10

Levels of Ontology and Natural Language

The Case of the Ontology of Parts and Wholes

Friederike Moltmann

10.1 Introduction

In contemporary metaphysics, it is rather common to recognize two levels of ontology:

(1) the naïve or *ordinary ontology*, as I will call it, which is the ontology reflected in our common-sense intuitions and perhaps in cognition in general and which includes the ontology of ordinary objects[1]
(2) the *fundamental ontology*; that is, the ontology of what there really or ultimately 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 ordinary ontology can be understood in terms of what is fundamental and whether some or all of its items even exist.

It seems obvious that natural language reflects ordinary ontology. With its referential noun phrases (NPs), in particular, it seems to display the full range of ordinary objects and entities ontologically dependent on them, an ontology that includes material objects, artifacts, events, shadows, holes, tropes, and various sorts of 'stuff'. Philosophers discussing such entities frequently make reference to linguistic data, such as the applicability of predicates to terms putatively referring to the entities in question. Yet, clearly, the ordinary ontology is not dependent on natural language; rather, as an ontology implicit in cognition in general, it is acquired quite independently of the acquisition and use of language.

The aim of this chapter is to argue for another level of ontology besides the levels of ordinary and of fundamental ontology. This is what I will call the

[1] There are reasons to think that there is a difference between naïve ontology, the ontology non-philosophers would accept using common sense or naïve reflection, and the ontology implicit in cognition. The latter may not be accessible to reflection in the way the former is. For the purposes of this chapter this potential difference will be set aside, however important it may turn out to be.

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language-driven ontology. The language-driven ontology is not a full alternative ontology to that of the ontology of ordinary objects, but rather involves an enrichment of it. The language-driven ontology is specifically tied to language, and the implicit acceptance of that ontology strictly goes along with the use of language.

One main motivation for the language-driven ontology is the semantics of the mass-count distinction and more generally the semantics of parts and wholes involving plural and mass nouns. Recent research on the mass-count distinction converges on an agreement that the semantic distinction between mass and count nouns cannot reside in a difference in the ordinary ontology, but is more closely tied to language itself. For example, minimal pairs of a mass noun and a count such as *carpeting-carpets* appear to stand for the very same things, yet they differ semantically in the acceptability of predicates and the availability of predicate readings:

(1) a. John counted the carpets
    b. ??? John counted the carpeting.
(2) a. John compared the carpets.
    b. John compared the carpeting in the two rooms /?? the carpeting.
    c. John compared the individual carpets.

Count applies only to plural, not mass NPs, as seen in (1a, b); *compare* applies to plural NPs and certain mass NPs, as seen in (2a, b). Unlike *count*, *compare* can target individuals as well as subgroups, as on a reading of (2a) on which John compared the carpets in the one room to those in the other. In addition, *compare* can apply to mass NPs when a modifier specifies a division of their denotation into parts, such as *in the two rooms* in (2b). A subgroup reading of a plural argument of *compare* becomes unavailable with the addition of *individual*, as in (2c).

Count and *compare* impose different *part-structure-sensitive semantic selectional requirements* on their arguments; that is, they carry different presuppositions regarding the part structure of an argument that a plural or mass NP may present. *Count* requires as an argument a plurality of single entities; *compare* requires an argument with contextually or descriptively distinguished parts.

In the language-driven ontology of parts and wholes, the notion of unity—that is, the property of being a single, countable entity—plays a central role. Count nouns denote sets of single entities and thus convey unity; mass nouns don't. In contemporary semantics, in the tradition of Link (1983) and others, a common view has been that for an entity to have unity means for the entity to be an atom with respect to the noun used to refer to it. On an older view, going back to Aristotle, having unity means being an integrated whole, by having a form or structure or a boundary or by being a maximal entity whose parts are connected. A situation-based version of that view has been pursued in Moltmann (1997, 1998). On that view, a count noun characterizes an entity as an integrated whole

in a (minimal) situation of reference, but not so a mass noun. This chapter rejects those views and instead adopts the view that the mass-count distinction consists in the presence (count nouns) or absence (mass nouns) of a primitive condition of unity in the language-driven ontology, the ontology from which noun extensions are made up. Besides the mass-count distinction, such a language-driven notion of unity also plays a central role in part-structure-sensitive semantic selection as well as the semantics of part structure modifiers such as *individual* and *whole*.

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? This chapter will argue that the language-driven ontology, like the ordinary ontology, is an ontology of the real (though not fundamental). However, it is based on a selection of actual entities and in that sense it is perspectival. This goes along with a 'maximalist' or 'permissive' 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, some of which will have unity in the language-driven ontology, some of which won't, depending on what entities language selects for its ontology. Both the language-driven ontology and the ordinary ontology thus are based on a (mind- or language-dependent) selection among what is real.

The chapter takes up a number of generalizations from my earlier work on the semantics of parts and wholes within the theory of situated part structure (Moltmann 1997, 1998, 2005), which was based on the notion of an integrated whole as well as a notion of a situation of reference. Being an integrated whole generally consists in having a form, structure, or 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, which makes pluralities like 'the carpets' or quantities like 'the carpeting in the room' integrated wholes. The new view this chapter pursues 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. Thus, the plurality 'the women' and the quantity 'the furniture in the room' will be integrated whole, but not single, entities. The new view no longer makes use of situations, but only of entities that come with unity or with a structure at the level of the language-driven ontology.

