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

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Introduction

In contemporary metaphysics, it is common to recognize two levels of ontology: the ontology of ordinary objects, which is reflected in our ordinary judgments, and the ontology of what there ultimately is, fundamental reality. 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 it or part of it even exists.

It seems obvious that natural language reflects the ontology of ordinary objects, an ontology that includes material objects, events, and artifacts as well as derivative objects such as shadows, holes, and tropes. In fact, philosophers discussing the ontology of ordinary objects frequently make reference to linguistic data, in particular the applicability of predicates to terms putatively referring to the ordinary objects 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 show the importance of another level of ontology, what I will call a ‘language-driven ontology’. The language-driven ontology is not a full alternative ontology, but rather comprises various ontological notions, structures, and items. It is a level of ontology that is specifically tied to language and intimately linked to the use of syntactic categories or constructions. Commitment to that ontology strictly goes along with the use of language.

This paper will focus on a particular part of that language-driven ontology, involving notions of part and whole broadly speaking, more specifically a language-driven perspectival ontology of pluralities, quantities, and, most importantly a language-driven notion of unity or countability that is associated with the mass-count distinction. The language-driven ontology of parts and wholes plays a particularly important role for semantic selectional requirements of predicates or readings of predicates that are sensitive to the part-whole structure (in the broad sense) of their arguments.

The paper resumes a number of generalizations from my earlier work on the semantics of parts and wholes and the mass-count distinction, which was based on a notion of a situated part structure and the notion of an integrated whole (Moltmann 1997, 1998, 2005). The view outlined in this paper, however, differs in a number of crucial respects from the earlier view. On the theory of situate part structures, what made something be countable ('one') was to be an integrated whole in the situation of reference, and it was information about integrated wholes in a situation that determined the structure of pluralities or quantities (entities in the denotation of plurals and mass nouns) in that situation. The new view sharply distinguishes a notion of unity from the notion of an integrated whole. Referring to something that has unity 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 has unity. Unity and thus countability is now taken to be a primitive notion, not derivable from conditions of having a boundary, a form or another sort 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 (plurality or quantity) 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. Such entities include those that fail to have unity (pluralities and quantities) and even entities that fail to have unity, yet have a structure ('configurations').

The language-driven ontology of parts and wholes shares important features with the light ontology of pleonastic entities of Schiffer (1996). They both appear to be part of the same 'language-created, language independent' ontology, which is rather 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, the lexicon.

The paper will focus on outlining the new view of the language-driven ontology of parts and wholes with its connection to the ontology of pleonastic entities. It will compare it to the older view of situated part structures only in an appendix.

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 with its referential and quantificational NPs and its predicates or so the most common view. Thus in a simple sentence like *John sees a tree*, the referential NPs *John* and the quantificational NP *a tree* range over objects and the property expressed by *saw* is predicated of John and one of the objects *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 objects, 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 objects, quantificational NP always range over objects, and predicates always express properties of objects.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 to the composition of the meaning of the sentence. Compositionality and ontology thus appear to be intimately linked.³

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

² Frege went even further and took the notion of an object 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 (Frege's Context Principle).

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 (Pietroski 2018). However, see my remarks in Section 7.

The view that referential NPs always stand for an object requires recognizing a wider range of entities than many philosophers may be unwilling to accept, such as a great range of derivative and perhaps abstract objects. It also requires recognizing entities that are part of the language-driven ontology, in particular pluralities (denotations of definite plural NPs) and quantities (denotations of mass NPs). Just as definite singular NPs stand for *individuals*, definite plural NPs and mass NPs should stand for entities, which I will call ‘pluralities’ and ‘quantities’. The three types of NPs allow for the same predicates with the very same reading, for example *weigh*:

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

Considerations of compositionality give a strong motivation for pluralities and quantities as entities, yet at the same time their ontological status is different from that of individuals, as we will see (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 (objects as opposed to events, concrete vs abstract objects, for example). 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.⁴

In order to avoid a category mistake, generally, accommodation may save the interpretability of the sentence, that is, shift from the actual referent of the nominal argument to a closely related one. For example, the predicate *start* is generally restricted to events; but when the object NP stands for an enduring object instead, accommodation, mapping that object to a closely related event, can save the truth-evaluability of the sentence:

- (2) a. John started reading the book.

