

Mass Terms

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1 Introduction

Mass terms are those such as ‘water’, ‘computer software’, and ‘knowledge’. They are contrasted with count terms such as ‘person’, ‘computer program’, and ‘belief’. Intuitively, mass terms refer to “stuff” while count terms refer to “objects”. Since mass terms refer to stuff, they (but not count terms) allow for measurement: ‘a liter of water’, ‘three CDs worth of computer software’, ‘many books worth of deep knowledge’. Since count terms refer to objects, they (but not mass terms) allow for counting, quantifying and individuating: ‘a person’, ‘three computer programs’, ‘each belief of his’. Philosophers from many areas have found this distinction to be of interest – the metaphysical question of the primary existence of gunk vs. things is one obvious area, but also issues in the notions of identification and re-identification have been thought to be related to the distinction: is it the same building when all the concrete has been replaced with new concrete? been replaced with stone? A statue can cease to exist without its constituent matter ceasing to exist. Does this mean there are two entities here: the statue and the parcel of matter? Further afield, but still relevant, are questions about the referents of “abstract” mass terms, such as ‘*Curiosity* is an admirable quality to have’. The fact that ‘knowledge’ is a mass term while ‘beliefs’ is a count term have led some to question the account of knowledge as a justified true belief.

The examples just given were from English. Not all languages follow English in their characterization of this distinction—indeed, perhaps no other language is quite like English. Even within the Indo-European language group, where this distinction most closely follows that of English, there are relevant differences. And in the wider realm of the world’s languages, there are those that do not allow plural/singular marking on individual nouns but only on larger phrases. There are languages that do not have a plural/singular marking for noun phrases at all (nor agreement with verb phrases); there are languages that do not have quantifiers that operate on nouns or noun phrases; there are languages that do not have determiners like ‘a(n)’ and ‘the’ even while marking singular/plural. Thus, the examples given in the previous paragraph—which make it seem that there are clear ways to distinguish count from mass nouns—do not have the same purchase (or perhaps no purchase at all) in these languages. And this can be seen as raising questions concerning the philosophical relevance of, or interest in the distinction

Within the study of mass terms, the philosophical problems traditionally encountered include distinguishing mass from count terms (is it a syntactic or a semantic distinction, or something else?), deciding the extent of the classification (does it include more than noun phrases?), describing the semantic underpinnings of mass terms (since they are not true of individuals, how can a model theory be developed?), and explaining the ontology presupposed by mass terms vs. count terms. Alongside these concerns, there is the meta-philosophical question of the extent to which the linguistic practices of the speakers of a language can be used as evidence for how those speakers view reality, or indeed, as evidence for what reality is like.

The examples above suggest that the distinction is designed to subdivide noun phrases, but there have also been attempts to extend the distinction to (some) adjectives (Quine 1960: p. 104), and especially to verb phrases. Verb phrases designating processes like *to eat* would be $+_{\text{MASS}}$ while those designating achievements like *to prove* would be $+_{\text{COUNT}}$. Works concerned with this extension of the notion of $+_{\text{MASS}}$ are mentioned under “Further Readings”.

2 $+_{\text{MASS}}$ and $+_{\text{COUNT}}$ as Syntax

Many descriptive grammars of English, e.g., Quirk et al. (1985), give a syntactic characterization of the $+_{\text{MASS}}/+_{\text{COUNT}}$ distinction within the category of noun (N). That is, they view the fact that some noun (e.g., *water*) is a mass term as giving an explanation for why some combinations with other words are ungrammatical. For example, they might say

- (1) a. Mass nouns, unlike count nouns, do not have plural forms and thus all verb agreement is singular.
- b. Mass nouns, unlike count nouns, do not admit of numeral modifiers.
- c. Mass nouns, unlike count nouns, do not allow “individuating” quantifiers such as *each*, *every*, *some* (stressed), *few*, *several*, *many*, . . .
- d. Mass nouns, unlike singular count nouns, employ measurement terms such as *much*, *a lot of*, *(a) little*.

(There are further problematic cases for the distinction: “collectives” such as *team*, *committee*, *army*, *herd*, *alphabet*, and “pluralia tantum” which has a large number of subcategories but includes words like *pliers*, *binoculars*, *suds*, *intestines*, *bleachers*, *ruins*, *groceries*, *spoils*, *valuables*, *contents*, etc.)

The syntactic characterization in (1) is supposed to account for the following classifications:

- (2) Mass Nouns: *water*, *blood*, *cutlery*, *knowledge*, *carpeting*, *advice*, . . .
- (3) Count Nouns: *person*, *dog*, *spoon*, *belief*, *carpet*, *suggestion*, . . .

These are all Ns viewed as being in the lexicon. . . *lexical nouns*, to give them a name. The $+_{\text{MASS}}/+_{\text{COUNT}}$ features are viewed by Quirk et al. and others of this syntactic persuasion to be a part of the lexical characterization of the nouns.