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 ordinary ontology. They both are tied to the functional part of language (syntactic constructions or categories), rather than the lexicon.

The chapter 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 discuss the mass-count distinction and 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.

10.2 How Does Natural Language Reflect Ontology?

The background assumption of this chapter is that natural language reflects ontology, though not the ontology of fundamental reality.[2] 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, at least on 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 entities, and predicates express properties of entities.

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 entities, quantificational NP always range over entities, and predicates always express properties of entities.[3] 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.[4]

The view that referential NPs always stand for entities requires recognizing a wider range of entities than many metaphysicians may be willing to accept, such as a great range of derivative and perhaps abstract entities. It also requires recognizing

[2] See Moltmann (2017, 2019) for more on the ontology reflected in natural language.

[3] Frege went even further and took the notion of an object (entity) itself to be tied to the syntactic function of a referential NP, introducing a syntactic notion of objecthood ('an object is what a referential NP may stand for').

[4] There is also an alternative view, though, according to which 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 10.7.

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).[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. 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*:

(3) a. The stone weighs 1 kilo.
b. The stones (together) weigh 5 kilos.
c. The material weighs 5 kilos.

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.

There is a debate whether pluralities should be viewed as entities; that is, 'collections as one' (formally, sums or sets) or rather as 'collections as many', an issue that will be addressed in section 10.5. For the time being, pluralities will be considered entities.

As a terminological clarification, the terms 'individual', 'plurality', and 'quantity' in this chapter will be used 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. The term 'entity' will be used as the more general term, applying to individuals, pluralities, and quantities.

10.3 The Mass-Count Distinction

The mass-count distinction is a morphosyntactic distinction between nouns that appears to reflect a fundamental ontological distinction: that between a single entity, an entity that has unity, and something that fails to be a single entity, but is

[5] The term 'quantity' for the sorts of things that make up the denotation of mass nouns and the referents of definite mass NPs is due to Cartwright (1970) (see also Ter Meulen 1981, Pelletier and Schubert 2012). It is not entirely felicitous in that it suggests those things have the status of single, countable entities, which they don't (McKay 2017). The term as used in this chapter is meant to be ontologically neutral.

The term 'stuff' is often used in the philosophical literature, but it is unsuited when talking about pluralities of such entities in the metalanguage. The term 'substance' was originally used for the denotation of kind-referring bare mass nouns such as *gold* in *Gold is shiny* (Ter Meulen 1981) and is not suited for the things that make up the denotation of mass nouns when they do not stand for kinds. Other semanticists have taken bare mass nouns to stand for intensions (Pelletier and Schubert 2012) or modalized pluralities or quantities (Moltmann 2013).

just stuff (a quantity). The semantically relevant notion of a single entity is closely connected to the use of count nouns (or categories) in natural language and plays a central role in part-structure-sensitive semantic selection. As will be discussed, there are serious difficulties for standard semantic approaches to the mass-count distinction. This chapter will instead take the notion of unity conveyed by count nouns to be a primitive notion and will formulate constraints on part-structure-sensitive semantic selection in terms of it.

While there has been an enormous amount of recent research on the mass-count distinction across languages and the related issue of classifier languages, for the purpose of this chapter, it will suffice to stay with standard criteria and intuitions regarding the mass-count distinction in English. The main criterion for the mass-count distinction is that count nouns take numerals, but mass nouns don't. Count nouns moreover generally display a singular-plural distinction, but mass nouns don't. Another criterion used by linguists for mass and count nouns is the selection of quantifiers (mass nouns go with *little* and *much*, count nouns with *few* and *many*).[6] The criterion that philosophers have often focused on is the choice between the predicates *being some of* and *being one of* (*This carpet is one of the carpets*/?? *some of the carpeting*, *This rice is some of what was offered*/?? *one of the things that were offered*) (McKay 2017). Moreover, mass nouns cannot generally be predicated of count NPs and count NPs cannot generally be predicated of mass NPs (?? *This carpet is expensive carpeting*, ?? *This carpeting is a beautiful carpet*) (McKay 2017).[7]

By tendency, the mass-count distinction goes along with the ontological distinction between objects and matter. Yet (near) minimal mass-plural pairs such as *carpets—carpeting*, *clothes—clothing*, *rice grains—rice*, *faculty members—faculty*, *animals—cattle* make clear that the distinction can hardly be one in the ordinary ontology. Mass and plural NPs in such pairs may, it seems, stand for the very same things, hardly even displaying a difference in how things are perceived or conceived.[8] The choice of mass or count often seems arbitrary, both for a given language (why the mass noun *rice*, but the plural *beans*?) and across languages (English *pasta* as a mass noun vs. French *pâtes* as a plural noun). Given those linguistic facts, there is little agreement among linguists what the content of the mass-count distinction consists in, and whether it is an ontological, extension-based, information-based, epistemic, or conceptual-perspectival distinction.[9] This chapter

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

[7] Sometimes in the literature, predicating mass nouns of a count as below is taken to be acceptable:
(i) This chair is wood.
As far as such examples are even acceptable, they rather involve the *is* of constitution.

[8] See also Soja, Carey, and Spelke (1991). The distinction between the material and an object constituted by it is generally regarded as an ontological distinction by philosophers concerned with the ontology of ordinary objects (rather than the ontology of fundamental reality) (Fine 2003).