⁴ See Magidor (2013) for an overview of the discussion of category mistakes.

b. John started the book.

There are challenges to the Fregean view that predicates apply just to objects that have been discussed in the literature. The dominant 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.⁵ For example, *appreciate* is a predicate that appears to be sensitive to the way an object is presented even in unembedded contexts:

(3) (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. Thus, (4) by itself can easily have the reading on which John appreciates Bill, the gardener, as a teacher:

(4) John appreciates the gardener.

In this paper, I will focus on another class of predicates that appear to be sensitive to the way an entity is presented, namely predicates that are sensitive to the mereological presentation of entities, in the broadest sense. Those predicates impose semantic selectional requirements that concern the linguistic presentation of entities in terms of unity, plurality and structure. One important difference to standard cases of semantic selection is that part-structure-sensitive semantic selection does not allow for accommodation.

⁵ An example heavily discussed in the literature is the one below (see Forbes 1999 and references therein):

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

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

- (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:

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

Whereas in my previous work (Moltmann 1997, 1998, 2005), I took those selectional requirements to require relativizing an argument to a situation and thus to involve a situated part structure, I now adopt an entirely ontological approach to part-structure-sensitive semantic selection, making use of the level of language-driven ontology. This avoids positing situation-relativity for part-structure-sensitive selection. Semantic selection in general in fact does not exhibit a situation-relativity; so positing situations for part-structure-sensitive semantic selection only could not really be on the right track.

2. Part structure-sensitive semantic selection

2. 1. The mass-count distinction

The mass-count distinction plays an important role for semantic selection and language-driven ontology in general. Therefore a few general remarks are in order about the nature of the mass-count distinction in general and its role for the ontology reflected in natural language.

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.⁶ The syntactic mass-count distinction, so the general agreement, has semantic content and goes along with a semantic mass-count distinction.

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

- (5) a. John and Mary are part / * a part of the first-year students
 b. The legs are part / parts / * a part of the table.

⁶ See Doetjes (2012) and Pelletier/ Schubert (1989, 2003) for criteria for mass and count.

- (6) a. He ate part / ?? a part of the apple.
 b. He drank part of the wine / ?? 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). 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).

But a look at a wider range of examples quickly shows that the mass-count distinction does not strictly go along with an ontological distinction between two sorts of entities. A singular count NP may, it seems, just convey accidental unity of a plurality, as plausibly in (7a) and merely conceived unity, as possibly in (7b, c):

- (7) a. the collection of papers on this desk – the papers on his desk
 b. the amount of alcohol - the alcohol
 c. the group / sum of children – the children

Singular count NPs may stand for what appear to be accidental wholes, as in (7a), or entities that are not wholes in any substantive sense at all, but perhaps merely conceived wholes, as in (7b, c).

Moreover, there are a range of minimal pairs of a mass NP and a plural NP that appear to stand for the very same entities:

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

There is also a lot of crosslinguistic variation regarding whether something is denoted by a plural or a mass NP (English *hair* - Italian *cappelli*).

Finally, there is a large class of what is called ‘object mass nouns’, mass nouns that appear to stand for pluralities of well-individuated objects, such as *hardware*, *jewelry*, *luggage*, *staff*, *police force*.

To sum up, whether a language chooses a plural or a mass noun in many cases appears entirely arbitrary. This is a major problem for standard semantic approaches to the mass-count distinction. It is a major problem for an approach that distinguishes entities in the denotation of mass nouns and in the denotation of count nouns in terms of a notion of a boundary or integrity. It is also a major problem for the more common approach in contemporary formal semantics that distinguishes mass nouns and count nouns semantically in terms of mereological properties of their extensions (mass nouns having a homogeneous extensions, singular count nouns an atomic extension) (Link 1983, Champollion/Krifka 2017). Object mass nouns, in particular, have extensions that share the same mereological properties as plural nouns.

