

Final version to appear in James Miller (ed.): *The Language of Ontology*. Oxford University Press

Levels of Ontology and Natural Language: the Case of the Ontology of Parts and Wholes

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Version March 29, 2020

Introduction

In contemporary metaphysics, it is rather common to recognize two levels of ontology: the ontology of ordinary objects, which is reflected in our common sense intuitions, and the ontology of what there really is. Metaphysics has been focused on those two levels as well as the relation between the two, pursuing questions such as whether and how the ontology of ordinary objects can be understood in terms of what is fundamental and whether some or all of the items in the ontology of ordinary objects even exists.

It seems obvious that natural language reflects the ontology of ordinary objects and entities ontologically dependent on them, an ontology that includes material objects, artifacts, events, shadows, holes, and tropes. In fact, philosophers discussing the ontology of ordinary objects frequently make reference to linguistic data, such as the applicability of predicates to terms putatively referring to the entities in question. While natural language certainly displays the full range of the naïve ontology of ordinary objects with its various referential terms, the ontology of ordinary objects is not dependent on natural language: the ontology of ordinary objects plays a role in cognition and perception quite independently of the acquisition and use of language.

The aim of the paper is to argue for another level of ontology besides that of what is real or fundamental and of the ontology of ordinary objects. This is what I will call the ‘language-driven ontology’. The language-driven ontology is not a full alternative ontology to that of the ontology of ordinary objects. Rather it is an ontology superimposed on the ontology of ordinary objects. It need not align with the latter, but may enrich or filter it. The language-

driven ontology is specifically tied to language, and a commitment to that ontology strictly goes along with the use of language.

This paper will argue for the level of the language-driven ontology on the basis of the semantics of parts and wholes broadly speaking, namely the mass-count distinction and part-structure-sensitive semantic selectional requirements, that is, presuppositions that predicates or readings of predicates may impose on the part structure of their arguments. This little-discussed phenomenon is illustrated by the available readings of *count* and *compare* below:

- (1) a. John counted the men and the women.
 b. John compared the men and the women.
 b. John compared the individual men and the individual women.

Count applies only to pluralities, with a reading targeting individual members of the plurality, as in (1a) (which cannot be true if John counted two: the group of men and the group of women). By contrast, *compare* in (1b) also has readings targeting subgroups, on a reading on which John compares the men to the women. Such a reading disappears with the addition of the modifier *individual* as in (1c), an expression specifically applying at the level of the language-driven ontology.

The language-driven ontology includes a domain of pluralities (entities in the denotation of plural nouns) and a domain of quantities (entities in the denotation of mass nouns), both of which are closed under sum formation, and thus can include anything one may refer to with *the things* or *the stuff*. By contrast, the ontology of ordinary objects does not reflect such mereological universalism, but imposes constraints of integrity or purpose on the formation of sums.

Central to the language-driven ontology of parts and wholes is moreover the notion of unity, that is, the property of being a single entity. I will argue that the content of the mass-count distinction consists just in the presence (count nouns) or absence (mass nouns) of a primitive condition of unity in the language-driven ontology, rather than in ontological properties of entities (in the tradition of Jespersen 1924) or mereological properties of extensions (in the tradition of Quine 1960 and Link 1983).

The language-driven ontology raises the question about its status: does it amount to another level of (conceptual) representation or can it be viewed as an ontology of what is real? I will argue for the latter: the language-driven ontology is an ontology of the real (though not fundamental). However, it is based on a selection of actual entities and features of entities

(unity), and in that sense it is perspectival. This goes along with a ‘maximalist’ view of reality as a plenitude of entities (Eklund 2008, Hawthorne 2006, Schaffer 2009). That is, reality consists in a plenitude of entities of both simple and derivative sorts among which the cognitive and language-driven ontologies will make their selection. Some of those entities will count as single entities in the language-driven ontology, some of them won’t, depending on what entities language selects for its ontology. Some of them will be selected for the ontology of ordinary objects, some of them won’t. The language-driven ontology and the ontology of ordinary objects thus are both based on a (mind- or language-dependent) selection among what is real.

The paper takes up a number of generalizations from my earlier work on the semantics of parts and wholes, the theory of situated part structure (Moltmann 1997, 1998, 2005). The view this paper develops, however, differs in some crucial respects from that theory. On the theory of situated part structures, what makes something have (language-driven) unity (and be in the extension of a count noun) is to be an integrated whole in the situation of reference. Singular count nouns convey unity in that sense, but not mass nouns. Part-structure-sensitive semantic selection cares about information about integrated wholes in a situation of reference. Being an integrated whole standardly consists in having a form or a boundary, but it may also just consist in being a maximal entity whose parts share a particular property or connection in the situation of reference (‘the women’ or ‘the furniture in the room’). The new view sharply distinguishes the notion of unity from the notion of an integrated whole. Referring to something as a single entity may go along with characterizing it as an integrated whole (and often does), but it need not. Conversely, referring to something as an integrated whole does not guarantee that it counts as a single entity (as fails to be the case for ‘the women’ and ‘the furniture in the room’). Unity is now taken to be a primitive notion, not derivable from conditions of integrity.

This paper recasts the theory of situated part structures in entirely ontological terms, doing away with situations. While the earlier view was based on the notion of an entity in a situation (with the assumption that the content of the situation would determine the part structure of the entity), the new view makes use only of entities, which include entities that fail to have unity (pluralities and quantities), yet may have a structure (‘the men and the women’ on one reading of (1b)). While for the main part of the paper pluralities and quantities are treated as entities, there is a serious issue that will be addressed at the end, namely whether pluralities and quantities, not being single entities, can even be regarded as entities in the first place (as they are on standard semantic theories).

The language-driven ontology of parts and wholes shares important features with the light ontology of pleonastic entities of Schiffer (1996), an ontology of abstract entities that includes properties and propositions introduced on the basis of the use of predicates and sentences respectively. They are part of the same, what Schiffer (1996) calls, ‘language-created, language-independent’ ontology, an ontology distinct from the ontology of ordinary objects. They both are tied to the functional part of language (syntactic constructions or categories), rather than, like the ontology of ordinary objects (and entities dependent on them), the lexicon.

The paper will start with a few remarks about ontology and natural language in general. Against the background of the older view of situated part structures, it will then outline the new view of the language-driven ontology of parts and wholes. Finally, it will address the question of the status of the language-driven ontology, drawing the connection to the ontology of pleonastic entities.

1. How does natural language reflect ontology?

1.1. Reflection of ontology in natural language

The background assumption of this paper is that natural language reflects ontology, though not the ontology of fundamental reality.¹ There are various ways in which natural language reflects ontology. Most importantly, natural language reflects entities by means of its referential and quantificational NPs and its predicates or so goes the most common view. Thus in a simple sentence like *John sees a tree*, assuming it is true, the referential NP *John* and the quantificational NP *a tree* stand for entities, and the property expressed by *saw* is predicated of John and one of the entities *a tree* ranges over. The standard view, in both linguistics and philosophy of language, is that referential NPs (names, definite NPs, and specificational indefinites) stand for entities, quantificational NPs range over, objects and predicates express properties of objects.

