 1987). A related view is that of pleonastic entities introduced by ‘something-from-nothing transformations’ on the basis of nonreferential expressions (Schiffer 1996). Are these strategies part of the (constructional) ontology of natural language? On the Fregean view, abstraction is part of the semantics of functional number terms like *the number of planets* , where it introduces a number on the basis of a concept (the concept of a planet) and the relation of equinumerosity. The pleonastic account was originally applied to *that-*clauses and nominals like *the property of being wise* (Schiffer 1996). As a method of introducing objects on the basis of noreferential expressions, it has been argued to be strictly associated with the compositional semantics of close appositions of the sort *the number eight* and *the truthvalue true*, as well as other ‘reifying terms’ of the sort *the property of being wise* and *the fact that* S (Moltmann 2013). The use of the abstraction strategy may clearly serve the purpose of enlarging the domain of the ontology of natural language by choice, given that reifying terms arguably are part of the ‘periphery’, not the ‘core’ of language (Section 5). The introduction of entities by abstraction also appears to underlie the Kimean notion of events, as opposed to the Davidsonian one of events as primitives (Kim 1976, Davidson 1967, Maienborn 2017).

**3.2. Intentional or nonexistent objects**

The view that there are nonexistent objects, Meinongianism, is a highly controversial philosophical view (van Inwagen 2001). But it is a view that is often motivated or defended by appeal to sentences in natural language (Parsons 1980, Salmon 1987, 1998, Fine 1982a, Priest 2005). The requirement of a compositional semantics also bears significantly on the issue where nonexistent objects are as part of the ontology of natural language. The Meinongian view is generally discussed with simple sentences involving *exist* or intentional transitive verbs such as *look for* or *think about*:

(8) a. Pegasus does not exist.

 b. John thought about / was looking for Pegasus.

It has often been proposed that the occurrence of *Pegasus* in (8a) and (8b) is in fact not a referential occurrence, but an exceptional, empty occurrence of a name (Sainsbury 2005). *Pegasus* in (8a) and (8b) appears to fulfill the criteria for referential terms, though (supporting anaphora, allowing for replacement by quantifiers). There are even stronger arguments from compositionality for NPs in the subject position of *exist* and the object position of *think* standing for a (non-existent) object, and that comes from constructions with relative clauses as below (Moltmann 2016a):

(9) a. The building John though about does not exist.

 b. John thought about a building that does not exist.

A compositional semantics of the relative clause constructions in (9a, b) can hardly be achieved without positing intentional objects as arguments of both *think about* and *exist*. Yet, intentional objects must be restricted to the argument positions of those verbs, since they could not contribute to the truth of sentences of sentences in other argument positions (including as implicit arguments), which, it has been argued, generally are existence-entailing (Priest 2005). Given the proper methodological order of natural language ontology, the subsequent task then is to develop a theory of nonexistent objects that is both coherent and does justice to their restricted occurrences in the semantic structure of sentences, perhaps as derivative objects obtained from (pretend or failed) referential acts (McGinn 2000), which could themselves be described by intentional verbs.

 One might think that given the approach of descriptive metaphysics, possibly non-existent objects would always have to be posited as semantic values of referential NPs: referential NPs reflect entities of a certain sort whether or not they exist. However, semantic values need to contribute to truth conditions, which means that referential NPs that turn out not to refer better fail to have a semantic value rather than standing for nonexistent objects. Nonexistent objects should serve as semantic values of referential NPs only if the latter are arguments of intentional predicates or occur in the scope of expressions serving as intensional operators, e.g. modifiers like *according to the story* or nonfactive attitude verbs (*think, believe say, claim*).

 Intentional objects have also played a semantic role for anaphora across sentence boundaries, both within an intensional context of a single agent and across intensional contexts involving different agents (Edelberg 1986). In those contexts, they serve as discourse referents (Karttunen 1977) and thus interact with dynamic semantics, being individuated not just by what properties agents attribute to them, but also by the flow of information in the discourse (Edelberg 1986). Discourse referents in fact have sometimes been conceived ontologically even in extensional contexts (Landman 1986), though this is not the dominant view in contemporary dynamic semantics (which takes them to be elements in a discourse representation structure or formal semantic constructions, at least in extensional contexts).