These features are to be inherited from the lexical items into the larger and larger syntactic units that are present in extended phrases: *blood* as lexical N contains the syntactic feature $+_{\text{MASS}}$, which is inherited by the common noun phrases (CNP) *bright red blood* and *bright red blood that is on the floor* and the full noun phrase (NP) *the bright red blood that is on the floor*. The fact that this longer phrase is also $+_{\text{MASS}}$ is what ultimately explains why

(4) *The bright red blood that is on the floor are slippery

is ungrammatical. (Because the fact that the phrase is $+_{\text{MASS}}$ prohibits it from being plural, as (1a) says, and hence the agreement with the verb phrase does not happen.) Violations of the constraints involving $+_{\text{MASS}}$ and $+_{\text{COUNT}}$ yield ungrammatical results that have the same status as other syntactic violations; (4) is no more a part of English than is

(5) *Dog the quickly

It might be noted that both of the mass and count categories contain terms that are “abstract”: *knowledge* and *advice* are $+_{\text{MASS}}$, while *belief* and *suggestion* are $+_{\text{COUNT}}$.

3 $+_{\text{MASS}}$ and $+_{\text{COUNT}}$ as Semantics

Some descriptive grammars of English, e.g., Huddleston and Pullum (2002), think of the $+_{\text{MASS}}/+_{\text{COUNT}}$ distinction as a description of the semantic properties of the denotation of the terms. In this type of view, mass meanings contrast with count meanings:

- (6) a. Mass meanings are *true of stuff*; count meanings are *true of things*
 b. Mass meanings are *divisive in their reference*; count meanings are *true of a unit as a whole*
 c. Mass meanings are *cumulative in their reference*; (singular) count meanings are *not true of groups of that which they are true*
 d. Stuff that mass meanings are true of *cannot be counted*; count meanings are true of *individuated items that can be counted*
 e. Stuff that mass meanings are true of *can be measured*; (singular) count meanings are *not measurable*

Some theorists take the divisiveness and the cumulativeness conditions together to be called the *homogeneous in reference* condition.

In the semantic view, the fundamental difference between mass and count terms is that count terms are true of *objects*—entities that are distinct from each other even while being of the same type, and thus one can distinguish and count them—while mass terms are true of *stuff* that is undifferentiated with respect to the term being used to describe it. This in turn explains why mass terms, unlike count terms, are *divisive* in their reference: they permit something that the mass term is true of to be arbitrarily subdivided and the term to be

true of these parts as well. Taking the water in the glass to be something that *is water* is true of, it can be divided into parts and *is water* will be true of both parts. And again, mass terms, unlike count terms, are also *cumulative* in their reference: putting the water contained in two glasses into a bowl yields something of which *is water* is true. But the same is not the case with a count term like *dog*. Chopping up a dog does not yield more things of which *is a dog* is true, nor do two dogs make a thing of which *is a dog* is true. (Other than in a Frankenstein-like scenario.)

In a semantic approach, the features $+_{\text{MASS}}/+_{\text{COUNT}}$ are descriptions of the semantic value of lexical nouns and the larger common noun phrases, etc. Thus, they do not figure in the syntactic well-formedness constraints of a grammar, but would emerge as a description of what the semantic values of the embedded nouns are, and how these semantic values get altered by the syntactic combination of those nouns with other words. These features do not syntactically rule anything out; the most that can be said is that certain combinations are “semantically anomalous”, and hence can’t be interpreted.

As with the syntactic version of $+_{\text{MASS}}/+_{\text{COUNT}}$, the lexicon supplies individual words with a set of syntactic features and also a set of semantic values. Larger and larger phrases that contain the noun also contain the semantic information mentioned in the lexical items, modified in accordance with rules that describe the semantic effect of being syntactically combined in the manner that is employed.

The difference between $+_{\text{MASS}}/+_{\text{COUNT}}$ as syntax and $+_{\text{MASS}}/+_{\text{COUNT}}$ as semantics thus is whether these features are seen as syntactic well-formedness constraints that yield ungrammaticality when violated or as semantic interpretability constraints upon syntactically correct sentences that yield semantic anomaly when violated.

4 Some Problems for the Syntactic Approach

In the Syntactic Approach, lexical Ns are assigned either a $+_{\text{MASS}}$ OR $+_{\text{COUNT}}$ feature, and this feature controls the syntactic (in)admissibility of larger phrases. But there are many words that have both mass and count meanings, for instance

- (7) a. Concrete terms
 (i) a lot of chocolate / many more chocolates
 (ii) more discipline / an academic discipline
 (iii) too much paper / write a paper
 b. Abstract terms
 (i) much discussion / three different discussions
 (ii) a lot of difference / two differences
 (iii) much more data / many more data

The examples in (7) are just the tip of the iceberg, There are many more of these “dual life” terms, sometimes forming regular patterns, but sometimes not:

- (8) Mass terms used “countily”:
- a. Pinot Noir is *wine* / Pinot Noir is *a wine*
 - b. Kim produces *sculpture* / Kim is producing *a sculpture*
 - c. *Beer* on the table / Three *beers* on the table / Eight *beers* on tap
- (9) Count terms used “massily”
- a. Leslie has more *car* than *garage*
 - b. Chris Pronger, 6'6" worth of *defenseman*...
 - c. Some people like *data* better than *theory*

As (Huddleston and Pullum 2002: p.335) remark “. . . the dual use of *chocolate* is not remotely exceptional but is representative of an extremely widespread phenomenon”, and they follow this with a list of 25 examples chosen over a wide variety of types of nouns that illustrate just how wide-spread the phenomenon of a noun having two equally-salient meanings where one is +MASS but the other +COUNT.