Why is this view plausible? First of all, it seems to match the intuitive functions of parts of speech: we use referential NPs to refer to entities and predicates to attribute properties to them. Moreover, the view allows for a uniform semantics of NPs and of predicates, and thereby appears to guarantee compositionality. That is, referential NPs always stand for

¹ See Moltmann (2017, 2019, to appear) for more on the ontology reflected in natural language.

entities, quantificational NP always range over entities, and predicates always express properties of entities.² Frege, in particular, was very explicit about the connection between objecthood and referential NPs. It was part of his Context Principle that a referential NP, in the context of a sentence, always contributes an object (entity) to the composition of the meaning of the sentence (Wright 1983). Compositionality and ontology thus appear to be intimately linked.³

The view that referential NPs always stand for entities requires recognizing a wider range of entities than many metaphysicians may in fact be willing to accept, such as a great range of derivative and perhaps abstract entities. It also requires recognizing entities that are specifically part of the language-driven ontology, in particular, it seems, pluralities (denotations of definite plural NPs) and quantities (denotations of definite mass NPs) (though the status of pluralities and quantities as entities is in fact questionable and may have to be abandoned, see Section 5). Just as definite singular NPs stand for entities that are individuals, definite plural NPs and mass NPs should stand for entities, namely pluralities and quantities. As a terminological clarification, I will use the terms *individual*, *plurality* and *quantity* as terms for the sorts of entities that make up the extension of singular count, plural, and mass nouns respectively and also act as respective semantic values of definite singular count, plural, and mass NPs.⁴ I use the term *entity* as the more general term, comprising individuals, pluralities, and quantities. That the three types of definite NPs stand for entities appears to be supported by the fact that they allow for the same predicates with the very same reading, for example *weigh*:

- (2) a. The stone weighs one kilo.
 b. The stones (together) weigh 5 kilo.
 c. The material weighs 5 kilo.

² Frege went even further and took the notion of an object (entity) itself to be tied to the syntactic function of an referential NP, introducing a syntactic notion of objecthood: an object is what a referential NP may stand for, and that is because referential NPs have the semantic role of standing for an object in the context of a sentence: they always contribute an object to the composition of the meaning of the sentence.

³ There is also the view, though, that natural language does not involve reference to objects (Chomsky 1986, 1998, 2013) and that compositionality can be achieved without ontology, on the basis of concepts only (Pietroski 2018). However, see my remarks in Section 7.

⁴ For the use of the term ‘quantity’ for the elements in the denotation of mass nouns see ter Meulen (1981), Schubert/Pelletier (2012). By contrast, the term ‘substance’ is used by some semanticists for the denotation of bare mass nouns (*Gold is shiny*) (in particular ter Meulen 1981). Quantities then are instances of substances. Other semanticists take bare mass nouns to stand for intensions (Pelletier / Schubert 2012) or modalized pluralities of quantities (Moltmann 2013). The present use of term ‘quantity’ is meant to be ontologically neutral.

Considerations of compositionality give a strong motivation for pluralities and quantities being entities on a par with individuals as elements in the denotation of nouns and as semantic values of definite NPs. Yet at the same time their ontological status is different from that of individuals, which may put into question their very status as entities, as on standard semantic theories (Section 5).

1.2. Semantic selection and category mistakes

This paper focuses on part-structure sensitive semantic selection, which has received little attention in the linguistic and philosophical literature. The literature has instead focused on constraints predicates may impose on the category of objects to which they may apply. For example *start* selects events, but not (enduring) objects. Such constraints are presuppositions that need to be satisfied in order for the sentence to be able to be true or false, rather than resulting in a category mistake.⁵ In order to avoid a category mistake, often accommodation may save the interpretability of the sentence, that is, there may be a shift from the actual referent of the nominal argument to a closely related one, as, for example, in the shift from the book to an event of reading it in (3b):

- (3) a. John started reading the book.
 b. John started the book.

There are challenges to the Fregean view that predicates apply just to objects which have been discussed in the literature. A widely shared view, however, which I will adopt myself, is that such challenges can be dealt with pragmatically, rather than requiring giving up the view that predicates apply just to objects.⁶ For example, *appreciate* is a predicate that appears to be sensitive to the way an object is presented even in unembedded contexts:

⁵ See Magidor (2013) for an overview of the discussion of category mistakes.

⁶ An example that figures prominently in the literature and for which a pragmatic account has been defended is the one below (Saul 1997):

- (i) Clark entered the phone-booth and Superman emerged.

There is one case, where a predicate does seem to select a particular linguistic presentation, namely the predicate *describe*, generally not recognized as such in the literature:

(4) a. (As regards Bill) John appreciates the gardener, but not the teacher.

Predicates like *appreciate* are sensitive to facets of an object. Yet, the predicate itself does not select the linguistically conveyed presentation itself. That is because (4b) by itself can easily have the reading on which John appreciates Bill, the gardener, as a teacher:

(4) b. John appreciates the gardener.

This paper focuses on predicates that appear to be sensitive to the way an entity is presented, predicates that are sensitive to the mereological presentation of an entity, in the broadest sense. Those predicates impose semantic selectional requirements that concern the linguistic presentation of entities in terms of unity, plurality, and contextual structure. I will argue for a purely ontological account of this form of semantic selection, rather than relativizing it to a situation as in my earlier work, thus avoiding an exceptional relativization of part-structure-sensitive semantic selection to linguistic presentation.

2. Part structure-sensitive semantic selection

2. 1. The mass-count distinction

The mass-count distinction is closely connected to part-structure-sensitive semantic selection, and both motivate the level of the language-driven ontology. I will therefore first argue for a novel account of the content of the mass-count distinction before turning to part-structure-sensitive semantic selection.

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- (ii) a. John described the object: he said it was a house.
 b. ??? John described the house: he said it was a house.
 (iii) He described the gift. It was red wine from France.

Predicates like *describe* are sensitive to the degree of generality of a description. The more general description may include accidental function. *Describe* is strictly sensitive to the content of the NP. A pragmatic account does not seem plausible in this case.

Another class of predicates not just caring about objects is predicates like *high*, which are sensitive about the orientation of the object in space (Moltmann 1998):

- (iv) This pole is higher / longer than that one.

The mass-count distinction is first of all a syntactic distinction between nouns. Nouns that display a singular-plural distinction are count; nouns that do not are mass. There are further, standard criteria for mass nouns that distinguish them from count nouns, such as their selection of quantifiers (mass nouns go with *little* and *much*, count nouns with *few* and *many*), resistance to numerals for mass nouns, but not count nouns, and lack of support of *one*-anaphora for mass NPs, but not singular count NPs.⁷ The syntactic mass-count distinction, so the general agreement, has semantic content and in that sense goes along with a *semantic mass-count distinction*. There is little agreement, though, what that semantic distinction consists in, whether it is an ontological, extension-based, situation-based, epistemic, or conceptual-perspectival distinction.⁸

By tendency, the mass-count distinction goes along with the ontological distinction between objects and matter or stuff (substances).⁹ This seems also reflected in the meaning shift that generally occurs when a count noun is turned into a mass noun (*many apples* → *much apple*). There are also mass-count pairs in which the meaning of the mass noun is not obviously derived from the count noun, yet display that same ontological distinction. An example is the pair of the count noun *part* and the mass noun *part*. The count noun generally stands for parts with a boundary, structure, or function; the mass noun also applies to parts that lack such features (Moltmann 1998):

- (5) a. He drank part of the wine / ate part of the meal.
 b. ??? He drank a part of the wine.