[9] See Pelletier and Schubert (1989, 2003) for an overview of different approaches to the semantic mass-count distinction.

will focus on the two main approaches to the semantics of the mass-count distinction:

(1) the *integrity-based approach*
(2) the *extension-based approach*.

The *integrity-based approach* takes the content of the mass-count distinction to be a distinction between entities that come with a boundary, form, gestalt, connectedness, or some other sort of integrity (count) and entities that lack integrity (mass). This way of drawing the mass-count distinction can be traced back to the Aristotelian notion of form (see also Simons 1987 for the general notion of an integrated whole). In linguistics, an integrity-based approach to the mass-count distinction was adopted by Jesperson (1924) and later Langacker (1987).[10] The theory of situated part structures (Moltmann 1997, 1998, 2005) makes use of the notion of the integrated whole of Simons (1987), but relativizes it to a situation, permitting entities to be accidental integrated wholes or to have or lack integrity just on the basis of linguistic information.

The *extension-based approach* to the semantics of the mass-count distinction takes the content of the mass-count distinction to consist in different properties of noun extensions formulated in terms of extensional mereology. The extension-based approach is due to Quine (1960) and became particularly influential in linguistics in the version it takes in Link (1983). Most importantly, 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 $x \vee y \in |[N]$, where $x \vee y$, the sum of x and y, is taken to be the least upper bound of {x, y} with respect to $<$ ($\sup_{<}(\{x, y\})$). Being both divisive and cumulative defines *homogeneity*, the characteristic property of mass noun extensions.

Both the integrity-based approach and the extension-based approach face two general difficulties:

(1) Singular count nouns that fail to meet atomicity or convey properties of integrated wholes
(2) Mass nouns that display atomicity or properties of integrated wholes.

Let us address these in turn.

[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'.

10.3.1 Singular Count Nouns That Fail to Meet Atomicity or Convey Properties of Integrated Wholes

There are a range of singular count nouns for which atomicity fails to hold. They include nouns like *thing*, *sum*, and *line* (Moltmann 1997) as well as *fence*, *twig*, and *wall* (Rothstein 2010, 2017). A proper part of a thing or sum may be a thing or sum again. One might relativize atomicity to a context that selects only maximal entities falling under the noun (Rothstein 2017). However, there are fully legitimate uses of the nouns in question on which they are not atomic (philosophical uses of *thing* or *entity*, for example). Semantic theory should not exclude legitimate 'technical' uses of nouns. The integrity-based approach does not make use of atomicity and thus in principle allows for count nouns to denote non-atomic entities. However, the entities in the extension of count nouns need to be integrated wholes in the situation of reference, which will hold only for maximal fences and walls. The integrity-based approach then has similar difficulties with legitimate uses of *thing*, *entity*, and *sum* on which integrity is not meant to play a role.

There are certain limit cases that make the difficulty for extension-based and integrity-based approaches particularly clear. These involve what I will call 'portion nouns' and 'collection nouns', nouns that fail to be atomic and need not convey any form of integrity. (5a, b) are examples with portion nouns; (6) is an example with a collection noun:

(5) a. the portion of wine John drank—the wine John drank
    b. the body water on earth—the water on earth
(6) the papers Mary proposed as readings—the collection of papers Mary proposed as reading

In (5a, b), the singular count NP and the mass NP provide the very same identity and persistence condition for an individual and a quantity, respectively, and so for the singular count NP and plural NP in (6). No integrity is implied by *portion*, *body*, and *collection* on the relevant use. Moreover, on that use, *portion*, *body*, and *collection* are non-atomic and thus fail to meet the extensional mereological criterion for singular count nouns. However, portion nouns and collection nouns clearly classify as singular count nouns, given the various criteria. For example, the portion of wine John drank is 'one of the portions offered', not 'some of the wine offered'; there is 'one portion of wine he drank', not 'one wine he drank', etc. (McKay 2017). Portion and collection nouns thus define something of which they are true as a single thing, but not in virtue of it being an atom or an integrated whole. Unity, the property of being a single thing, thus may, but need not, be grounded in properties such as being an atom with respect to an expression or concept or being an integrated whole. Singular count nouns, in addition to

providing identity conditions, which may be the same as those of mass nouns, specify that an entity have the status as a single entity. Whatever their lexical content may be, singular count nouns convey unity and thus countability. This motivates the view that unity is a primitive notion, not reducible to atomicity or integrity.

10.3.2 Mass Nouns That Display Atomicity or Quantities Whose Parts Are Integrated Wholes

Lack of atomicity for mass nouns poses the familiar difficulty of the minimal-parts problem. It arises quite obviously for granular mass nouns like *rice* but also others such as *water*. An even more serious problem are so-called object mass nouns. Object mass nouns represent a great range of mass nouns that appear to stand for pluralities of well-individuated objects. They include *furniture*, *clothing*, *carpeting*, *hardware*, *jewelry*, *luggage*, *staff*, *police force*, and *cattle*.[11] Object mass nouns often come with apparent co-extensional plural nouns in the same language or in a different language. In English, we have *clothes—clothing*, *carpets—carpeting*, *policemen—police force*, *professors—faculty*, *cows—cattle*. Across languages, we have the choice of the mass noun *pasta* in English and Italian and the plural noun *pâtes* in French, the mass noun *hair* in English and the plural noun *cappelli* in Italian. The choice of an object mass noun as opposed to a plural noun across languages appears generally arbitrary, without there being an obvious perceptual difference (Chierchia 1998b).