There’s also the “universal grinder” of Pelletier (1975), which is like a meat grinder except that it can accommodate any object, no matter how large, and its teeth are so powerful and fine that it can grind anything, no matter how strong. Insert an object that falls under any (concrete) count noun into one side. . . for example, a hat. Push the button, and the result is that there is hat all over the floor. (True despite the fact that we might have some other term, e.g., *felt*, also describing what is on the floor.) Another push of the button and we can have book all over the floor. An unfortunate accident might generate curious cat all over the floor.

One might also think of “universal packagers” in this regard, that take any item of which a mass term is true and convert it into an object. Any time there is a use for a particular type of some mass then there can be a count term that describes it – for example, *a finely-silted mud*, which can be a name for a type of mud and also a predicate that is true of all individual exemplars of this type. And if there is a standardized amount of *M* that is employed in some use, then there will be a count term that describes this amount, such as *a beer* or *an ice cream*. Furthermore, there seems always to be a count use for any alleged mass term *M*, meaning (roughly) *a kind of M*. Putting all these together, a term like *a scotch* could be true of individual servings (thus being independently true of each piece of the actual matter in the various glasses), or true of the different standardized amounts (so that two instances of the same standard one-ounce serving count as only one such standardized amount), or true of the different kinds of scotch on the table or available at the bar. Thus any of ‘four’, ‘three’, ‘five’ could be true answers to the question “How many scotches are on the table?”

These considerations show that the appropriate theory needs to talk about *meanings* of terms, or *uses* of the terms, or maybe *occurrences* thereof (some occurrences are +MASS, others of the same word are +COUNT). But then this is no longer a syntactic account! And the syntactic approach just doesn’t work. For, it will turn out that since *any* noun can be either mass or count, a +MASS/+COUNT

syntactic distinction does no work – *nothing* is ruled out by the syntactic rules.

5 Some Problems for the Semantic Approach

Many Ns have both a natural mass and a natural count sense. So the basic lexical item that gets entered into a phrase structure description of a sentence will be one of these senses. It is never very clear how this is supposed to be effected in a grammar, but we will simply assume that there is some way that this can be done. But even if we assume this, there nonetheless seem to be some serious difficulties that are semantic mirrors of the difficulties found in the syntactic approach.

Many formal semanticists (e.g., Link 1983 Chierchia 1998a,b Pelletier and Schubert 1989/2003 Landman 1991) take the characteristics in (6) to be best accounted for in terms of a semi-lattice theory. A semi-lattice has no lowest elements and is atomless. The idea is that anything that *water*, for example, might be true of has subparts – things in the lattice that are its parts – of which *water* is true; and any two elements in the *water*-lattice find a joined element also in the lattice that represents the merge of those two elements.

But it should be noted that many mass terms obviously are not “atomless” in the sense required by this theory. Consider

- (10) *furniture, cutlery, clothing, equipment, jewelry, crockery, silverware, footwear, bedding, toast, stemware, gravel . . .*

Clearly there are atomic parts of these; yet they are considered mass terms by any of the traditional grammars. So it cannot be an atomless mereology that accounts for the mass nature of these words; and since it doesn’t account for the mass nature of these particular words, there seems to be no reason to think it accounts for the mass nature of *any* words.

Some theorists, e.g., Huddleston and Pullum (2002), take this as evidence that terms like those in (10) are of a different nature than what we have been calling ‘mass terms’, and are to be treated differently. Huddleston and Pullum call them ‘aggregate terms’ and semantically distinguish them from other mass terms by their being true of “very different sorts of things”. The idea is that furniture, for example, is true of sofas, chairs, tables, carpets, and so on, and that these are “very different” from one another. But a true mass term, for example ‘blood’, is really true only of one kind of thing.

But one might still wonder: are *any* words at all that obey the condition on divisiveness? Are there really any words that are atomless – whose referent has no smallest parts? Doesn’t *water* have smallest parts: H₂O molecules perhaps? A standard defense of the divisiveness condition in the face of these facts is to distinguish between “empirical facts” and “facts of language”. It is an empirical fact that water has smallest parts, it is said, but English does not recognize this in its semantics: the word *water* presupposes infinite divisibility.

It is not clear that this is true, but if it is, the viewpoint suggests interesting questions about the notion of semantics. If *water* is divisive but water isn’t,

then water can't be the semantic value of *water* (can it?). This in turn suggest a notion of semantics that is divorced from "the world", where semantics is not be a theory of the relation between language and the world. But it also would seem not to be a relation between language and what a speaker's mental understanding is, since pretty much everyone nowadays *believes* that water has smallest parts. Thus, the mental construct that in some way corresponds to the word *water* can't be the meaning of *water* either. This illustrates a kind of tension within "natural language metaphysics" (Bach 1986a,b).