**3.3. The mass-count distinction**

The mass-count distinction bears, it seems, on a central topic in ontology, the notion of being a single object and being countable. It also appears to display in a particularly striking way a discrepancy between the ontology displayed by natural language and the ontology tied to cognition or the ontology of the real. Various criteria distinguish count nouns from mass nouns in English. Most important is the availability of the plural and the applicability of cardinal and ordinal numerals with count nouns, but not mass nouns (Pelletier/Schubert 1989/ 2003, Doetjes 2012). The mass-count distinction, it is generally agreed, has semantic content, but there is much less agreement as to what that content amounts to. At first sight, the mass-count distinction seems to reflect the ontological distinction between individuals (*chair, door*) and matter or stuff (*metal, wood*), a distinction that is usually cast in terms of entities having a boundary or some other form of integrity or by being atoms with respect to the noun in question and entities that fail to have unity in that sense. Such an ontological distinction is, if not a distinction in reality, certainly a distinction in our cognitive ontology. However, more recently linguists have drawn the attention to a number of generalizations that indicate that the distinction between singular count, mass, and plural nouns does not strictly go along with an ontological distinction among different sorts of entities (Pelletier/Schubert 1989/ 2003, Chierchia 1998b, Rothstein 2017, Moltmann 1997). First, singular count NPs seem to be able to stand for the very same things as definite plural or mass NPs (*the (loose) collection of stuff on this desk – the stuff on this desk, the quantity of liquid in the container – the liquid in the container*). Second, languages may make a choice of mass as opposed to count without apparent grounds for a perceptual difference (*rice – oats*, *corn – peas*, *cattle – horses*). Also crosslinguistically, the choice of mass vs count for particular entities appears to an extent arbitrary (Engl.  *hair* - Italian *cappelli*, English *pasta* – French *pâtes*). Third, there is an important class of so-called object mass nouns, mass nouns that appear to stand for pluralities of well-individuated objects, such as *hardware, jewelry, luggage, staff*, *police force*, often competing with apparent co-extensional plural nouns in the same language (*clothes – clothing, policemen – police force, cows – cattle, carpets – carpeting*). Yet like other mass nouns, object mass nouns resist numerals (\* *the three police force*) as well as a range of other predicates applicable to plurals (*John listed the clothes* / ??? *the clothing*, *John cannot distinguish the policemen* / ?? *the police force*, *John compared / the carpets* / ??? *the carpeting*).

 Whether a language chooses a singular count, plural, or a mass noun thus appears to an extent arbitrary, yet the choice does play a role for countability and the applicability of predicates. The mass-count distinction thus appears to display a discrepancy between a notion of unity based on the use of singular count nouns and the notion of unity that pertains to our cognitive ontology, which has given rise to semantic approaches that recognize a level of ‘grammaticized individuation’ (Rothstein 2017), as distinct from the ontology that pertains to cognition or to reality. Yet, the cognitive ontology reflected in the lexical content of nouns still plays a semantic role as well, for example in the choice of ‘classifiers’ for mass nouns standing for different sorts of entities (in English *piece of furniture, head of cattle, glass of wine*). That said, the linguistic research on the mass-count distinction across languages and related issues, such as classifier languages across languages has become enormous and thus is in risk of simplified philosophical interpretation.

**4. The nature of the ontology implicit in natural language**

**4.1 Characterizing the ontology of natural language**

This section presents developing views of Moltmann (2019, 2020a, b), addressing the general question of how the ontology implicit in natural language is to be understood and to be distinguished from other ontologies, including ontologies that can be conveyed by using natural language itself.

 The project of natural language ontology goes hand in hand with a view of ontological pluralism, the view according to which there is not a single ontology, but several ontologies: at least potentially distinct ontologies pertaining to language, to cognition, and to fundamental reality. How then should the ontology of natural language be characterized and distinguished from other ontologies?