The distinction between the material and an object constituted by it is generally regarded an ontological distinction by philosophers concerned with the ontology of ordinary objects. (rather than the ontology of fundamental reality) (Fine 2003). The semantic distinction between count and mass might then be drawn as an ontological distinction between entities that come with a boundary, form, or integrity of some sort (count) and entities that lack a boundary, form, or integrity (mass). In fact this is how the mass-count distinction was first

⁷ See Doetjes (2012) and Pelletier/ Schubert (1989, 2003) for criteria for mass and count.

⁸ See Pelletier/ Schubert (1989, 2003) for an overview of different approaches to the semantic mass-count distinction.

⁹ See also Soja/Carey/Spelke (1991).

drawn by Jespersen (1924).¹⁰ In the theory of situated part structures (Moltmann 1997, 1998, 2005), the notion of integrity was relativized to a situation, permitting entities to be accidental integrated wholes or to have or lack integrity just on the basis of linguistic information.

There are a number of observations to the effect that the distinction between singular count, mass, and plural nouns does not strictly go along with an ontological distinction among different sorts of entities.

First, a singular count NP may, it seems, refer to the very same thing as a definite plural or mass NP, in examples such as the following:¹¹

- (6) a. the collection of papers on this desk – the papers on this desk
 b. that particular amount of medicine John swallowed – that medicine John swallowed
 c. the patch of water on the floor – the water on the floor

The count nouns *collection*, *amount*, and *patch* in (6) could convey at best the accidental integrity of a plurality or quantity (e.g. temporary configuration of the papers in (6a)) or even just merely conceived integrity, not grounded in any actual properties of the plurality or quantity. The semantic differences in the pairs in (6) cannot be attributed to ontological differences grounded in the absence or presence of integrity of entities.

Second, in a given language, the choice of a mass noun or a count noun for particular entities is often arbitrary, not grounded in any perceptual differences among types of entities (Chierchia 1998b). Examples in English are the mass-count pairs *rice – oats*, *corn – peas*, *cattle – horses*.

Third, there is a great range of so-called object mass nouns, mass nouns that appear to stand for pluralities of well-individuated objects, such as *furniture*, *hardware*, *jewelry*, *luggage*, *staff*, *police force*.¹² Object mass nouns often come with apparent co-extensional plural nouns in the same language (Chierchia 1998b), as the following count-mass pairs illustrate:

¹⁰ Thus, for Jespersen (1924, p. 198): ‘There are a great many words which do not call up the idea of some definite thing with a certain shape or precise limits. I call these ‘mass-words’; they may be either material, in which case they denote some substance in itself independent of form, such as silver, quicksilver, water, butter, gas, air, etc., or else immaterial, such as leisure, music, traffic, success, tact, commonsense’ .

¹¹ See, for example, Moltmann (1997) and Chierchia (1998b), for discussion.

¹² See, for example, Chierchia (1998b), Cohen (to appear) for linguistic discussions of object mass nouns.

- (7) a. clothes – clothing
 b. policemen – police force
 c. cows – cattle
 d. carpets - carpeting

Finally, there is a lot of crosslinguistic, and, it seems, arbitrary variation regarding whether something is denoted by a plural or a mass NP, illustrated by English *hair* - Italian *cappelli*, English *pasta* – French *pâtes* (Chierchia 1998).

In summary, whether a language chooses a singular count, plural, or a mass noun is to an extent arbitrary and only by tendency aligns with the way entities are individuated in the ontology of ordinary objects. This makes an ontological account of the semantic mass-count distinction rather implausible. In Rothstein’s (2010) words, ‘While the mass-count distinction is clearly influenced by the structure of matter, it is not taken over from it’.

The relevant generalizations are major problem not just for ontological approaches to the content of the mass-count distinction, but also for approaches to the mass-count distinction based on mereological properties of noun extensions in the tradition of Link (1983).¹³ On such a view, the characteristic property of a singular count noun is to have an *atomic* extension, that is for any x and y , if $x \in [N]$ and $y < x$, then $\neg y \in [N]$, where $<$ is the proper-part relation. By contrast, the extension of a mass noun is not atomic; rather it generally is taken to be taken to be *divisive*, that is, for any $x \in [N]$, for any y , if $y < x$, then $y \in [N]$. The extensions of both mass nouns and plural nouns are cumulative, that is, if $x, y \in [N]$, then $\text{sup}_{<}(\{x, y\}) \in [N]$, where the sum of x and y is taken to be the least upper bound with respect to $<$ ($\text{sup}_{<}$) of x and y . Being both divisive and cumulative defines *homogeneity*, the characteristic property of mass noun extensions. Lack of atomicity for mass nouns is known to raise difficulties, in particular the minimal-parts problem, which arises for mass nouns such as *rice*. Also atomicity for singular count nouns is problematic since it is inapplicable to nouns like *fence*, *thing*, and *line* (Moltmann 1997, Rothstein 2010, 2017). Most striking is the inapplicability of the extension-based approach to object mass nouns. Object mass nouns have extensions that share the very same mereological properties as plural nouns.¹⁴ These problems

¹³ The extension-based approach can be traced back to Quine (1960).

¹⁴ These problems have given rise to variants of extensional mereological theories, such as epistemic theories (Chierchia 2015), or context-based theories (Rothstein 2010, 2017). I consider the problems serious enough to require abandoning the approach entirely.

have given rise to variants of the extension-based mereological approach, such as epistemic theories (Chierchia 2015) and context-based theories (Rothstein 2010, 2017), which involve a relativization of conditions such as atomicity and divisiveness.

Another major challenge for standard, ontological and extension-based, views of the content of the mass-count distinction is the semantics of nouns in classifier languages. In Chinese, all nouns (with the exception of measurement nouns) require numeral classifiers for numerals to be applicable. Numeral classifiers select either natural units (sortal numeral classifiers) or units based on measurement (mensural numeral classifiers).¹⁵ English has something close to classifier constructions with mass nouns:

- (8) a. two pieces of furniture
 b. two liters of milk

In (8a), *pieces* and *liter* act like sortal and mensural classifiers respectively, enabling countability of the denotation of a mass noun. Standard ontological and extension-based characterizations of mass nouns (lack of integrity or natural unity and homogeneity respectively) do not apply to number-neutrals nouns, just as they do not apply to object mass nouns. In languages such as Chinese, all count as mass or rather ‘number-neutral’, regardless of mereological properties of their extensions or the structure of entities in their extension. Extension-based approaches are not as such suited for classifier languages, since on those approaches number-neutral nouns display the same semantic mass-count distinction as nouns participating in the mass-count distinction.¹⁶

On the present view, the problems for the extension-based approach are serious enough to abandon the approach. Only cumulativeness for mass and plural nouns appears to be an adequate condition, though it does not distinguish mass nouns and count nouns and may itself not apply in the way it meant to (Section 5). The present proposal is that the semantic content of the mass-count distinction consists simply in that singular count nouns convey primitive unity and mass nouns don’t. Importantly, the extension of nouns will consist in entities in the language-driven ontology, not the ontology of ordinary objects. This means that the entities in the extension of singular count nouns have the status of single entities in the

¹⁵ For classifiers and the distinction between mensural and sortal classifiers in particular see Cheng / Sybesma (1999), Doetjes (2012), and Rothstein (2017).