Another major challenge for standard views of the mass-count distinction is the semantics of nouns in classifier languages. In Chinese, nouns are considered number-neutral, requiring numeral classifiers for numerals to be applicable. Numeral classifiers select either natural units (sortal numeral classifiers) or units based on measurement (mensural numeral classifiers).⁷ Standard semantic characterizations do not apply to number-neutrals nouns just as they do not apply to object mass nouns. English has something close to classifier constructions with mass nouns:

- (9) a. two pieces of cattle
 b. two liter milk

In (9a), *pieces* and *liter* act like sortal and mensural classifiers respectively, enabling countability of the denotation of a mass noun.

2.2. The ontological status of unity

Count nouns, unlike mass nouns, thus convey unity, enabling countability, and that regardless of the individuation of entities in the cognitive ontology. 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, I will argue, count nouns operate at another level, selecting or imposing unity as a feature of entities, possibly but not necessarily based on unity

⁷ Some references concerning classifiers are Doetjes (2002), Borer (2005), and Rothstein (2017)

at the level of the ontology of ordinary objects. The same holds for classifiers, which impose or select unity based on natural units (as in 9a) or measured units (as in 9b).

What is the ontological status of the notion of linguistically conveyed unity? When speaking about ‘imposing unity’, unity is treated as a cognitive notion, added on to chunks of reality and thus leading to mind-dependent entities (e.g. on a fictionalist account of composition). However, language-driven unity need not be regarded that way. It goes along just as well with a view on which unity of entities of various sorts (with or without integrity) is an actual feature and the use of count nouns or classifiers means selection of actual features of unity of entities. The absence of grammatically conveyed unity similarly would mean abstinence from selecting unity that way. If grammatically conveyed unity is selective in that way, it sets up a level of ontology that is mind-dependent only in so far as it is perspectival (rather than being created). Language makes unity and countability available by selecting entities as units. The ontology of countability in that sense is a ‘language-created, language-independent’ ontology to use Schiffer’s (1996) term for pleonastic entities (See Section 6).

Unity should entail identity conditions, but these need not be the identity conditions generally associated with ordinary objects. An apparent accidental whole, the collection of papers on my desk, is constituted just by the plurality of papers and them being on my desk. An apparently merely conceived whole such as a particular quantity of water is constituted by just water within a particular boundary that has been set. There should not be constraints on unity as such, though unity is, by preference, select on the basis of entities forming integrated wholes in one way or another. Various conditions can be constitutive of the identity of the entity. But those conditions cannot enforce unity: they may simply be regarded as part of a plurality of features and things. Unity rather should be regarded a primitive notion. What makes something have unity and thus be a single entity, thus, will not be grounded in other properties the entity or its parts may have. 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 may go along with conditions of integrity, but such conditions do not guarantee that an entity counts a single entity.

3. Semantic Selection

I will now turn to semantic selectional requirements that are sensitive to language-driven part-whole structure. These requirements should be semantic universals, and they involve

specifically the language-driven ontology. As such, they cannot be subject to revision upon reflection, say ontological reflection regarding the existence and nature of unity and plurality.

For the time being, I will make the assumption that definite plurals stand for entities that are pluralities and definite mass NPs for entities that are quantities. Pluralities thus have parts, the individuals making up the plurality as well as subpluralities of the plurality. Similarly, quantities have subquantities as parts.

3.1. The Accessibility Requirement as a semantic universal

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 but not the whole of the argument can apply only to a mass or plural NP, not a singular count NP. Making use of the notion of primitive unity, this is formulated as the ‘Accessibility Requirement’ below (Moltmann 1997):

(10) The Accessibility Requirement

Predicates or readings of predicates making reference to the parts, but not the whole, of an argument are true or false only of something that does not have (linguistically conveyed) unity.