Another problem with the semantic approach to the distinction comes from pairs of words where one is mass and the other is count and yet the items in the world that they describe seem to have no obvious difference that would account for this. On the intuitive level, it seems that postulating a *semantic* difference should have some reflection in the items of reality that the terms designate. But this is just not true. There seems to be nothing in the *referent* of the following mass vs. count terms that would explain how they should be distinguished – as they intuitively are. (See McCawley 1975 for further examples).

- (11) a. Concrete terms
 (i) baklava vs. brownies
 (ii) garlic vs. onions
 b. Abstract terms
 (i) success vs. failures
 (ii) flu vs. colds

To many, these examples and their surrounding facts have seemed to prove that the linguistic features of +COUNT and +MASS do not have any backing in reality. Nor any backing in people's intuitive understanding of *when* a word will be +MASS or +COUNT or *what it is* for a word to be +MASS or +COUNT.

6 +COUNT and +MASS Semantic Theories

A rather heterogeneous group of topics has been included within the subject matter of the semantics of +MASS vs. +COUNT terms. Given that the general topic concerns the content of lexical items, we can expect that much of the discussion will differ from that of the more traditional compositional semantic theories.

The older philosophical literature on mass terms (and many other terms) tended to find different meanings for the terms under consideration, depending on what role they had in a sentence. Theorists would consider one of the following types of uses of a mass term:

- As names, as in *Water covers most of the globe*
- As predicates true of quantities/portions of matter, as in *John drank some water*
- As predicates true of objects, as in *This ring is gold*
- As predicates true of kinds/substances, as in *Claret is wine*

- As predicate modifiers, as in *She is wearing a gold bracelet*

To some this suggested that +_{MASS} terms were ambiguous.

In general, a mass term in predicative position may be viewed as a general term which is true of each portion of the stuff in question, excluding only the parts too small to count ... A mass term used in subject position differs none from such singular terms as ‘mama’ ... , unless the scattered stuff that it names be denied the status of a single sprawling object. (Quine 1960: pp.97–98)

To others it suggested that a theory should pick one of these ways that mass terms are used in sentences as basic and either ignore the others or try to generate them by some “semantico-syntactic trick”. Parsons (1970) took them always to be names of substances (“in the chemistry sense”), but when a mass noun *M* was “in predicate position” such an occurrence was transformed into *is a quantity of M*. (This same transformation occurred in other positions also). One of the earliest attempts to employ mereology as a tool for representing mass terms was Moravcsik (1973). In such a framework nouns (and adjectives) designated mereological wholes and the copular connection becomes *is a part of*. Pure mereological approaches have been found wanting, because of the problem of “minimal parts” – classical mereology has no minimal parts other than the empty part, yet it is generally assumed that the designations of ordinary-language +_{MASS} nouns do have minimal parts. So Moravcsik invoked a notion of *is a part having relevant structural properties*. This has also been found wanting (see Montague 1973 Pelletier 1974), but more clever ways of operating do seem to avoid these problems (e.g., Bunt 1979, 1985; see also Burge 1972 Ojeda 1993 Moltmann 1998). A parallel – and related – development has been the notion of a (join) semi-lattice to support part-whole structures. This was first urged onto the mass term semantics world by Link (1983) and picked up by many others.

A related question is whether it is possible to show a unity within the +_{MASS}/+_{COUNT} realm. Gillon (1992, 1999), who adopts a syntactic view of the +_{MASS}/+_{COUNT} distinction, argues for a “common semantics” for +_{MASS} and +_{COUNT} nouns. Count nouns are assigned a set of atomic individuals, and a mass noun is assigned the mereological join of the individuals of which it is true. Chierchia (1998a,b) instead assigns mass nouns to be “inherently plural”. And in Chierchia (2010), +_{MASS} and +_{COUNT} are given the same type of semantic value as one another, with the exception that +_{MASS} terms, unlike +_{COUNT} terms, are said to have “vague minimal parts”.

One understudied aspect of this concerns “abstract” mass nouns (*advice, freedom, information, ...*). Many theorists wish to invoke a mereology or a semi-lattice as the relevant semantic structure for concrete mass nouns such as *water, blood, steel, ...*, but mereology (in particular) seems completely out of place for abstract nouns. Intuitively, +_{MASS} is independent of whether the noun is ±_{ABST}, and therefore any semantic technique that is correct for concrete mass terms should be applicable to abstract mass terms. Differences between abstract and concrete mass terms should be due to the ±_{ABST}, and not due to

$+_{\text{MASS}}$. But mereology just doesn't apply to $+_{\text{ABST}}, +_{\text{MASS}}$ terms; hence, it should not be a defining semantic feature of $-_{\text{ABST}}$ (concrete) $+_{\text{MASS}}$ terms either. And so, mereology would *not* be a part of the semantics of $+_{\text{MASS}}$, but at most a consequence of the interaction of a more general semantic account of $+_{\text{ABST}}$ and $+_{\text{MASS}}$. Some attempts towards an account of the semantics for $+_{\text{ABST}}, +_{\text{MASS}}$ terms using the semantics of comparatives can be found in Nicolas (2008); an account using the methodology of Natural Semantic Metalanguage (Wierzbicka 1996) can be found in Goddard and Wierzbicka (2010). I think all these authors would admit that their account needs to be expanded before it can truly be said to describe $+_{\text{ABST}}, +_{\text{MASS}}$ nouns in general.