¹⁶ Extension-based approaches, though, have been pursued for classifier languages. See for example Rothstein (2017).

language-driven ontology, but not so the entities in the extension of mass nouns. Entities in the extension of mass nouns will lack unity in the language-driven ontology even if they have unity in the ontology of ordinary objects. For the time being, the denotation of a plural noun N_{plur} can be taken to be just as on extensional mereological approach, namely the closure under sum formation of the extension of N .

Two ontological structures are then to be distinguished, one for the ontology of ordinary objects, minimally given in (9a), and one for the language-driven ontology, given in (9b):

(9) a. The ontology of ordinary objects: $\langle I^*, Q^* \rangle$

b. The language-driven ontology: $\langle I, (Q, <), (P, <) \rangle$

The assumption about the ontology of ordinary objects is simply that it divides into a domain of entities that are single entities (I^*) and a domain of entities that aren't (Q^*) (a domain of quantities and perhaps pluralities). The language-driven ontology consist of a domain I of single entities as well as a domain Q of quantities, which is closed under sum formation (least upper bounds with respect to $<$) and a domain of pluralities P which again is closed under sum formation.

The domains I^* and I need not coincide, and neither do Q^* and Q . One important difference between I^* and I is that in the ontology of ordinary objects, unity is based on conditions of integrity and purpose, which restricts the formation of sums (Simons 1987, Schaffer / Rosen 2017). In the language-driven ontology, by contrast, unity need not be grounded and sum formation is unrestricted (mereological universalism).

The semantics of singular count, mass, and plural nouns is subject to the following conditions:

(10) a. For a count noun N , $[N] \subseteq I$

b. For a mass noun N , $[N] \subseteq Q$

c. $P = \{x \mid \exists X (X \neq \emptyset \ \& \ X \subseteq I \ \& \ x = \text{sup}_{<}(X))\}$

d. For the plural N_{plur} of a count noun N , $[N_{\text{plur}}] = \{x \mid \exists X (X \neq \emptyset \ \& \ X \subseteq [N] \ \& \ x = \text{sup}_{<}(X))\}$

(10b) also applies to number-neutral nouns as in Chinese. This means that entities in the extension of number-neutral nouns fail to have unity in the language-driven ontology even if

they have unity in the ontology of ordinary objects. The effect of numeral classifiers then is to impose unity, by selecting entities that have unity in the ontology of ordinary objects (sortal numeral classifiers) or by imposing a measurement (mensural numeral classifiers). The meaning of a classifier now is a function mapping an entity e in the domain Q onto one in I minimally distinct from e by having unity. In the ontology of ordinary objects, the relation of constitution C would relate an entity without unity to one made up from it that has unity. That same relation can be carried over to the language-driven ontology, relating an element e in Q to one in I that differs from e only in having unity. C will then figure in the meaning of sortal classifier constructions as below:

(11) For a sortal numeral classifier C and a noun N ,

$$[CN] = [x | \exists y (y \in Q \ \& \ Cy \ x \ \& \ y \in [C] \ \& \ x \in [N])]$$

I will set aside the semantics of mensural classifier constructions, which will involve measurement functions applying to quantities.

2.3. The theory of situated part structures (Moltmann 1997)

On the present view, unity is a primitive notion. Being a single entity may go along with being an integrated whole, but being an integrated whole does not guarantee having unity and thus counting as a single entity. This holds also when integrity is relativized to a situation of reference. This constitutes the crucial departure from the theory of situated part structure in Moltmann (1997, 1998, 2005), which I will here quickly review.

The general idea of that theory was that the semantics of natural language involves a part structures in situations, where information content of the situation determines the part structure of quantities and pluralities, based on whether entities count as integrated wholes. . The semantic mass-count distinction, on that view, moreover consists in that singular count nouns convey integrity of an entity in a situation of reference, whereas mass nouns convey the absence of it in a minimal situation of reference (that is, a situation attributing to an entity no more than the content of the noun itself) (Moltmann 1997, 1998). Part-structure-related semantic selectional requirements furthermore care about whether entities or their parts are integrated wholes in the situation of reference.

The theory of situated part structures has difficulties dealing with some aspects of the mass-count distinction. It needs to appeal to a problematic notion of merely conceived integrity for

data as in (6), where integrity is not grounded in any actual properties of the entity referred to. Like any standard ontological and extension-based account, it has difficulties dealing with object mass nouns. That is because the reference situation for, for example, the NP *the furniture* will always include the attribution of the lexical content of the noun *furniture* to the referent, but that means that parts of the referent (the pieces of furniture) are characterized as integrated. Yet they do not count as single entities. Moltmann 1998).

One of the most important problems of the theory of situated part structures is that it considers the referents of definite plural and mass NPs integrated wholes. But this means that the pluralities and quantities count as one, rather than as many, which is inadequate, as we will see.

A further problem for the situation-based approach of Moltmann (1997) is that the situation associated with the utterance of definite plural or mass NP cannot generally determine the contextually relevant structure of the plurality or quantity referred to. The idea was that the information content of the reference situations tells what parts of the plurality or quantity are integrated wholes and therefore count as the only parts (on a nontransitive, situated part relation). However, as a matter of fact, it still depends on speaker's intentions what the relevant parts are. The readings of (12) show that:

(12) John compared the German and American students.

In (12), the descriptive content of the definite NP would determine the maximal plurality of German students and the maximal plurality of American students as integrated wholes. But (12) has also the individual-student comparison reading as well as readings on which, say, John compared the German and American physics students to the German and American math students.¹⁷

¹⁷ Another difficulty for the situation-based approach is that it predicts that (i) and (12) have exactly the same readings, since they involve situations with the same information content (individuals being German students and individuals being American students):

(i) John compared the German students and the American students

But as a matter of fact, they don't: only (12) allows for readings of the sort 'John compared the German and American physics students to the German and American math students'. This means that descriptive information constitutive of integrated wholes does not strictly determine a configuration (but rather properties such as being a semantic value of the same definite NP, see Moltmann 2017). On the present view, structured pluralities or quantities are no longer determined by the information content of a situation. Rather as configurations, they are determined by the speaker's intentions when uttering the plural or mass NP, subject, of course, to maxims of cooperative communication.

3. Semantic Selection

Part-structure-sensitive semantic selectional requirements involve the semantic mass-count distinction and specifically the language-driven ontology. They are expected to be semantic universals that hold across languages.

In the theory of situated part structures (Moltmann 1997, 1998, 2005), part-structure-sensitive selectional requirements are taken to require relativizing an argument to a situation, with the situation determining the part structure of the argument. In what follows, I will pursue an entirely ontological approach to part-structure-sensitive semantic selection, making use of structured quantities and pluralities and a primitive notion of unity.

3.1. The Accessibility Requirement

The first semantic selectional requirement concerns predicates or readings of predicates that appear to be sensitive to the distinction between singular count NPs on the one hand and plural or mass NPs on the other hand. The generalization roughly is that predicates making reference to the parts of the argument (but not the structure of the whole) can apply only to a mass or plural NP, not a singular count NP. Given that only singular count nouns describe an entity as having unity and being a single entity, this requirement can be formulated as the ‘Accessibility Requirement’ below:

(13) The Accessibility Requirement

Predicates or readings of predicates whose content makes reference to the parts, but not (the structure of) the whole, of an argument are true or false only of an entity that does not have unity.¹⁸

Two types of predicates making reference to the parts, but not the structure whole of an argument can be distinguished. First, there are numerals and related predicates, such as *enumerate* and *rank*, which I will call ‘*count*-type predicates’:

¹⁸ Reference to the structure of the whole, rather than just the whole (as in Moltmann 1997) is necessary because predicates like *count* and *enumerate* in a way make reference to the whole by exhausting the parts of the argument in the process described. However, those predicates do not make reference to the structure of the whole, unlike predicates like *organize* (see below).