Two types of predicates making reference to the parts, but not the whole of an argument can be distinguished.

First, there are collective predicates such as *numerous* and *count* (on an internal reading) -- verbal and adjectival predicates that correspond to numerals:

- (11) a. ??? The class is numerous.
 b. The students are numerous.
- (12) a. ??? John counted the orchestra.
 b. John counted the orchestra members.

I will call these ‘*count*-type predicates’.

Second, there are predicates like *compare*, *distinguish*, *be similar*, *be different*, *be distinguishable*, which I will call ‘*compare*-type predicates’. Unlike *count*-type predicates,

compare-type predicates can apply to a contextual division of a plurality into sub-pluralities as well as a quantity into subquantities.

(13) a. John compared / distinguished the students.

b. ??? John compared the class.

Also distributive readings fall under the Accessibility Requirement: they are hard to get with singular count NPs, at least with a range of predicates:

(14) John evaluated the class / the students.

The Accessibility Requirement excludes predicates making reference not just to the parts, but also to the whole, as in the following examples:

(15) a. John organized the collection of paper on the desk.

b. John divided the collection

c. John restructured the committee.

In Moltmann (1997), I took the Accessibility Requirement to be a requirement that the argument not be an integrated whole. But this cannot be right. Integrity can also be imposed without using count nouns, for example with the use of a definite plural or mass NPs referring to the maximal quantity or plurality falling under the noun that is used (Simons 1985, Moltmann 1996). However, such integrity never blocks the application of part-structure-sensitive predicates. By contrast, even merely conceived unity going along with the use of a count noun (*quantity, sum, collection*) does block the application of part-structure-sensitive predicates or readings of predicates:

(16) a. John compared / distinguished the papers.

b. ??? John compared the collection of papers / the amount of papers on my desk.

The relevant notion of unity on which the Accessibility Requirement is based is thus a matter of a perspectival language-driven ontology rather than of the substantive nature of objects or their language-independent cognitive individuation.

That such a level of ontology is involved is made particularly clear with the use of *whole* as a noun modifier. *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 (17a), as opposed to (17b), as well as distributive readings, as in (18a), as opposed to (18b) (Moltmann 1997, 2005):

(17) a. John counted the whole class.

b. John counted the class.

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

b. The art collection is expensive.

Whole thus 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. Strictly distributive predicates: predicates of size and shape and of existence

The next semantic selectional requirement manifests itself in a resistance of predicates of shape and size to apply a plurality or quantity as a whole (Moltmann 2004, Schwarzschild 2011). Such predicates are then strictly distributive. They can apply to both NPs with plural nouns and object mass nouns, but targeting only the individuals of which their denotations are made up.

If a definite plural or mass NPs stand for a plurality or quantity, then, one would have thought, predicates of size and shape should be able to convey a property of the plurality or quantity, but they cannot do that:

(19) a. The children are big.

b. The people are long.

c. The furniture is large.

(19a) cannot possibly mean that the group of children is large, (19b) cannot possibly mean that the line of people is long, and (19c) cannot possibly mean that the collection of furniture is large

There is no general prohibition against collective readings of predicates with definite plurals and object mass NPs. Plural and mass NPs do allow for certain predicates to convey a property of the whole plurality or quantity, for example predicates of weight:⁸

(20) The furniture is heavy.

Predicates of shape and size can apply distributively to object mass nouns, targeting the objects that make up their denotations:

- (21) a. The luggage is small.
 b. The furniture is round.
 c. The jewelry is big.

This means that predicates of size and shape relate directly to the ontology of ordinary objects. Pluralities and quantities are not entities that would be part of that ontology.

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:

- (22) a. ?? The decor is large.
 b. The furniture is large.
 (23) a. The artwork is small.
 b. ?? The art is small.