The two approaches to the content of the mass-count distinction, the extension-based approach and the integrity-based approach, are hardly applicable to object mass nouns. Object mass nouns are atomic as much as count nouns are, and object mass nouns appear to provide integrity conditions for the individuals that make up their denotations as much as plural nouns do. But object mass nouns fulfill the main criteria of mass nouns, such as the choice of determiners *little* and *much* and the resistance of numerals.

Object mass nouns have given rise to the view that the choice among mass and count is to an extent arbitrary and does not align with the actual ontology of things. 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'.

On the present view, object mass nouns convey a content that simply fails to describe an entity as a single entity (as 'one') or as a plurality of entities (as 'many'). Object mass nouns describe quantities that have parts that are single entities, but that themselves are not mere pluralities of single entities. That is because the

[11] Chierchia (1998b), Cohen (to appear) for linguistic discussions of object mass nouns.

lexical content of object mass nouns conveys properties based on collective or overall qualities, functions, or patterns, rather than standing for mere pluralities of individuals. Some apparent minimal pairs may display such differences particularly well, for example *jewelry—pieces of jewelry* or *hair—hairs*. *Colorful jewelry* can stand for differently colored, monochrome pieces of jewelry, but *colorful pieces of jewelry* requires the individual pieces to be colorful. 'Little hair' is less than 'few hairs', since the latter counts individual hairs, but the former measures an overall quantity. There are limit cases with little manifest differences (e.g. *pasta* vs. *pâtes*). Just as with the difference between portion and collection nouns, in the limit cases the ordinary ontology does not seem to be reflected in the choice between mass nouns and plural nouns.

Portion and collection nouns as well as object mass nouns pose serious problems for extension-based and integrity-based approaches to the mass-count distinction and support the view that the semantic content of the mass-count distinction resides in the presence or absence of a primitive notion of unity (even if there is a tendency for that unity to be grounded in conditions of integrity or atomicity). Unity in that sense need not align with the individuation of entities as single entities in the ordinary ontology. Only entities in the language-driven ontology make up the extension of nouns, not entities in the ordinary ontology. The entities in the extension of singular count nouns have the status of single entities in the language-driven ontology, but not so the entities in the extension of mass nouns and plurals.

Let us introduce some minimal formal representation. For the time being, the denotation of a plural noun N_{plur} can be taken to be the closure under sum formation of the extension of N, as on the extensional mereological approach. The minimal structure of the ordinary ontology is then as in (7a), and that of the language-driven ontology as in (7b):

(7) a. The ontology of ordinary objects: <I*, Q*>
    b. The language-driven ontology: <I, (Q, <), (P, <)>

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 (E*) (a domain of quantities and perhaps pluralities). The language-driven ontology consists 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, for now, is also closed under sum formation.

The domains I* and I need not coincide. In the ordinary ontology, unity is generally based on conditions of integrity and purpose, which also restricts the formation of sums (Simons 1987, Schaffer and Rosen 2017). In the language-driven ontology, by contrast, unity need not be grounded and sum formation appears unrestricted (mereological universalism).

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

(8) a. For a count noun N, $[N] \subseteq I$
b. For a mass noun N, $[N] \subseteq Q$
c. $P = \{x|\exists X\ (X \neq \emptyset\ \&\ X \subseteq I\ \&\ x = \sup_{<}(X))\}$
d. For the plural N_{plur} of a count noun N, $[N_{plur}] = \{x|\exists X(X \neq \emptyset\ \&\ X \subseteq [N]\ \&\ x = \sup_{<}(X))]$

Another potential support for the distinction between the language-driven ontology and the ordinary ontology comes from classifier languages such as Chinese, though the issue of classifiers across languages is highly complex and the case of Chinese itself controversial. This is not a place to enter the debate about Chinese, but to simply make clear that one view within that debate can be cast straightforwardly within the present approach. Simplified, in Chinese, (almost) all 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).[12] English has something close to classifier constructions with mass nouns:

(9) a. two pieces of furniture
b. two liters of milk

In (9a), *pieces* and *liter* act like sortal and mensural classifiers, respectively, enabling countability of the denotation of a mass noun. The view about Chinese that has sometimes been held is that Chinese nouns are always mass or at least are never specified as count (Ojeda 1993, Borer 2005, Rothstein 2017).[13] But standard ontological and extension-based characterizations of mass nouns (lack of integrity or natural unity and homogeneity, respectively) do not apply to Chinese nouns, just as they did not apply to object mass nouns. The present view can make sense of that view about Chinese: Chinese nouns never convey a notion of unity, regardless of their lexical content. (8b) then applies to Chinese nouns as well. The effect of numeral classifiers, on this view, 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 that is minimally distinct from e by having unity:[14]

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

[13] For a different view about Chinese see, for example, Doetjes (2012) and Cheng and Sybesma (1999, 2005).

[14] See Rothstein (2017) for a similar view.

(10) For a sortal numeral classifier C and a noun N,
[CN] = [x|∃y (y ∈ Q & Cy x & y ∈ [C] & x ∈ [N])}

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

10.3.3 The Theory of Situated Part Structures

The present view takes unity to be a primitive notion, at the level of ontology relevant for semantics, the language-driven ontology. Being a single entity at that level 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 for the semantics of singular count nouns made use of the notion of an integrated whole relative to a situation. I will quickly review that theory.