- (14) a. The students are ten.
 b. ??? The class is ten.
- (15) a. John enumerated the orchestra members.
 b. ??? John enumerated the orchestra.
- (16) a. John ranked the students
 b. ??? John ranked the class. (in the sense of ranking the individual parts of the class)

Second, there are predicates like *compare*, *distinguish*, *be similar*, *be different*, *be distinguishable*, which I will call ‘*compare*-type predicates’. With singular count NPs, they lack the sort of internal reading available with plural NPs:

- (17) a. John compared the students.
 b. ??? John compared the class.
- (18) a. The male and the female students are similar
 b. ??? The class is similar.
- (19) a. John compared jewelry in the different boxes.
 b. ??? John compared the treasure.

Unlike *count*-type predicates, which strictly take into account individuals only, *compare*-type predicates can apply to a contextually or descriptively given division of a plurality or quantity into sub-pluralities. Thus, (17a) has an individual comparison reading as well as a reading on which students in different classes are compared. I will come back to that in the next section.

Also distributive readings fall under the Accessibility Requirement: they are hard to get with singular count NPs, at least with a range of predicates. A distributive reading is unproblematic in (20a), but hard to get in (20b):

- (20) a. John evaluated the students.
 b. John evaluated the class.

The Accessibility Requirement excludes predicates making reference not just to the parts, but also to the whole of an argument, such as *organize* and *restructure* (Moltmann 1997):¹⁹

¹⁹ The verb *count* itself is actually not that bad with collective singular count NPs in English:

(i) a. ? John counted the class.

- (21) a. John organized the collection of paper on the desk.
 b. John restructured the committee.

In Moltmann (1997), the Accessibility Requirement is formulated in terms of the notion of an integrated whole: predicates subject to the Accessibility Requirement can apply only to entities that are not integrated wholes in the reference situation. The problem is that integrity can also be imposed without using count nouns, just by using a definite plural or mass NP, but then it will not block the application of predicates or readings of predicates involving of parts, but not the whole of the argument. A definite plural or mass NPs *the N* (*the children* or *the water*) refers to an integrated whole, namely the maximal quantity or plurality falling under N (*children* or *water*). If F is the property expressed by N, this is an FF-integrated whole in the sense that all the parts are connected by sharing F (i.e. stand in the relation FF) and are not FF-connected to anything that is not part of d (Simons 1985, Moltmann 1997). In the theory of situated part structures, the notion of FF-integrated whole is of course restricted to the situation of reference of the definite NP.²⁰ The important observation in the present context then is that integrity in the sense of an FF-integrated whole never blocks the application of part-structure-sensitive predicates. By contrast, even ‘ungrounded’ unity that may go along with the use of a count noun such as *collection* or *amount* does block the application of part-structure-sensitive predicates or readings of predicates, as seen below:

- (22) a. John compared the papers.
 b. ??? John compared the collection of papers

-
- b. ?John counted the committee.
 (ii) a. ?? John counted the orchestra.
 b. John counted the orchestra members.

This may be either because the Accessibility Requirement allows for some amount of accommodation. It may also be because *count* is in fact a predicate making reference not just to the parts, but also the whole of the argument, involving a condition of exhaustion of the parts. In German the prefix *durch* ‘through’ makes that condition explicit, which leads to the contrast between (iia) and (iib) (Moltmann 1997):

- (iii) a. ?? Hans zaehlte die Klasse.
 ‘John counted the class’
 b. Hans zaehlte die Klasse durch.
 John counted class through.

²⁰ In that theory, the notion of FF-integrated whole is important because it restricts sum formation (which is restricted to integrated wholes in general).

c. ??? John compared the amount of papers on my desk.

The Accessibility Requirement thus involves unity tied to the use of a singular count noun, rather than integrity. As such, it is part of a perspectival, language-driven ontology, rather than of the more substantive nature of ordinary objects with their language-independent cognitive individuation.

That such a level of ontology is involved is made particularly clear by the noun modifier *whole*. *Whole* changes the perspective of an entity from being regarded as a unit to one of a mere plurality of its parts, thus permitting the application of part-structure-sensitive predicates, as in (23a), as opposed to (23b), as well as distributive readings, as in (24a), as opposed to (24b), which has only a collective reading (Moltmann 1997, 2005):²¹

(23) a. John enumerated the whole class.

b. ??? John enumerated the class.

(24) a. The whole art collection is expensive.

b. The art collection is expensive.

Whole has the function of mapping a unit to an entity that has no unity, but is a mere collection of parts (or, on a second, collective reading, the parts together with a form Moltmann 2005).

3.2. The Plurality Requirement

Count-type predicates, we have seen, differ from *compare*-type predicates in that they cannot target contextually or descriptively individuated subpluralities or subquantities. Thus, *count* in (25a) can only target individual students, not contextually individuated subgroups, unlike *compare* in (25b), which has a reading on which John compared the students in one class to those in another:

(25) a. John counted the students.

b. John compared the students.

²¹ Note that the data with *whole* make clear that the Accessibility Requirement could not be viewed as a syntactic selectional requirement.

Similarly, (25a) has a reading on which the women induce a partition of the jewelry, but not (25b):

- (26) a. John compared the jewelry of the women.
 b. ??? John counted the jewelry of the women.

Count-type predicates differ somewhat in their applicability to mass nouns, especially object mass nouns. Numerals are strictly inapplicable:

- (27) a. * ten wood / ten pieces of wood
 b. * ten furniture / ten pieces of furniture

The predicate *count*, by contrast, is not good with mass NPs in general, though they are not entirely excluded with object mass nouns such as *luggage* and *art work*.^{22, 23}

- (28) a. ? John counted the luggage.
 b. John counted the pieces of luggage.
 (29) a. ?? John counted the art.
 b. ? John counted the artwork.
 c. John counted the works of art.

Count thus permits accommodation of a quantity as the plurality of individuals making up the quantity in the ontology of ordinary objects.

Setting the possibility of such accommodation aside, the generalization is that *count*-type predicates select entities at the level of the language-driven ontology, namely pluralities of entities with linguistically conveyed unity:

²² The data are presented in a less differentiated way in Moltmann (1997).

²³ They are much less acceptable, though, with mass nouns like *art*, which put value rather than material individuation in the foreground:

- (i) a. John counted the art.
 b. John counted the décor.

That is because art and decore are individuated in terms of quality and function, by way of abstraction from individuals. See also Fn .

(30) The Plurality Requirement

Count-type predicates can be true or false only of pluralities of individuals (entities with unity).

Instead of (30), the theory of situated part structures made use of an ‘Integrated Parts Requirement’, which, basically, said that count-type predicates can apply only to entities that consists in parts that are integrated wholes in the situation of reference. This formulation faces the same difficult as the Accessibility Requirement when formulated in terms of integrated wholes: parts distinguished not by the use of a count noun, but in terms of the description used or in the context of reference cannot make *count*-type predicates. There are predicates that can take such parts into account, but they are *compare*-type predicates. Unlike *count*-type predicates, *compare*-type predicates can relate to a contextual division of the plurality or quantity denoted by their complement. The division may be based on the description used as in (31a, b) or come from the nonlinguistic context, as in (32a, b):

(31) a. John compared the furniture in the different rooms.

b. John compared the students in the different classes.