Accounts of the meaning of items that are lexically $+_{\text{MASS}}$ can be divided into two sorts: those that view themselves as part of formal semantics and those that think of giving a more “ordinary language” account of the meaning. The former will try either to employ existing constructs from formal semantics or else will recommend the use of some novel logical or mathematical machinery to be incorporated into formal semantics. The latter will offer more of a “dictionary sense” to these lexical entries, often phrased in terms of some set of cross-cultural semantic primitives.

This latter methodology has been most deeply developed within the Natural Semantic Metalanguage (NSM) framework of Wierzbicka (1996). Indeed, many of the works within this framework have concerned themselves directly with the issue of the meaning of $+_{\text{MASS}}$ terms, and they have outlined a quite rich structure within the category of $+_{\text{MASS}}$ nouns. (See in particular Wierzbicka 1988 Goddard and Wierzbicka 2002 Goddard 2009). Although there are many who find the NSM framework to be wanting (e.g., Barker 2003 Matthewson 2003 Riemer 2006 Jackendoff 2007), the work has produced the most detailed descriptions of different types of $+_{\text{MASS}}$ (and $+_{\text{COUNT}}$) nouns and ought to be studied for that reason alone.

Within the formal semantic group of theories, it has long been recognized that standard first-order logic seems unsuited to representing sentences involving mass terms. For example, even if one grants that (12a) is to be represented as (12b), nonetheless Tarski's classic (13a) can't reasonably be represented as (13b), because there are no plausible values for x :

- (12) a. Men are mortal.
 b. $\forall x(Man(x) \supset Mortal(x))$
- (13) a. Snow is white.
 b. $\forall x(Snow(x) \supset White(x))$

For, what could be the value of x in “For all x , if x is snow, then x is white”? Intuitively, we want it to be “snowy stuff”, but the idiom of classical logic is committed to the values being objects/things/entities – elements of the domain. However, those are what is designated by $+_{\text{COUNT}}$ nouns, not $+_{\text{MASS}}$ nouns.

Earlier attempts invoked relational constants into the first-order language to accommodate $+_{\text{MASS}}$ terms. Parsons (1970), for example, used names for substances and the relations *quantity-of* and *constituted-by* as well as a “substance-

forming operator”. Burge (1975) considers two different theories along these lines: a “relational” account that analyzes sentences like (14a) as (14b)

- (14) a. This ring is now gold
 b. Gold(r , now)

He rejects this account because it takes the basic individuals to be stages of objects. His preferred account employs the basic 3-place relation of ‘ x constitutes y at (time) t ’, analyzing (14a) as

- (15) $(\exists x)(\text{Gold}(x) \wedge C(x, r, \text{now}))$

One or the other of these two general approaches have been adopted by a wide range of theorists who want to employ as much of ordinary first-order logic as possible.

An important topic concerns the “dual life” that many (most? all?) nouns lead in English and similar languages. What should the semantic value of the lexical item be for such nouns? Consider *chocolate*, for example. Should its semantic value be the set of chocolates? But of course not only do we have the chocolates that are delivered to one’s lover on Valentine’s Day, but there is the chocolate that they are made from. Here is where a first choice point arises. Should we take the set of chocolates to be basic and somehow “derive” the chocolate from them? Or should we take the chocolate stuff as basic and derive the set of chocolates from that? Or should there be two separate meanings that are each basic? Or should there be one meaning that is “unspecified for +MASS/+COUNT” thereby implicitly including both meanings?

The literature on mass nouns seems to be committed to taking one of the meanings as basic and deriving the other. The process is called “coercion” and is said to be triggered by features of the surrounding linguistic context (or, sometimes, by the non-linguistic context). For example, if the mass-meaning is taken as primitive, then a sentence like *Abelard gave Heloise seven chocolates* is said to have ‘chocolate’ coerced into a +COUNT meaning by the presence of the plural and the number modifier. If the sentence were *Each chocolate was made by hand*, then the presence of ‘each’ will coerce the basic mass meaning into a count meaning. Alternatively, if the count-meaning is taken as primitive, then a sentence like *The box contained two kilos of chocolate* would be seen as coercing the basic count meaning into the mass meaning by means of the measure phrase ‘two kilos of’.

It is never clear why one meaning vs. the other is taken as primitive. It is as if the theorists have some special insight into what the true, real and underlying meaning is. It seems unlikely to be due merely to frequency; maybe it is some combination of frequency and saliency. When examples are given, they do not use nouns like *chocolate* but rather *house*, *child*, *car*, It then seems more plausible to say that *Sally owns too much house!* employs a coerced mass-meaning of *house* – which is “really” a +COUNT term. But this seems to become a more suspect attitude when one views the full range of “dual life” terms. The list in (Huddleston and Pullum 2002: p.335) shows such a truly

wide variety of these terms that one would hesitate to employ the notion of ‘coercion’ so rapidly.