The general idea of that theory was that the semantics of natural language involves part structures in situations where the 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 the 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 important aspects of the mass-count distinction, as already mentioned. Another problem is that it considers the referents of definite plural and mass NPs integrated wholes. This means that the pluralities and quantities count as one, rather than as many, which is inadequate, as we will see (section 10.4.2). 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 (given a non-transitive, situated part relation). However, as a matter of fact, it still depends on the 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.[15]

10.4 Semantic Selection

We can now turn to part-structure-sensitive semantic selection, where the language-driven notion of unity plays a central role. Part-structure-sensitive semantic selectional requirements are expected to be semantic universals that hold across languages.

Part-structure-sensitive semantic selection has received little attention in the linguistic and philosophical literature, which has instead focused on constraints predicates may impose on the category of objects to which they may apply. These 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.[16] In order to avoid a category mistake, often accommodation may save the interpretability of the sentence; that is, a shift from the actual referent of the nominal argument to a closely related one. For example, *start* selects events, but not (enduring) objects, as in (11a); but still (11b) is acceptable with accommodation, mapping the book onto an event of reading:

(11) a. John started reading the book.
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. A widely shared view, though, is that such challenges can be dealt with pragmatically, rather than requiring giving up

[15] 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.

[16] See Magidor (2013) for an overview of the discussion of category mistakes.

the view that predicates apply just to objects.[17] For example, *appreciate* is a predicate that appears to be sensitive to the way an object is presented even in unembedded contexts:

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

Predicates like *appreciate* are sensitive to the facets of an object. Yet, the predicate itself does not select the linguistically conveyed presentation itself. That is because (12b) by itself can easily have the reading on which John appreciates Bill, the gardener, as a teacher:

(12) b. John appreciates the gardener.

The focus of this chapter is on predicates that appear to be sensitive to the way the part-whole structure of an entity is presented; the linguistic presentation of entities in terms of unity, plurality, and division into relevant parts. Given the theory of situated part structures, such semantic selection requires an exceptional relativization of arguments to a situation; that is, predicates select not just entities, but pairs consisting of entities and a situation of reference. The information content of the situation, on that view, determines the part structure of the entity. This chapter, by contrast, proposes an account of part-structure-sensitive semantic selection without an exceptional relativization to a situation, making just use of structured quantities and pluralities and a primitive notion of unity.

10.4.1 The Accessibility Requirement

The first semantic selectional requirement, the 'Accessibility 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

[17] 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:

(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.

NPs on the other. The generalization, roughly, is that predicates (or readings of predicates) making reference to the parts of the argument (but not the structure of the argument as a whole) can apply only to a mass or plural NP, not a singular count NP. Since only singular count nouns convey unity, this means that arguments of the relevant (readings of) predicates may not be single entities:

(13) The Accessibility Requirement
Predicates (or readings of predicates) that make 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.

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':

(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.
(16b) is impossible if understood in the sense of ranking the individual members of the class.

Second, there are predicates like *compare*, *distinguish*, *be similar*, and *be different*, which I will call '*compare*-type predicates'. With singular count NPs, they lack the sort of internal reading available with plural NPs:[18]

(17) a. John compared the students.
b. ??? John compared the class.

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

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

This may be 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 to 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 (iiia) and (iiib) (Moltmann 1997):

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

(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 subpluralities. 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 section 10.4.2.

Also, distributive readings fall under the Accessibility Requirement: they are hard to get with singular count NPs, at least with a range of predicates. Thus, (20b) can hardly have the distributive reading available for (20a):

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

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

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

Predicates like *count* and *enumerate* in a way make reference to the whole by exhausting the parts of the argument in the process described, but they do not make reference to the structure of the whole, unlike predicates like *organize* (see below).[19]

In the theory of situated part structures, 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. One problem with this account of the Accessibility Requirement is that integrity can also be imposed without count nouns, just by using a definite plural or mass NP. A definite plural or mass NP *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. they stand in the relation FF) and are not FF-connected to anything

[19] In Moltmann (1997, p. 199), the Accessibility Requirement was formulated just making reference to the whole.

that is not part of d (Simons 1987, Moltmann 1997). In the theory of situated part structures, the notion of FF-integrated wholes is of course restricted to the situation of reference of the definite NP.[20] The important observation is that integrity in the sense of an FF-integrated whole never blocks the application of part-structure-sensitive predicates.

A second problem for casting the Accessibility Requirement in terms of integrity is that even 'ungrounded' unity, conveyed by collection and portion nouns, blocks the application of part-structure-sensitive predicates or readings of predicates:

(22) a. John compared the papers on the desk.
b. ??? John compared the collection of papers on the desk.
c. ??? John compared the amount of jewelry on the desk.

The Accessibility Requirement involves unity tied to the use of a singular count noun, which means it involves entities at the level of the perspectival, language-driven ontology, rather than that of the more substantive, language-independent ordinary ontology.

That the Accessibility Requirement involves a perspectival, language-driven ontology is apparent also in the semantic effect of the noun modifier *whole*. Modifying a singular count NP with the adjective *whole* semantically means mapping a single entity (the denotation of the singular count NP) to the mere plurality of its parts. The result is the applicability of predicates subject to the Accessibility Requirement, 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.[22]

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

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

[22] NPs with the modifier whole as in (24a) permit a second, collective reading. Here the predicate applies to the collection of the parts together with a form (Moltmann 2005).