This supports then the following generalization: certain predicates apply only to natural units of the ontology of ordinary objects, namely precisely those predicates whose content pertains to the individuation of ordinary objects (size, shape as opposed weight). Unlike *count*-type predicates, such predicates do not require that the entities to which they apply have

⁸ 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.

linguistically conveyed unity. This means that the ontology of ordinary objects remains accessible for part-structure-sensitive readings of certain predicates.

3.3. *Count-type predicates*

Count-type predicates target not natural units per se, but only natural units distinguished as such by the use of a count expression. *Count-type* predicates include numerals, the predicates *count* and *numerous* as well as predicates of ranking and of individuality (*individual*). *Count-type* predicates apply to plural NPs, but fail to apply to mass NPs of any sort (or are at least significantly worse with mass NPs). The inapplicability of numerals to mass NPs, including object mass NPs, is illustrated below:

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

The predicates *count* and *numerous* are not good with mass NPs, though they are perhaps not entirely excluded with object mass nouns, at least if function or value are in the background (e.g., *art work* as opposed to *art*):

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

Count-type predicates differ from predicates of size and shape in not being able to apply to object mass nouns: *Count-type* predicates can target only linguistically selected units.

Moreover, unlike *compare-type* predicates, *count-type* predicates cannot apply to contextually individuated subgroups. 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.

Similarly, (26a) has a reading on which the women induce a partition of the jewelry, but not (26b):

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

Count-type predicates, thus, select entities at the level of the language-driven ontology, namely pluralities of entities with linguistically conveyed unity:

(27) Semantic selectional requirement of *count*-type predicates

Count-type predicates can be true or false only of pluralities of entities with linguistically conveyed unity.

An important observation about this selectional requirement, as in the case of the Accessibility Requirement, is that accommodation cannot rescue a violation of it, unlike selectional constraints on types of ordinary objects. No effort of accommodation makes a mass NP acceptable with a count-type predicate, not even one headed by an object mass noun.

3.4. *Compare*-type predicates

Compare-type predicates (on the relevant internal reading) are subject to the Accessibility Requirement and thus require a plural or mass NP (or an NP with the modifier *whole*). 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 presented linguistically as in (28a, b) or come from the nonlinguistic context, as in (29a, b):

- (28) a. John compared the furniture in the different rooms.
 b. John compared the students in the different classes.
 (29) a. John compared the furniture.
 b. John compared the students.

In (28a) the modifier *in the different rooms* imposes a division of the gold into maximal subquantities of gold constituting the individual rings, and similarly the modifier *in the*

different classes imposes a division of the plurality of students in (28b). (29a, 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 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 cannot be counted as single entities. They may be integrated wholes in the relevant context. But they do not have unity. This also holds for the entire quantity of the furniture in (28a) and for the entire plurality of the students in (28b): they do not count as one even though, as maximal sums of entities sharing a property, they are integrated wholes.

Let me call quantities and pluralities that come with a particular contextual division into subquantities and subpluralities ‘*configurations*’. Configurations are entities, but neither they themselves nor their contextual parts have unity and thus count as single entities.

How do configuration come into play in the meaning of sentences? I take it that configurations with their contextual divisions are simply determined by speakers’ intentions rather than grounded in the ‘content’ of situations (which were part of the lexical arguments of predicates on the view in Moltmann 1997, 1998, 2005).

There are other linguistic expressions besides prepositional phrases as in (28a, b) that can influence the configuration that a plural or mass NP stands for. In particular, the adjectival modifier *individual* sets up a configuration in which a plurality is divided just into its individual members.⁹ Thus (30) has only the individual-comparison reading:

(30) 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:

(31) $\forall x(\text{individual students } (x) \text{ iff } \forall y(y < x \rightarrow \text{UNIT}(y))$

The meaning of *individual* as a plural modifier thus holds of an entity x just in case every proper part of x is a unit (UNIT), that is, counts as a single entity.

4. The status of the language-driven ontology

⁹ See Moltmann (2005) for a situation-based account of *individual*.