(32) a. John compared the furniture.

b. John compared the students.

In (31a) the modifier *in the different rooms* imposes a division of the furniture into maximal subquantities found in the particular rooms, and similarly the modifier *in the different classes* imposes a division of the plurality of students in (31b). (32a, b) can be used so as to be about the very same divisions, without such modifiers.

What distinguishes *compare*-type predicates from *count*-type predicates thus is their ability to take into account contextual divisions of pluralities or quantities into subpluralities or subquantities. *Count*-type predicates cannot relate to such divisions since pluralities and quantities do not have unity and thus count as single entities, though they may be integrated wholes in the relevant context.

Quantities and pluralities that come with a particular contextual division into subquantities and subpluralities, that is ‘configurations’, are entities; but neither they themselves nor their contextual parts have unity and thus count as single entities. Only *compare*-type predicates can apply to configurations and take into account their particular structure.

In the theory of situated part structures, what I now call ‘configurations’ were pluralities and quantities that come with a division into parts based on the information content of the situation of reference. Now configurations are considered entities by themselves that are as unstable as a situation of reference. Given that configurations are not grounded in the ‘content’ of situations, this raises the question of how they come into play in the meaning of sentences? The answer is, configurations with their contextual divisions are simply determined by speakers’ intentions, just as any other object of reference may be.

Configurations do play a significant semantic role in that there are expressions whose specific semantic function is to set them up. In particular, the adjectival modifier *individual* sets up a configuration in which a plurality is divided just into its individual members.²⁴ Thus (33) has only the individual-comparison reading:

(33) John compared the individual students.

Individual is a *count*-type predicate in that it targets parts of an entity specified as countable. Its semantic effect is to ensure that a plurality has only its individual members as its parts.

3.3. The strict distributivity of predicates of size and shape and of existence

The Accessibility Requirement and the Plurality Requirement are conditions that need to be satisfied at the level of the language driven-ontology, requiring the absence or presence of linguistically conveyed unity, regardless of unity in the ontology of ordinary objects.

There is one class of predicates that relate not only to the language-driven ontology, but also the ontology of ordinary objects, namely predicates of shape and size. Such predicates are strictly distributive, resisting an application to a plurality or quantity as a whole (Moltmann 2004, Rothstein 2010, Schwarzschild 2011). What characterizes such predicates is that they can apply to both NPs with plural nouns and with object mass nouns as heads, but target only the individuals of which their denotations are made up:

- (34) a. The children are big.
 b. ??? The people are long.
 c. The furniture is large.

²⁴ See Moltmann (2005) for the semantics of *individual* within the theory of situated part structures.

d. The luggage is small.

(34a) cannot possibly mean that the group of children is large, (34b) cannot possibly mean that the line of people is long, and (34c) cannot possibly mean that the collection of furniture is large.²⁵

There is no general prohibition against collective readings of predicates with definite plurals and object mass NPs as such. Plural and mass NPs do allow for certain predicates to convey a property of the whole plurality or quantity, for example predicates of weight:²⁶

(35) a. The books (together) are heavy.

b. The furniture is heavy.

Unlike *count*-type predicates, predicates of size and shape do not require linguistically conveyed unity, but can relate to just the natural units of the ontology of ordinary objects. But linguistically conveyed unity will also do, even if it is not grounded, as in the case of loose collections, amounts, and quantities:

(36) a. The collection of unopened letters on my desk is large.

b. The amount of alcohol he swallowed is small.

c. The quantity of water on the floor is enormous.

Predicates of size and shape thus apply to just those entities that have unity either in the language-driven ontology or in the ontology of ordinary objects. Their presupposition of unity

²⁵ There are some limits as to the sorts of object mass nouns that allow for a distributive reading of predicates of size and shape. Mass nouns that put function or value into focus disfavor such readings:

(i) a. ?? The decor is large.

b. The furniture is large.

(ii) a. The artwork is small.

b. ?? The art is small.

Such mass nouns does not apply to quantities composed of ordinary object, but rather to quantities that consist of concrete aesthetic or functional quantities of ordinary objects (tropes), and to those predicates of shape and size do not apply.

²⁶ Predicates like *enormous* can target the entire denotation of a mass NP if the denotation is a quality or trope, in which case they convey intensity rather than size in the spatial sense, as illustrated in the contrast below:

(i) a. John's excitement was enormous.

b. The equipment was enormous.

of predicates of size and shape is satisfiable at either level of ontology.²⁷ The reason why they can apply to entities that lack unity in the language-driven ontology may be because properties of size and shape specifically pertain to the individuation of entities (with unity) in the ontology of ordinary objects, but not in the language-driven ontology, where unity need not be grounded. The ontology of ordinary objects remains accessible not for part-structure-sensitive semantic selection, but for choice of sortal numeral classifiers, which depends on natural units described by number-neutral nouns.

3.4. Constraints on accommodation

Semantic selectional requirements regarding types of objects, as was mentioned, can sometimes be violated, allowing accommodation to rescue the acceptability of the sentence. There are significant constraints on accommodation regarding part-structure sensitive semantic selection, which bear on the relation between the language-driven ontology and the ontology of ordinary objects. We have seen that some *count*-type predicates are not entirely excluded with singular count NPs (? *John counted the class*) as well as object mass nouns (? *John counted the furniture*), though they generally select pluralities. Such predicates permit accommodation mapping an individual or quantity onto a plurality of the things that compose the individual or quantity in the ontology of ordinary objects. By contrast, no *count*-type predicate can apply to a configuration, a quantity or plurality whose relevant parts are subquantities or subpluralities (*John counted the men and the women* cannot mean ‘John counted two things: the group of men and the group of women’.) This means accommodation cannot map pluralities or quantities onto corresponding single entities. Accommodation may only ‘remove’ unity or add language-driven unity the basis of unity in the ontology of ordinary objects. That is, accommodation is possible only as long as it aligned with the ontology of ordinary objects; it cannot just add unity to quantities or pluralities in the language-driven ontology.

4. The status of the language-driven ontology

4. 1. The status of unity

Count nouns, unlike mass nouns, convey unity, enabling countability, and do so regardless of the individuation of entities in the ontology of ordinary objects. The ontology of ordinary objects thus is not reflected in the mass-count distinction as such and even less so in the category of number-neutral nouns. This does not mean, though, that the mass-count distinction distorts the ontology of ordinary objects. Rather, count nouns operate at another level, that of the language-driven ontology, selecting unity as a feature of entities, possibly but not necessarily based on unity at the level of the ontology of ordinary objects. The same holds for classifiers, which select unity based on natural units (as in 9a) or measured units (as in 9b). The absence of grammatically conveyed unity similarly means refraining from selecting unity that way. Unity and thus countability are language-driven and made available only by the use of count nouns or classifiers. Unity as conveyed by count nouns and classifiers, however, is not a cognitive notion, a mind-dependent condition imposed on certain parts of the world. Rather it is feature that entities have mind-independently, but subject to selection by the use of language. Grammatically conveyed unity is mind-dependent only in so far as it is selected among actual features of entities. In that sense, it is perspectival.