10.4.2 The Plurality Requirement

The Plurality Requirement distinguishes *count*-type predicates from *compare*-type predicates. *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.

Similarly, (25a) has a reading on which the women induce a partition of the jewelry, a reading that is absent in (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 NPs, especially those with object mass nouns. With those, 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 entirely excluded with object mass nouns such as *luggage* and *artwork*.[23,24]

(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 appears to permit accommodation of a quantity as a plurality of its individual parts.

[23] The data are presented in a less differentiated way in Moltmann (1997).

[24] 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 decor.

That seems to be because entities like art and decor are individuated primarily in terms of quality and function, in abstraction from individuals that make them up.

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

(30) The Plurality Requirement

Count-type predicates can be true or false only of pluralities of single entities.

Instead of (30), the theory of situated part structures made use of an 'Integrated Parts Requirement', a requirement that, basically, said that *count*-type predicates can apply only to entities that consist in parts that are integrated wholes in the situation of reference. Such a requirement faces the same problem as the Accessibility Requirement when the latter is formulated in terms of integrated wholes: *count*-type predicates cannot apply to entities whose parts are integrated wholes because of the description used for contextual information, unlike *compare*-type predicates. *Compare*-type predicates can relate to parts of an argument that are distinguished by virtue of the description used as in (31a, b) or in the nonlinguistic context, as possibly 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. Such readings are unavailable for *count*-type predicates *Count*-type predicates cannot take into account contextual divisions of pluralities or quantities into subpluralities or subquantities since pluralities and quantities do not count as single entities, even if they are integrated wholes in the relevant context.

Quantities and pluralities that come with a particular contextual division into subquantities and subpluralities are entities that I will call 'configurations'. In the theory of situated part structures, '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. Configurations are no longer determined by the 'content' of reference situations, but rather by speakers' referential intentions, just as other objects of reference.

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.[25] 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.

10.4.3 The Strict Distributivity of Predicates of Size and Shape and of Existence

The Accessibility Requirement and the Plurality Requirement are requirements that need to be satisfied at the level of the language-driven ontology, requiring the absence or presence of linguistically conveyed unity. There is one class of predicates whose application to entities relates not just to the language-driven ontology, but also the ordinary ontology, 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.
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.[26]

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

[26] 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 do not apply to quantities composed of ordinary objects, but rather to quantities that consist of concrete aesthetic or functional quantities of ordinary objects (tropes), and those predicates of shape and size do not apply.

Also certain mass nouns permit predicates of size, for example *output* and *Werk* 'oeuvre'.

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:[27]

(35) a. The books (together) are heavy.
b. The furniture is heavy.

The distributive readings of (34a–c) mean that, 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 ordinary ontology.

For predicates of size and form, linguistically conveyed unity will also do, though, even if it is not grounded, as with the collection and portion nouns below:

(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 the ordinary ontology. The latter thus remains accessible for semantic selection, as well as, for example, the choice of sortal numeral classifiers, which depends on natural units in the denotation of nouns.

10.4.4 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 ordinary ontology. 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 ordinary ontology. By contrast, no *count*-type predicate can apply to a configuration, a quantity, or a plurality whose relevant parts

[27] 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.

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 that accommodation cannot map pluralities or quantities onto corresponding single entities. Accommodation may only 'remove' unity from units in the ordinary ontology or add language-driven unity to units in the ordinary ontology. This means that the use of language—that is, the use of a count noun or classifier—is necessary for adding unity at the level of the ontology relevant for semantic selection, which is thus rightly called the language-driven ontology.

10.5 The Status of the Language-Driven Ontology

10.5.1 The Status of Unity

Count nouns, unlike mass nouns, convey unity, enabling countability; mass nouns don't, and they do so regardless of how entities may be individuated in the ordinary 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, 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 a feature that entities have mind-independently, but subject to selection by the use of language. Grammatically conveyed unity is mind-dependent only insofar 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; that is, 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.

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.

10.5.2 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 are themselves 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 just consist of what is fundamental or 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

[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.

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 a par, based on a mind- or language-dependent selection among what is real. Thus, the ontology of the real includes both the ordinary ontology and the language-driven ontology.

10.5.3 The Language-Driven Ontology of Pleonastic Entities

The language-driven ontology, with its notion of unity, is an ontology that strictly goes along with the use of language, in particular the use of definite mass and plural NPs. The question then arises whether there are motivations for that level of ontology independent of the mass-count distinction and part-structure-sensitive semantic selection. 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 as pleonastic entities are language-driven. Properties conceived that way 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 exist language-independently. However, we can hardly talk 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.

10.6 Challenges 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):

(38) The buildings do not exist.

(38) 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:

(39) 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

[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 everything has a sum. Yet even such philosophers cannot use those sentences to convey the existence of a particular sum.

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 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 for 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, 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 the 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, such as the predicate *weigh* mentioned earlier. 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).