Some theorists have thought that there should be a distinction made within $+_{\text{MASS}}$ nouns for those that are homogeneous vs. those that are “atomic”. The sort of distinction these theorists have in mind is between words like *blood* and *furniture*. We have already seen in conjunction with (10) above that Huddleston and Pullum (2002) wish to make these form separate categories within $-_{\text{COUNT}}$, on the basis that these “aggregate terms” are true of “very different types of things”. This issue of how a mass term can be a cover term for a variety of different subtypes, each of which is a count term, is discussed in the psychology literature under the heading of “mass nouns as superordinate terms” (see Markman 1985 Wisniewski et al. 1996, 2003 Takatori and Schwanenflugel 2008), with an emphasis on whether there is some basis “in reality” for the notion of an ‘individual’ vs. ‘stuff’. This is often called “natural atomicity”. We should notice that, while the atomic parts of furniture are rather large – making it be clear that the natural atomicity has been fulfilled – the atomic parts of cutlery are smaller and those of gravel are very small indeed. And as I mentioned above, pretty much every English speaker believes that there are atomic parts of *any* purported mass term, even such prototypical ones as ‘water’ or ‘blood’. What *does* seem true, however, is that for some mass nouns, ‘gravel’ perhaps or maybe ‘coffee’, just what counts as atomic parts is “vague”. The idea is that while there are clear cases of the atomic parts of (most?) $+_{\text{COUNT}}$ nouns, and of some $+_{\text{MASS}}$ nouns (the clear-cut “aggregates”), and while some words perhaps designate “complete homogeneity” (maybe ‘space’?), these endpoints merge into one another in the same way that any of the traditional vague predicates do. And then the issue of what nouns should be $+_{\text{COUNT}}$ and which should be $+_{\text{MASS}}$ is of the same nature as vagueness: here, the vagueness of what counts as an atomic part. This line of research is pursued by Chierchia (2010).

7 Some Diachronic and Cross-Linguistic Data

Chierchia (2010) gives a very helpful three-way division of how various languages deal with the $+_{\text{MASS}}/+_{\text{COUNT}}$ distinction. Without insisting on the exhaustivity of its classification, or even on the ultimate “truth” of its vision, we can nonetheless use the labels to give general characterizations. According to this division, the world’s languages fall into one of the following three groups with regards to $+_{\text{MASS}}/+_{\text{COUNT}}$.

1. Number marking languages, which have overt number features that obligatorily appear on nouns. Here the $+_{\text{MASS}}/+_{\text{COUNT}}$ distinction applies to the nouns directly. (Most?) Indo-European languages, e.g., current English, are such languages.
2. Classifier languages, which do not have obligatory number marking on nouns (and arguably do not have a singular/plural contrast at all on nouns). Lexical nouns in such languages could be viewed as $+_{\text{MASS}}$, al-

though there is a $+_{\text{MASS}}/+_{\text{COUNT}}$ distinction that is active more generally. (For this reason it might be better to view the lexical nouns as unspecified for $+_{\text{MASS}}/+_{\text{COUNT}}$). The classifiers in these languages enforce the $+_{\text{MASS}}/+_{\text{COUNT}}$ distinction, but at the level of an entire “classified noun phrase”. (Most?) Asian languages, e.g., Mandarin, Japanese, and Korean, are such languages.

3. Languages lacking both obligatory number marking and obligatory classifier systems. Various Amerindian languages, various South American languages, and various Austronesian languages are such languages. It is not clear whether these languages can be said to have a $+_{\text{MASS}}/+_{\text{COUNT}}$ distinction, although some scholars have argued for it.

Toyota (2009) reports that a close study of the use of mass and count terms in the five recognized phases of the development of the English language shows that there has been substantial changes in the counting system of English, especially in the use of classifiers. Apparently, the earlier English did not make a distinction between mass and count nouns, using classifiers exclusively and therefore having the nouns all be $+_{\text{MASS}}$. The $+_{\text{MASS}}/+_{\text{COUNT}}$ distinction eventually emerged around around 1500. Toyota concludes that in fact English changed from a classifier language to the current number-marking, non-classifier language, and as part of this change came to mark a $+_{\text{MASS}}/+_{\text{COUNT}}$ distinction within lexical nouns.

The Chinese languages and the Korean-Japanese languages are often argued *not* to make a $+_{\text{MASS}}/+_{\text{COUNT}}$ distinction within the lexical noun, because in these languages *no* noun can directly combine with numerals. Instead, a classifier – a word that indicates a way to “individuate” what is being discussed – is always needed. The classifier might designate a measure, or some container, or some shape (etc.) that the referent of the noun is to have. Many writers, e.g., Hansen (1976) Sharvy (1978) Krifka (1995) Chierchia (1998a,b), have concluded that the referent of the noun is therefore to be understood as “mass stuff”, waiting to be “classified” into an object or a portion or some shape, etc. This is true for nouns such as ‘man’ as well as ones like ‘water’. And hence, the meaning of all lexical nouns is $+_{\text{MASS}}$. However, the work of Cheng and Sybesma (1999) has convinced many that the appropriate place to look for the $+_{\text{MASS}}/+_{\text{COUNT}}$ distinction in these languages is the classifier system itself. And thus Chierchia (2010) can now writes that although it is /emphpossible to view the lexical nouns as $+_{\text{MASS}}$, “there is a $+_{\text{MASS}}/+_{\text{COUNT}}$ distinction that is active more generally”.