The present view is that anything in reality in a way has unity, any plurality of entities, whether it exhibits integrity or not, has unity. At the same time, any single entity is constituted by something that fails to have unity, i.e. the plurality or quantity consisting of its parts (depending on whether the parts themselves are single entities or not). This is also intuitive: any collection of things can be viewed as a collection as one or a collection as many. Only a collection as one can be subject to counting, a 1-1 association of entities with natural numbers.

This also holds for an entity and a particular feature it may have: the entity with that feature may be regarded as a unit or as a mere collection of an entity and a feature. Even if an entity has a form and persists with that form, it could still be viewed as a mere plurality of features and parts, rather than as a single entity. Unity as such is not grounded in intrinsic properties of entities. In the context of cognition and the use of language, though, only certain beings will be selected as single entities, generally based on integrity of some sort. As such, unity may go along with conditions of integrity, but such conditions do not guarantee that an entity counts as a single entity at the relevant level of ontology.

4.2. The language-driven ontology and reality as plenitude

What is the status of the language-driven ontology, an ontology that includes entities such as pluralities, quantities, and the notion of unity? Should the language-driven ontology be

viewed as a merely conceptual level, and thus another level of syntactic representation, as opposed to the ontology of ordinary objects, which would be part of reality? The answer is clearly no. Entities that are pluralities or quantities serve as arguments of predicates and contribute just as much to truth conditions as ordinary objects when they are arguments of predicates. This means that the language-driven ontology must be an ontology of the real. Entities in the language-driven ontology, just as much as ordinary objects, are actual, if derivative entities. The language-driven ontology thus is no less real than the ontology of ordinary objects.²⁸ The language-driven ontology, though, involves a selection of entities and their features. The ontology of ordinary objects in fact can be viewed in the same way, as a selective ontology of derivative entities, entities whose composition and nature is itself based on selection (of features and matter).

This goes along with a particular view of reality of what has been called ‘maximalism’ (Eklund 2008), ‘plenitude’ (Hawthorne 2006) or ‘permissiveness’ (Schaffer 2009), the view that ‘for any type of object such that there can be objects of that type given that the empirical facts are exactly what they are, there are such objects’ (Eklund 2008). Reality, on that view, does not consist in what is fundamental, and it is not the realm of ordinary objects. Rather it consists of a plenitude of beings, whether intuitive or not, simple or derivative. It will include unrestricted sums, composites of matter and form of some sort, and composites of matter, form and primitive unity. Some of those beings will count as ordinary objects, others won’t, depending on what the cognitive ontology of ordinary objects selects. Some of them will count as single entities in the language-driven ontology, some of them won’t, depending on what language selects for its ontology. The language-driven ontology and the ontology of ordinary objects thus will be on par, based on a mind- or language-dependent selection among what is real.

The ontology of the real thus includes both the ontology of ordinary objects and the language-driven ontology. The language-driven ontology itself is based on the ontology of ordinary objects, but is not included in it. It in some respects extends that ontology (for example, by including unrestricted sums), but in other respects may filter it (by ignoring unity of some ordinary objects).

²⁸ There is a third option, that is, that neither the ontology of ordinary objects, nor the language-driven ontology is real, but only the ontology of the fundamental. The language-driven ontology and the ontology of ordinary objects would have the status of mind-dependent constructs, on a par with fiction. Unity, on that view, would be considered a cognitive notion, added on to chunks of reality. However, natural language certainly does not reflect a distinction between what is real and the sorts of derivative entities considered fictional. They both contribute to truth conditions in the same way.

4.3. The language-driven ontology of pleonastic entities

The language-driven ontology, with its notion of unity and domains of quantities and pluralities, is an ontology that strictly goes along with the use of language, in particular the use of definite mass and plural NPs. This raises the question whether there are independent motivations for that level of ontology. As a matter of fact, a language-driven ontology has been discussed in other contexts, in particular by Schiffer (1996) in connection with his theory of pleonastic entities. Pleonastic entities are entities that are referents of referential NPs introduced by what Schiffer calls ‘something-from-nothing’ transformations. For example, properties as pleonastic entities are introduced by a transformation of the sort *John is happy* → *John has the property of happiness*. There is nothing more to properties than what can be derived from such term-introducing inferences. In that sense properties are language-driven or pleonastic entities. As pleonastic entities, properties do not have a substantial nature that could be subject to any further investigation. Pleonastic entities, for Schiffer, are what he calls ‘language-created, language-independent’ entities. This means they are made available for thought and linguistic reference by the use of certain object-introducing linguistic devices (*the property of being happy*), yet on the basis of language-independent conditions actually obtaining (John’s being happy).

Non-worldly facts are another example for which the notion of a pleonastic object is particularly suited. Non-worldly facts are the referents of canonical fact descriptions of the sort *the fact that someone entered the room* or *the fact that John won the race* or *Mary did*. They exist in virtue of particular sentences or propositions being true and exist thus language-independently, but we can hardly speak or think about them without using fact-introducing devices, canonical fact descriptions of the sort *the fact that S*.

Language-driven countability sides with pleonastic, ‘language-created, language independent’ objects: countability is made available by the use of particular linguistic devices that select entities as units. As with pleonastic entities, this need not mean that linguistically conveyed unity is in fact created and thus imposed by the mind; rather it is selected among the various conditions of unity that in fact obtain. Language makes unity and countability available by selecting entities as units, just as pleonastic entities are not literally created but made available by the relevant object-introducing linguistic devices, in virtue of language-independent conditions obtaining. The ontology of countability and the ontology of pleonastic entities thus belong to the same level of language-driven ontology

5. Challenged for formal semantics: ontological commitment to sums

Pluralities and quantities do not have unity and thus do not count as single entities; pluralities are not ‘one’, but ‘many’, and quantities are neither ‘one’ nor ‘many’. This means that the plurality denoted by *the children* could not possibly be the same entity as that denoted by *the sum of the children* or any other count NPs. The denotation of *the wood* could not possibly be the same entity as that of *the quantity / amount / heap of wood*. The difference is reflected not only in the applicability of *count*-type predicates as well as the strict distributivity of predicates of size and shape.

It is also reflected in the understanding of the existence predicate *exist*. The predicate *exist* behaves like predicates of shape and size in that it displays a strictly distributive reading. Thus, with plurals, *exist* can target only individual members of the plurality, not the plurality as such (Moltmann 2004, 2017):

(37) The buildings do not exist.

(37) cannot possibly be used as a statement about the existence of the sum as opposed to just the individual members (as a statement, say, by someone expressing doubt in the existence of a particular sum). The same holds for object mass nouns:

(38) The furniture does not exist.

(38) can be understood only as a statement about the existence of the individual pieces, not as a statement about the existence of the quantity as such (as a statement, say, by someone doubting the existence of a quantity as an entity separate from the pieces making it up).²⁹

The view that pluralities and quantities are not single entities is not captured by standard semantic theories of plurals and mass nouns, neither those based on extensional mereology in the tradition of Link (1983) nor those that include conditions of integrity besides a part-of relation (Moltmann 1997, 1998). On standard semantic theories, pluralities and quantities are

²⁹ One might object that sentences with *exist* should not be taken seriously for semantic purposes since *exist* is a technical verb, mainly used by philosophers. However, it appears that *exist* is subject to robust constraints, constraints that may in fact be incompatible with a philosopher's reflective notion of existence (Moltmann 2020). (37, 38) illustrate this: there are philosophers that adopt mereological universalism, the view that that everything has a sum. Yet even such philosophers cannot use those sentences to convey the existence of a particular sum.

treated as single entities in the very same way as the elements in the denotation of singular count nouns: they all are elements in the domain of entities in any model interpreting the language. As such, they act as semantic values of referential NPs and first-order variables and are generally taken to form domains that are closed under sum formation. The standard model-theoretic semantics of plurals and mass nouns fails to capture the presence or absence of unity in entities, a notion that plays a central role not just for the mass-count distinction, but also part-structure-related semantic selectional requirements. The metalanguage of standard model-theoretic semantics does not distinguish between individuals on the one hand and pluralities and quantities on the other hand, as beings that have unity and beings that fail to have unity.