 First of all, it should be distinguished with respect to the cognitive dimension it relates to, language, as opposed to perception and cognition in general. The following condition then is a first proposal of how to characterize the ontology of natural language:

(10) Characterization of the ontology of natural language (1st version)

 The ontology of a natural language is the ontology a speaker accepts *by way of using the*

 *language.*

The by-way-of-condition ensures that the ontology of natural language is not an ontology the speaker just accepts when using language, which could be the case just by coincidence.

 The other dimension in which the ontology of natural language needs to be characterized is in terms of the opposition intuition – reflection / reasoning [see SEP intuition]. The ontology of natural language is to be distinguished from the ontology a philosopher or non-philosopher accepts upon reflection, that is, on the basis of ontological reasoning. An ontological view that a philosophy (or non-philosopher) arrives at upon reflection can obviously expressed and conveyed to others making use of natural language. Natural language can be used for making and denying various ontological claims and for introducing revisionary ontological theories. However, such uses of natural language do not display the ontology implicit in natural language. The ontology implicit in natural language thus must be distinguished from ontological views that are based on reasoning and that can be put forward or denied using natural language.

 What are the criteria for the distinction between the ontology implicit in language and an ontology based on reasoning? In what sorts of linguistic data does it manifest itself? As a first important criterion, metaphysical assertions cannot be indicative of the ontology implicit in natural language. In that respect, natural language ontology differs both from the use of language for the purpose of conveying philosophical reflection and from folkmetaphysics (Schaffer 2019), metaphysics whose subject matter is the ontology reflected in ‘folk intuitions, that is, the naïve ontology that non-philosophers (‘the folk’) subscribe to. Folkmetaphysics, just like folkpsychology, folkphysics and folkbiology, can manifest itself in metaphysical assertions. Thus, the assertions below may belong to the data of folkmetaphysics:

(11) a. There are artifacts.

 b. States are not events.

 c. There are things that don’t exist

However, the assertive content of such sentences is not indicative of the ontology of natural language (whether widely believed or not). No philosopher or linguist would appeal to the acceptability of sentences such as (11) when arguing that natural language reflects an ontology of artifacts, of states distinct from events, or of nonexistent entities. Otherwise, another philosopher or linguists might just as well appeal to negations of (11a, b, c) to argue for just the opposite. What matters for natural language ontology are ontological presuppositions, not assertions.

 How do ontological presuppositions manifest themselves in language? One rather familiar way is as pesuppositions of ontological categories carried by predicates, referential NPs, quantifiers, or pronouns. Thus, predicates may require as arguments entities of particular ontological categories on pain of resulting in a category mistake (Magidor 2013). For example, *stop* and *happen* require events as arguments, and *move* and *exist* (enduring) objects. There are also constraints on the sorts of entities particular sorts of NPs may stand for. For example, gerunds like *John’s buying of the house* can only stand for events, gerunds like *John’s buying the house* only for facts (Vendler 1967). Quantificational NPs like *every time* can range only over times or situations, quantifiers like *somewhere* only over places, and quantifiers like *somehow* only over qualities. Similarly, the pronoun *when* can only stand for a time, the pronoun *where* for a location, and the pronoun *how* for a quality. Ontological categories may also be associated with syntactic categories (Section 2.2.3.).

 There are types of linguistic data that only natural language ontology can take into account, but not folkmetaphysics or any form of philosophical reflection. These include sentences that involve ontological commitments not accessible to ordinary speakers, for example, by containing silent syntactic elements with ontological content, as would be the case according to the sorts of syntactic structures posited in generative syntax. For example, Kayne (2005, chap. 8) argues that the sentence *John has few books* contains a silent (antecedentless) occurrence of the noun *number*, which would mean that the actual structure of the sentence, *John has* NUMBER *books*, involves reference to a number. Another example is lexical decomposition in syntax with ontological relevance. Thus, Harves/Kayne (2012) argue that the underlying form of the English verb *need* is *have need*. If this structure is input to interpretation, it means that it involves an ontological commitment to things like needs that is not evident from the simple verb *need* alone. Underlying syntactic structures of this sort are generally unavailable for reasoning by speakers of the language. They are posited in generative linguistics on the background assumption that knowledge of grammar is implicit and to an extent innate, and as such not available to introspection and reflection. Ontological notions involved in such structures should be just as much part of implicit knowledge unavailable to introspection as the syntactic structures themselves. This, though, raises a new challenge, namely to explain how it is possible for a speaker to reject upon reflection an ontological notion whose acceptance goes along with the implicit knowledge of grammar.