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 and 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.[30] 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

[30] But see Nicolas (2008) for a proposal of that sort.

that remains to be undertaken. That challenge needs to be pursued while maintaining, in some way, the insights and advantages of the standard approach.[31]

10.7 The Importance of Language-Driven Ontology and Unity for Grammar and Semantics

The ordinary ontology 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 spontaneous modification by the user (subject, of course, to conditions of cooperative communication) By contrast, acceptance of the language-driven ontology is mandatory with the use of the language. [32] 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, and that even if they are part of the ontology of the real. They can be considered part of universal grammar because they align with the functional part of syntax and need to be acquired together with it. They are part of the core of language on an extended understanding of the term, just as much 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 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, which Chomsky denies.[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. For that reason, it should be considered part of universal grammar, in a suitably extended sense. Chomsky motivates his view with various types of examples of referential NPs permitting apparently contradictory predicates

[31] For proposals in that direction see McKay (2017) and Laycock (2006).
[32] See Moltmann (2020) for that distinction and the related core-periphery distinction.
[33] See Yang (2016) for the view that the functional part of grammar represents core grammar.
[34] Chomsky's skepticism pertains to both actual and merely conceived objects as semantic values of referential NPs (Chomsky p.c.).

that challenge the notion of an object of reference. The challenges are due largely to Chomsky's adoption of 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.

10.8 Conclusions

This chapter has argued for a distinction among three different levels of ontology: the ontology of the real, the ordinary ontology, and a language-driven ontology. The latter is aligned with the syntax of natural language, forming a close tie with compositionality. The co-existence of three ontological levels can best be understood on a maximalist view of reality, which means reality includes not just what is fundamental but also various sorts of derivative entities that are part of the ordinary and the language-driven ontology. While the ontology of the fundamental hardly plays a role for the semantics of natural language, the ordinary ontology clearly does, especially for the semantics of the lexicon.

We have seen that the language-driven ontology may select unity differently from the ordinary ontology, being tied to the functional part of language as well as syntactic constructions. The two ontologies also seem to involve different general notions. The ordinary ontology 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 ordinary ontology 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.[36]

References

Borer, H. 2005. *Structuring Sense, Volume 1: In Name Only*. Oxford: Oxford University Press.

Cartwright, H. 1970. 'Quantities', *The Philosophical Review*, 79: 25–42.

[35] See Hespos and Spelke (2004).

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Champollion, L. 2017. *Parts of a Whole*. Oxford: Oxford University Press.

Cheng, L. and Sybesma, R. 1999. 'Bare and Not So Bare Nouns and the Structure of NP', *Linguistic Inquiry*, 30: 509–542.

Cheng, L. and Sybesma, R. 2005. 'Classifiers in Four Varieties of Chinese'. In Guglielmo Cinque and Richard S. Kayne (eds.), *The Oxford Handbook of Comparative Syntax*, 259–292. Oxford: Oxford University Press.

Chierchia, G. 1998. 'Plurality of Mass Nouns and the Notion of "Semantic Parameter"'. In S. Rothstein (ed.), *Events and Grammar*, 53–103. Dordrecht: Kluwer.

Chierchia, G. 2015. 'How Universal Is the Mass/Count Distinction? Three Grammars of Counting'. In Audrey Li, Andrew Simpson, and Wei-Tien Dylan Tsai (eds.), *Chinese Syntax in a Cross-Linguistic Perspective*. Oxford: Oxford University Press.

Chomsky, N. 1986. *Knowledge of Language: Its Nature, Origin, and Use*. Westport, CT and London: Praeger.

Chomsky, N. 1998. *New Horizons in the Study of Language and Mind*. Cambridge: Cambridge University Press.

Chomsky, N. 2013. 'Notes on Denotation and Denoting'. In I. Caponigro and C. Cecchetto (eds.), *From Grammar to Meaning: The Spontaneous Logicality of Language*. Cambridge: Cambridge University Press.

Cohen, D. to appear. 'Activewear and Other Vaguery: A Morphological Perspective on Aggregate-Mass'. In F. Moltmann (ed.), *Mass and Count in Linguistics, Philosophy, and Cognitive Science*. Amsterdam: Benjamins.

Doetjes, J. S. 2012. 'Count/Mass Distinctions Across Languages'. In C. Maienborn, K. v. Heusinger, and P. Portner (eds.), *Semantics: An International Handbook of Natural Language Meaning, Part III*, 2559–2580. Berlin: De Gruyter.

Eklund, M. 2008. 'The Pictures of Reality as an Amorphous Lump'. In T. Sider, J. Hawthorne, and D. W. Zimmerman (eds.), *Contemporary Debates in Metaphysics*, 382–396. Oxford: Blackwell.

Fine, K. 2003. 'The Non-Identity of a Material Thing and Its Matter', *Mind*, 112: 195–234.

Fine, K. 2017. 'Naïve Metaphysics', *Philosophical Issues*, 27: 98–113.

Hawthorne, J. 2006. 'Plenitude, Convention, and Ontology'. In *Metaphysical Essays*, 53–70. Oxford: Oxford University Press.

Hespos, S. and Spelke, E. 2004. 'Conceptual Precursors to Language', *Nature*, 430: 453–456.

Jespersen, J. 1924. *The Philosophy of Grammar*. London: George Allen and Unwin.

Krifka, M. 1998. 'The Origins of Telicity'. In Susan Rothstein (ed.), *Events and Grammar*, 197–235. Dordrecht: Kluwer.

Langacker, Ronald 1987. *Foundations of Cognitive Grammar*. Stanford University Press, Stanford.

Laycock, H. 2006. *Words without Objects: Semantics, Ontology, and Logic for Non- Singularity*. Oxford: Oxford University Press.