There are well-known motivations and advantages of the standard semantics of plural, mass, and singular count nouns, of course. The standard semantics gives a unified semantics of the three sorts of NPs. First of all, it complies with Fregean view, treating definite singular count, plural, and mass NPs as singular terms standing for entities. Second, it allows for a uniform semantics of predicates in general as well as particular expressions that apply, it seems, with the same meaning to singular count, plural, and mass NPs. An example mentioned earlier is the predicate *weigh*. Another example is the partitive construction *some/all/part of*, which applies to individuals, pluralities as well as quantities, picking out material parts, subpluralities, and subquantities respectively (Moltmann 1998).³⁰

- (39) a. some/all/part of the house
 b. some/all/part of the students
 c. some/all/part of the furniture

Finally, the standard semantics is able to capture the way the mereology of events may reflect the mereology of their participants, with thematic relations that involve the gradual involvement of a participant in the event. An example is the object argument of *eat* (*eat the apple, eat the apples, eat rice*), which appears to impose its part structure on the event and determine the aktionsart of the VP (and thus the applicability of modifiers such as *for an hour* and *in an hour*) (Krifka 1998, Champollion 2017).

³⁰ Further parallels among the part structures of individuals, pluralities and quantities are discussed in Moltmann (1997, 1998). Parallels between the domain of pluralities and the domain of quantities only are the focus of extensional mereological theories in the tradition of Link (1983). See also Champollion/Krifka (2016).

There is one alternative semantic approach to the semantics of plurals. This approach, which has been pursued especially by philosophical logicians, is that of plural reference (Yi 2005, 2006, Oliver /Smiley 2013, Moltmann 2017). It is based on the view that a definite plural NP such as *the children* does not stand for a single entity, a plurality, but rather refers to each student at once. Pluralities, on that view, are no longer entities; instead there is only plural reference, reference to several entities at once.

Plural reference, however, does not provide an account for the semantics of mass NPs, since plural reference is based on reference to individuals and the parts of quantities (entities in the denotation of mass nouns) do not have language-driven unity.³¹ How to deal with the semantics of mass nouns by giving justice to the distinction between entities that have unity and those that don't is a serious challenge that remains to be undertaken. That challenge needs to be pursued while maintaining, in some way, the insights and advantages of the standard approach.³²

6. The importance of language-driven ontology and unity for grammar and semantics

The ontology of ordinary objects relates to the semantics of natural language differently than the language-driven ontology. Ordinary objects as putative semantic values of referential NPs may be subject to ontological reflection and rejection, and the lexical words used to refer to them may be subject to some degree of modification by the user (subject, of course, to conditions of cooperative communication) (Moltmann 2020). By contrast, acceptance of the language-driven ontology is mandatory with the use of the language. Given the perspective of generative linguistics, the notions and conditions of the language-driven ontology can be viewed as part of universal grammar more broadly understood, even though, on the present view, they are part of the ontology of the real. That is because they align with the functional part of syntax and need to be acquired together with it. They are in a way part of the core of language, just as the functional part of grammar is.³³

The central role of the notion of unity for the mass-count distinction and semantic selection shows the importance of the concept of an object for the semantics as well as the syntax of natural language. The notion of unity (the property of being a single entity) can hardly be

³¹ But see Nicolas (2008) for a proposal of that sort.

³² For proposals in that direction see McKay (2017) and Laycock (2006).

³³ See Yang (2015) for the view that the functional part of grammar represents core grammar.

understood without the notion of an object itself, and given that it is tied to grammar, the notion of an object must be part of language itself, its semantics.

This issue bears on Chomsky's (1986, 1998, 2013) skepticism regarding the involvement of objects in the semantics of natural language, more precisely, the view that referential NPs stand for objects.³⁴ The question of whether natural language involves objects in its semantics cannot just be addressed by reflecting upon what referential NPs may stand for and what sorts of predicates they permit, in the sense of standard semantic selection. The notion of being a single entity is already intimately connected to the functional part of language and plays an important role in universals of part-structure-sensitive semantic selection. It should thus be part of universal grammar as much as the core of syntax is.

Of course there are the various examples by Chomsky of referential NPs permitting apparently contradictory predicates that challenge the notion of an object of reference. To an extent they presented problems because Chomsky adopted a non-maximalist view of reality, with a particularly constrained notion of a 'real' object. Taking a maximalist view of reality that includes various sorts of highly derivative, possibly mind-dependent, entities promises a new take on the Chomskyan challenges for referentialist semantics.

7. Conclusions

The point of departure of this paper was that ontology is intimately tied to the syntax of natural language, forming a close tie with compositionality. This requires distinguishing different levels of ontology: the ontology of the real, the ontology of ordinary objects, and a language-driven ontology. I have adopted a maximalist view of reality, which means reality includes not just what is fundamental, but various sorts of derivative entities. In particular, it includes both the ontology of ordinary objects and the language-driven ontology. While the ontology of the fundamental hardly plays a role for the semantics of natural language, the ontology of ordinary objects clearly does, especially for the semantics of lexical items and referential NPs that refer in virtue of lexical material.

The language-driven ontology is superimposed on the ontology of ordinary objects. The entities and their properties are preserved in the language-driven ontology. But the language-driven ontology may select unity differently than the ontology of ordinary objects. Moreover,

³⁴ For Chomsky (p.c.) that skepticism pertains to both actual and merely conceived objects as semantic values of referential NPs.

unlike the ontology of ordinary objects, it reflects mereological universalism, with a domain of pluralities and quantities that is closed under sum formation (provided pluralities and quantities are viewed as entities in the first place). Unlike the ontology of ordinary objects, it is tied to the functional part of language as well as syntactic constructions. The language-driven ontology thus may diverge from that of the ontology of ordinary objects, while it is based on it. It also involves different notions, specific to that level. The ontology of ordinary objects involves notions such as form, function, and persistence; the language-driven ontology involves primitive unity and, possibly, the introduction of objects by abstraction, as pleonastic entities.

The language-driven ontology and the ontology of ordinary objects differ also in cognitive status. The acquisition of the ontology of ordinary objects starts before the acquisition of language and proceeds rather independently of it, being based on perception (involving conditions of form and size) and functionality.³⁵ The language-driven ontology is acquired strictly with the acquisition of the language.

Acknowledgments

I would like to thank Lucas Champollion, Hana Filip, David Liebesman, James Miller, Gary Ostertag, Jonathan Schaffer, and Stephen Schiffer for comments on an earlier version of this paper as well as Kit Fine for comments as well as an inspiring conversation. Thanks also to the audience at the conference *Conceptualising Reality in the Aristotelian Tradition and Beyond* in Gothenburg in February 2020, where the paper was presented.

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³⁵ See Hespos/Spelke (2004).

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