 The ontology of natural language thus must be understood as an ontology that speakers *implicitly accept*, not as an ontology speakers accept upon reflection when thinking about what there is and about the nature of things:

(12) Characterization of the ontology implicit in natural language (2st version)

 The ontology of a natural language is the ontology speakers *implicitly* accept by way of

 using the language.

The notion of implicit acceptance of the ontology is a particularly robust one in that it resists rejection upon reflection, at least as long as the agent uses the same language. Ordinary speakers may reject entities or any notions in the ontology that is implicit in natural language displays and maintain a revisionary ontological view instead. Yet anyone that uses the relevant parts of the language commits herself to them. The form of implicit acceptance is rather different from the notion of implicit acceptance in ethics. In the context of ethics, what is implicitly accepted, *implicit bias* [SEP], permits rejection upon reflection. Accepting the ontology of natural language by using a language somehow does not even seem to contradict an explicitly adopted ontological belief, which means that it is better not to be understood as a form of belief at all. The ontology implicit in natural language appears instead on a par with syntax, where even awareness of grammatical structure generally does not permit changing or ‘improving’ it. This suggests that the implicit acceptance of the ontology of natural language should better be understood as tacit knowledge, namely in the sense of tacit knowledge of a ontology that is selected from the ontological plentitude of the real, on a maximalist conception of reality (Eklund, 2008Schaffetr 2009).

**4.2. Natural language ontology and the core-periphery distinction**

(12) requires a further modification, namely by making reference to a distinction between an ontologically relevant core and ontologically relevant periphery of natural language. Natural language ontology should set aside not only metaphysical assertions, but also a second range of linguistic data, namely those involving technical philosophical expressions or special, philosophical or ‘technical’ uses of expressions. Philosophers or non-philosophers when engaging in ontological reflection may use or introduce expressions specifically meant to convey ontological notions based on reflection. But of course, such technical philosophical expressions or uses of expressions are not indicative of the ontology that is implicitly accepted by the use of language, but rather of an ontology based on reasoning or reflection. Non-ordinary uses of natural language expressions were the subject of critique in ordinary language philosophy since they appear to generate philosophical problems. Whether or not one agrees with the latter, certainly non-ordinary uses of ontologically relevant expressions need not reflect the ontology implicit in language. That does not mean such uses should be sanctioned. Rather a distinction that needs to be made between the (ontological) *core* of natural language (or the use of it) and its (ontological) *periphery.* Only the core reflects the ontology of natural language of language, not the periphery.

 In fact, such a core-periphery distinction has been made implicitly throughout the history of philosophy. Philosophers who have appealed to natural language for motivating a particular ontological view have always made use of only certain types of expressions or uses of expressions and not others, implicitly drawing the distinction between ontology based on implicit acceptance, and ontology based on reasoning. The same holds for the practice of contemporary semanticists and philosophers pursuing natural language ontology. This core-periphery distinction is essential for natural language ontology. Otherwise, any ontological view or notion, as reflected in particular technical terms or uses of them, would be part of the ontology of natural language, which is clearly not the case.

 What sorts of expressions or uses of expressions are part of the periphery? Apart from technical terms introduced as such, one kind of expression that certainly belongs to the periphery is reifying NPs of the sort *the number eight, the property of being happy, the proposition that it is raining*, or *the truth value true*. Philosophers have generally stayed away from reifying NPs when appealing to natural language for motivating an ontological category. For example, Frege (1884) did not motivate numbers as objects by appealing to 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*, which certainly belong to the core of language, when arguing for numbers being objects, and his motivations for considering truth values to be objects did not come from particular natural language sentences at all. Likewise, Hale (1987) did not argue for properties being objects on the basis of terms like *the property of mercy*. Rather he used simple terms like *mercy* from the core of language. Finally, Link (1983) did not motivate mereological sums being part of the ontology of language on the basis of terms like *the sum of the students*, which belong to the periphery of language, but simple definite plurals like *the students*, which clearly belong to the core of language.