Other languages have fewer syntactic constructions that would give clues as to whether a noun $+_{\text{MASS}}$ OR $+_{\text{COUNT}}$. There are languages that have number marking (e.g., singular/plural) but it is not obligatory to use it. And there are classifier-like languages where the use of the classifiers is not obligatory. More notably, there are languages where there in fact is *no* number marking or classifiers; and languages that have no determiners (like ‘a(n)’ or ‘sm’) at all. There are languages where all quantification is adverbial, and not over nouns: one says ‘Bears are always dangerous’ rather than ‘All bears are dangerous’.

And there are even languages where one uses the same construction to describe the result of adding two bowls of water together to form one bowl as would be used to consider putting two monkeys in the same vicinity to each other.

References to work on cross-linguistic comparisons is gathered under “Further Readings”.

8 Concluding Remarks

We have seen that the $+_{\text{MASS}}/+_{\text{COUNT}}$ distinction has been thought to have philosophical ramifications within metaphysics, both as to the ultimate nature of reality and to issues of identity and re-identification. The extension of the $+_{\text{MASS}}/+_{\text{COUNT}}$ distinction to the realm of verb phrases also yields a philosophically interesting area of investigation into differentiation among processes, events, achievements, and so on. We have also seen that the existence of mass nouns in natural language has challenged traditional first-order logic as a representation language, and sparked development of mereological and lattice-theoretic approaches as representational media.

There are two standard approaches to the $+_{\text{MASS}}/+_{\text{COUNT}}$ distinction: syntactic and semantic. But there appear to be severe difficulties with making either of them into a general theory. Furthermore, the facts surrounding how $+_{\text{MASS}}/+_{\text{COUNT}}$ is manifested in languages other than the Indo-European ones might seem to show that the basis and rationale for making the distinction – and perhaps any philosophical consequences that might seem to follow from the distinction – are not really valid as claims about reality in general or about how people might conceptualize reality.

One topic not broached in this survey is the psycholinguistic work done on the $+_{\text{MASS}}/+_{\text{COUNT}}$ distinction. Most of this work has been done in English, and even that done in other languages has mostly concentrated on number-marking languages with only a small amount done with classifier languages and none at all done in other languages. Nonetheless, it seems that the results are important for a universal theory of $+_{\text{MASS}}/+_{\text{COUNT}}$. Further philosophical studies (and further linguistic studies) of the $+_{\text{MASS}}/+_{\text{COUNT}}$ distinction in English will need to be cognizant of this work, for it provides a touchstone of empirical reality in the way speakers employ the distinction, and it cannot be ignored in favor of “a more beautiful theory.” Some of this work is referenced in the “Further Readings”.

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References

- Bach, E. (1986a). The algebra of events, *Linguistics and Philosophy* **9**: 5–16.
- Bach, E. (1986b). Natural language metaphysics, in R. B. Marcus, G. Dorn and P. Weingartner (eds), *Logic, Methodology, and Philosophy of Science, VII*, North Holland, Amsterdam, pp. 573–595.
- Barker, C. (2003). Paraphrase is not enough, *Theoretical Linguistics* **29**: 201–209.
- Bunt, H. (1979). Ensembles and the formal semantic properties of mass terms, in F. J. Pelletier (ed.), *Mass Terms: Some Philosophical Problems*, Reidel, Dordrecht, pp. 249–277.
- Bunt, H. (1985). *Mass Terms and Model Theoretic Semantics*, Cambridge UP, Cambridge.
- Burge, T. (1972). Truth and mass terms, *Journal of Philosophy* **69**: 263–282.
- Burge, T. (1975). Mass terms, count nouns and change, *Synthèse* **31**: 459–478. Reprinted in (Pelletier 1979:pp. 199–218).
- Cheng, L. and Sybesma, R. (1999). Bare and not-so-bare nouns and the structure of NP, *Linguistic Inquiry* **30**: 509–542.
- Chierchia, G. (1998a). Plurality of mass nouns and the notion of ‘semantic parameter’, in S. Rothstein (ed.), *Events and Grammar*, Kluwer, Dordrecht, pp. 53–103.
- Chierchia, G. (1998b). Reference to kinds across languages, *Natural Language Semantics* **6**: 339–405.
- Chierchia, G. (2010). Mass nouns, vagueness and semantic variation, *Synthèse* **174**: 99–149.
- Gillon, B. (1992). Towards a common semantics for English count and mass nouns, *Linguistics and Philosophy* **15**: 597–640.
- Gillon, B. (1999). The lexical semantics of English count and mass nouns, in E. Viegas (ed.), *The Breadth and Depth of Semantic Lexicons*, Kluwer, Dordrecht, pp. 19–37.
- Goddard, C. (2009). A piece of cheese, a grain of sand: The semantics of mass nouns and unitizers, in F. J. Pelletier (ed.), *Kinds, Things and Stuff*, Oxford UP, New York, pp. 132–165.
- Goddard, C. and Wierzbicka, A. (2002). *Meaning and Universal Grammar: Theory and Empirical Findings*, John Benjamins, Philadelphia.