Unity and countability, on the present view, are language-driven and made available only by the use of count nouns or classifiers. Yet the ontology of ordinary objects remains accessible and plays a role in the lexical meaning of predicates and the choice of classifiers. Semantic selection clearly can relate to both the language-driven ontology and the ontology of ordinary objects.

An obvious question now is: what is the status of the language-driven ontology, which includes entities such as pluralities, quantities, and the notion of unity? While it is certainly not the ontology of fundamental reality, it is an ontology based on selection of features and parts of reality that thus is perspectival, yet no less real than the ontology of ordinary objects. Unity as conveyed by count nouns and classifiers does not have to be conceived as a cognitive notion, as a mind-dependent condition imposed on certain parts of the world. Rather language-driven unity can be taken to be based on a selection of actual features that entities have mind-independently.

5. Challenge for the 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 display a strictly distributive reading. Thus, with plurals, *exist* can target only individual members of the plurality, not the plurality as such (Moltmann 2004, 2017):

(32) The buildings do not exist.

(32) cannot possibly be used as a statement about the existence of the sums as opposed to just the individual members (as a statement, say, by someone doubting the existence of sums).

The same holds for object mass nouns:

(33) The furniture still exists.

(33) 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).

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 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. Quantities form a subdomain of the domain of entities that is closed under sum formation. Pluralities are standardly taken to be sums of individuals and also form a subdomain that is 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 Frege's context principle, 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 is *part of*, which applies to individuals, pluralities as well as quantities, picking out material parts, subpluralities, and subquantities respectively (Moltmann 1998):

- (34) a. part of the house
 b. part of the students
 c. 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 1989, Champollion 2017).

There is one alternative semantic approach in the literature, which gives justice to the difference between individuals and pluralities. 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 would not be suited for the semantics of mass NPs, though, 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.¹⁰ How to deal with the semantics of mass nouns preserving 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.¹¹

6. The language-driven ontology of pleonastic entities

This paper has argued that natural language involves an additional level of ontology besides that of the ontology of ordinary objects, namely that of a language-driven ontology. The language-driven ontology represents countability, but also weakly individuated entities such as quantities and pluralities as well as contextually individuated configurations. A commitment to such entities strictly goes along with the use of language, in particular the use of definite mass and plural NPs. The view retains the assumption that referential NPs always stand for entities, but allows those entities to lack unity and thus not count as single entities.

¹⁰ But see Nicholas (2008) for a proposal of that sort.

¹¹ For proposals in that direction see McKay (2017) and Laycock (2006).

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 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. As with pleonastic entities, this need not mean that unity is in fact created; rather it is selected among the various conditions of unity that in fact obtain. The same can be said about pleonastic entities: they are not literally created, since they would exist simply in virtue of the language-independent conditions obtaining. Rather, they are made available by the relevant object-introducing linguistic devices.

The more general relevance of a level of a language-driven ontology distinct from the ontology of ordinary objects raises a range of questions for further research, such as: what general features or items in the ontology pertain to the language-driven ontology? What sorts of conditions govern the language-driven ontology and how do they compare to those that govern the ontology of ordinary objects? How universal is the language-driven ontology? It is plausible that the language-driven ontology is part of universal grammar since it goes along with the functional part of syntax (count categories) and needs to be acquired together with it.

The language-driven ontology would thus be part of the core of language, just as the functional part of syntax is.

7. The importance of language-driven ontology and language-driven 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 semantic values of referential NPs may be subject to reflection and rejection, and the lexical words used to refer to them may be subject to modification by the user ('conceptual engineering'). Furthermore, referential NPs standing for objects permit accommodation, in order to avoid category mistakes. This is different for the language-driven ontology. Acceptance of the language-driven ontology is mandatory with the use of the language, and predicates imposing requirements regarding the language-driven ontology do not permit accommodation.