 Given such a core-periphery distinction, the characterization of the ontology implicit in natural language needs to be revised as follows:

(13) Characterization of the ontology of a natural language (final version)

 The ontology of a natural language is the ontology a speaker implicitly accepts by way of

 making use of the *core* of the language.

(13) gives the characterization of the ontology of a particular language, rather of natural language in general. The practice of natural language ontology, at least in philosophy, is generally based on an implicit assumption of there being a single ontology shared by all human languages. This assumption is of course not unproblematic, touching upon the Sapir-Whorf hypothesis and the controversy surrounding it (Pinker 1982, Hespos & Spelke 2004, Pelletier 2011).

 The core-periphery distinction raises a number of general questions. One of them is whether there are linguistic criteria for the distinction, that is, syntactic or lexical conditions that determine which expressions (or uses of expressions) will be part of the periphery rather than the core. These criteria may involve the distinction between the lexical and the functional part of language, different syntactic categories (nouns generally seem to permit a non-ordinary use). It also raises the question how the distinction relates to the core-periphery distinction that Chomsky (1981, 2006) introduced for syntax, where, very roughly, the core of the syntactic system of a language represents universal grammar and the periphery consists in exceptions and parts of language added on from outside influences (see also Yang 2016).

 The core-periphery distinction in natural language ontology is important also for the quest for universals of natural language ontology. Clearly, only the core, not the periphery 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. Explicitly the core-periphery distinction is used in the general hypothesis about reference to abstract objects in natural language:

(14) The Abstract-Objects Hypothesis

 Natural language does not involve reference to abstract objects in its core, but only in its

 periphery.

Given (14), what appeared to be expressions in the core of natural language, referring to abstract objects (numbers, 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 [SEP tropes], which in turn 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, the word ‘happy’* or *the proposition that it is raining.*

 The periphery presents specific challenges for natural language semantics and natural language ontology. The periphery, from a linguistic point of view at least, is a legitimate part of natural language (or a legitimate extension of it): philosophical technical terms and non-ordinary, philosophical uses of expressions certainly have a semantics and will reflect an ontology. However, they do not reflect the ontology implicit in natural language, but rather an ontology that may diverge from that ontology, the ontology of the core. It is also a task of semantics and natural language ontology to allow for an account of the ontology, and hence compositional semantics, of the periphery (and for that purpose it is important to keep in mind that natural language ontology permits merely conceived entities as semantic values in intensional contexts, namely those setting out the relevant philosophers’ point of view).

 Why do reifying NPs such as *the property of being happy* have a peripheral status, but not *happiness*? This may be attributed to the occurrence of the sortal *property* in that construction, rather than the construction as such, namely if functional categories (syntactic categories and features) generally belong to the syntactic core, but the lexicon, at least to a great extent, to the periphery. Thus, functional elements generally do not allow for non-ordinary uses (e.g. (overt or empty) determiners, morpho-syntactic categories (plural, tense)), as opposed to lexical words, especially nouns.

**6. Outlook**

Natural language ontology is just at the initial stage of a developing discipline of its own. The methodological issues surrounding it remain to a great extent to be developed much further, such as the relation of the ontology reflected in language to conceptions of reality, to ontologies tied to other representational or cognitive functions, the core-periphery distinction, which is essential for natural language ontology, the ontological status associated with different semantic roles, the way ontological categories are reflected in natural language given recent theoretical syntactic and crosslinguistic research, and the close connection of the ontology of natural language to the functional part of language. At the same time, it is undeniable that there is an ever expanding empirical field of deeper research on the reflection of ontology in a particular language and across languages, as well as the relation of the ontology reflected in natural language to cognition.

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