Link, G. 1983. 'The Logical Analysis of Plurals and Mass Nouns'. In R. Baeuerle et al. (eds.), *Semantics from Different Points of View*, 302–323. Berlin: Springer.

Magidor, O. 2013. *Category Mistakes*. Oxford University Press, Oxford.

McKay, T. 2017. 'From Mass to Plural'. In M. Carrara, A. Arapinis, and F. Moltmann (eds.), *Unity and Plurality: Logic, Philosophy, and Semantics.* Oxford: Oxford University Press.

Moltmann, F. 1997. *Parts and Wholes in Semantics*. New York: Oxford University Press.

Moltmann, F. 1998. 'Part Structures, Integrity, and the Mass-Count Distinction', *Synthese*, 116(1): 75–111.

Moltmann, F. 2004. 'Two Kinds of Universals and Two Kinds of Collections', *Linguistics and Philosophy*, 27(6): 739–776.

Moltmann, F. 2005. 'Part Structures in Situations: The Semantics of *Individual* and *Whole*'. *Linguistics and Philosophy*, 28(5): 599–641.

Moltmann, F. 2013a. *Abstract Objects and the Semantics of Natural Language*. Oxford: Oxford University Press.

Moltmann, F. 2013b. 'The Semantics of Existence', *Linguistics and Philosophy*, 36(1): 31–63.

Moltmann, F. 2016. 'Plural Reference and Reference to a Plurality: Linguistic Facts and Semantic Analyses'. In M. Carrara et al. (eds.), *Unity and Plurality: Philosophy, Logic, and Semantics*, 93–120. Oxford: Oxford University Press.

Moltmann, F. 2017. 'Natural Language Ontology'. In *Oxford Encyclopedia of Linguistics.* Oxford: Oxford University Press.

Moltmann, F. 2019. 'Natural Language and Its Ontology'. In A. Goldman and B. McLaughlin (eds.), *Metaphysics and Cognitive Science*. Oxford: Oxford University Press.

Moltmann, F. 2020. 'Abstract Objects and the Core-Periphery Distinction in the Ontological and the Conceptual Domain of Natural Language'. In J. L. Falguera and C. Martínez (eds.), *Abstract Objects: For and Against*. Dordrecht: Synthese Library., 255-276.

Nicolas, D. 2008. 'Mass Nouns and Plural Logic', *Linguistics and Philosophy*, 31(2): 211–244.

Ojeda, A. 1993. *Linguistic Individuals*. Stanford, CA: CSLI Publications.

Oliver, A. and Smiley, T. 2013. *Plural Logic.* Oxford: Oxford University Press.

Pelletier, F. J. and Schubert, L. (1989, 2003). 'Mass Expressions'. In F. Guenthner and D. Gabbay (eds.), *Handbook of Philosophical Logic*, 2nd edition, 249–336. Vol. 10. Dordrecht: Kluwer (Updated version of the 1989 version).

Pietroski, P. 2018. *Conjoining Meanings: Semantics without Truth Values*. Oxford: Oxford University Press.

Quine, W. V. O. 1960. *Word and Object*. Cambridge, MA: MIT Press.

Rothstein, S. 2010. 'Counting and the Mass/Count Distinction', *Journal of Semantics*, 27(3), 343–397.

Rothstein, S. 2017. *Semantics for Counting and Measuring*. Cambridge: Cambridge University Press.

Saul, J. 1997. 'Substitution and Simple Sentences', *Analysis*, 57(2): 102–108.

Schaffer, J. 2009. 'What Grounds What?'. In D. Chalmers, D. Manley, and R. Wassermann (eds.), *Metametaphysics*, 347–383. Oxford: Oxford University Press.

Schaffer, J. and Rosen, D. 2017. 'Folk Mereology Is Teleological', *Nous*, 51: 238–270.

Schiffer, S. 1996. 'Language-Created and Language-Independent Entities', *Philosophical Topics*, 24(1): 149–167.

Schwarzschild, R. 2011. 'Stubborn Distributivity, Multiparticipant Nouns and the Count/Mass Distinction'. In S. Lima, K. Mullin, and B. Smith (eds.), *Proceedings of the 39th Meeting of the North East Linguistic Society (NELS 39)*, 661–678. Amherst, MA: GSLA.

Simons, P. (1987). *Parts. A Study in Ontology*. Oxford: Oxford University Press.

Soja, N., Carey, S., and Spelke, E. 1991. 'Ontological Categories Guide Young Children's Inductions of Word Meanings: Object Terms and Substance Terms', *Cognition*, 38: 179–211.

Strawson, P. 1959. *Individuals: An Essay in Descriptive Metaphysics*. London: Methuen.

Ter Meulen, A. 1981. 'An Intensional Logic for Mass Terms', *Philosophical Studies*, 40(1): 105–125.

Wright, C. 1983. *Frege's Conception of Numbers as Objects*. Aberdeen: Aberdeen University Press.

Yang, C. 2016. *The Price of Linguistic Productivity. How Children lean to break the Rules of Language*. Cambridge, MA: MIT Press.

Yi, B.-Y. 2005. 'The Logic and Meaning of Plurals: Part I', *Journal of Philosophical Logic*, 34: 459–506.

Yi, B.-Y. 2006. 'The Logic and Meaning of Plurals: Part II', *Journal of Philosophical Logic*, 35: 239–280.