The central role of language-driven unity for the mass-count distinction and part-structure-sensitive semantic selection shows the importance of the notion of an object for the semantics as well as the syntax of natural language. Chomsky (1986, 1998, 2013) famously put into doubt the involvement of objects in the semantics of natural language, more precisely, the view that referential NPs stand for objects. The importance of the notion of unity, which defines something as a single entity, sheds a different light on that skepticism. The notion of unity, defining a single entity, is an essential part of the language-driven ontology, the part of ontology that is intimately tied to syntax, the functional and constructional part of language. It should thus be part of universal grammar as much as the core of syntax is. The importance of the notion of unity, however, is ignored in Chomsky's critique of referentialist semantics and should be grounds for a review of that critique.

8. Conclusions

The point of departure of this paper has been the view that ontology is intimately tied to the syntax of natural language, forming a close tie with compositionality. This, though, requires distinguishing different levels of ontology. In particular, three levels of ontology need to be distinguished: the ontology of fundamental reality, the ontology of ordinary objects, and a 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, by contrast, is tied to the functional part of language as well as particular constructions. It comprises certainly aspects of ontology, such countability, and the part structure of quantities and pluralities, as well as the ontology of light objects. The language-driven ontology of part-whole structure supersedes and may diverge from the ontology of ordinary objects. It is also based on different notions. The ontology of ordinary objects is based on notions such as form, function, and persistence; the language-driven ontology is based on primitive unity and the introduction of objects by abstraction.

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.¹² The language-driven ontology is acquired strictly with the acquisition of language.

Appendix:

Comparison with the situation-based account of parts and wholes

On the present view, unity is a primitive notion. It may go along with conditions of integrity, but the latter does not guarantee it. This constitutes a crucial point of critique of the situation-based approach in Moltmann (1997). The general idea of that approach was that the semantics of natural language involves a level of situated part structures, in which the notion of an integrated whole plays a central role. Specifically:

1. The mass-count distinction consists in that singular count nouns convey integrity of an entity in a situation of reference, whereas mass nouns convey the absence of it.
2. The ‘information content’ of a situation determines whether entities or their parts are integrated wholes.
3. Part-structure-related semantic selectional requirements care about whether entities or their parts are integrated wholes in the situation of reference.

On that approach, no distinction between unity and integrity was made. The approach then had to avoid that pluralities that are integrated wholes in the situation of reference count as ‘one’ (e.g. maximal pluralities of individuals sharing a property). It is doubtful whether a distinction between weak and strong integrated wholes would be able to account for that.. On

¹² See Hespos/Spelke (2004).

the present view, configurations and their parts are entities. But they are not individuals, that is, entities with unity.

A further problem for the situation-based approach of Moltmann (1997) is that the situation associated with the utterance of a plural or mass NP cannot generally determine the relevant division. The idea was that the information content of the situations tells what subpluralities or subquantities are integrated wholes. However, as a matter of fact, it still depends on speaker's intentions which integrity-defining conditions are constitutive of the configuration in question. The two readings of (1) illustrate that:

(1) John compared the German and American students.

In (1), the descriptive content of the definite NP provides information that would determine the maximal plurality of German students as an integrated whole and so for the maximal group of American students. But (1) has also the individual-student comparison reading as well as other subgroup readings.

On the present view, structured pluralities or quantities are no longer determined by the information content of a situation. Rather as configurations that come with a structure of subpluralities or subquantities they form simply part of the speaker's intentions when uttering the plural or mass NP.

There is another difficulty for the situation-based approach and that is differences between definite Ps with conjoined plural or mass nouns and conjoined definite plural or mass NPs (Moltmann 2017). Thus, different readings are available in (2a) and (2b), unlike what the situation-based approach predicts:

(2) a. John compared the students and the teachers.

b. John compared the students and teachers.

The information content of the NP complement in (2a) and (2b) is the same. Yet only (2b) allows for a reading on which part of the students and part of the teachers form relevant subpluralities. This means that what influences a configuration may not be so much descriptive information constitutive of integrated wholes, but properties such as being a semantic value of the same definite NP (Moltmann 2017).

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