- Goddard, C. and Wierzbicka, A. (2010). The semantics of ‘abstract nouns’: Modern NSM analyses and the thinking of John Locke and Jeremy Bentham. Submitted.
- Hansen, C. (1976). Mass nouns and ‘a white horse is not a horse’, *Philosophy East and West* **26**: 189–209.
- Huddleston, R. and Pullum, G. (2002). *The Cambridge Grammar of the English Language*, Cambridge UP, Cambridge.
- Jackendoff, R. (2007). Conceptual semantics and natural semantic metalanguage theory have different goals, *Intercultural Pragmatics* **4**: 411–418.
- Krifka, M. (1995). Common nouns: A contrastive analysis of English and Chinese, in G. Carlson and F. J. Pelletier (eds), *The Generic Book*, University of Chicago Press, Chicago, pp. 398–411.
- Landman, F. (1991). *Semantic Structures*, Kluwer, Dordrecht.
- Link, G. (1983). The logical analysis of plurals and mass terms: A lattice-theoretical approach, in R. Bäuerle, C. Schwarze and A. von Stechow (eds), *Meaning, Use and Interpretation*, de Gruyter, Berlin, pp. 303–323.
- Markman, E. (1985). Why supordinate category terms can be mass nouns, *Cognition* **19**: 31–53.
- Matthewson, L. (2003). Is the meta-language really natural?, *Theoretical Linguistics* **29**: 263–274.
- McCawley, J. (1975). Lexicography and the count-mass distinction, *Berkeley Linguistic Society, Vol. 1*, pp. 314–321. Reprinted in J. McCawley (ed.) *Adverbs, Vowels, and Other Objects of Wonder*, Univ. Chicago Press, Chicago, 1979, pages 165–173.
- Moltmann, F. (1998). Part structures, integrity, and the mass–count distinction, *Synthese* **116**: 75–111.
- Montague, R. (1973). Reply to Moravcsik, in K. Hintikka, J. Moravcsik and P. Suppes (eds), *Approaches to Natural Language*, Reidel, Dordrecht, pp. 289–294. Reprinted as “The Proper Treatment of Mass Terms in English” in (Pelletier 1979: pp. 173–178).
- Moravcsik, J. (1973). Mass terms in English, in K. Hintikka, J. Moravcsik and P. Suppes (eds), *Approaches to Natural Language*, Reidel, Dordrecht, pp. 263–285.
- Nicolas, D. (2008). Towards a semantics for mass expressions derived from gradable expressions. Unpublished, on website.
- Ojeda, A. (1993). *Linguistic Individuals*, CSLI Press, Stanford.

- Parsons, T. (1970). An analysis of mass and amount terms, *Foundations of Language* **6**: 363–388. Reprinted in (Pelletier 1979: pp. 167–171).
- Pelletier, F. J. (1974). On some proposals for the semantics of mass terms, *Journal of Philosophical Logic* **3**: 87–108.
- Pelletier, F. J. (1975). Non-singular reference: Some preliminaries, *Philosophia* **5**: 451–465. Reprinted in (Pelletier 1979: pp. 1–14).
- Pelletier, F. J. (ed.) (1979). *Mass Terms: Some Philosophical Problems*, Kluwer Academic Pub., Dordrecht.
- Pelletier, F. J. and Schubert, L. (1989/2003). Mass expressions, in F. Guenther and D. Gabbay (eds), *Handbook of Philosophical Logic, 2nd edition. Vol. 10*, Kluwer, Dordrecht, pp. 249–336. Updated version of the 1989 version in the 1st edition of *Handbook of Philosophical Logic*.
- Quine, W. V. (1960). *Word and Object*, MIT Press, Cambridge, MA.
- Quirk, R., Greenbaum, S., Leech, G. and Svartvik, J. (1985). *A Comprehensive Grammar of the English Language*, Longman, New York.
- Riemer, N. (2006). Reductive paraphrase and meaning: A critique of Wierzbickian semantics, *Linguistics and Philosophy* **29**: 347–379.
- Sharvy, R. (1978). Maybe English has no count nouns: Notes on Chinese semantics, *Studies in Language* **2**: 345–365.
- Takatori, Y. and Schwanenflugel, P. (2008). Superordinate category terms and mass-count noun status, *Linguistic Anthropology* **2**: 199–209.
- Toyota, J. (2009). When the mass was counted: English as classifier and non-classifier language, *Skase Journal of Theoretical Linguistics* **6**: 118–130.
- Wierzbicka, A. (1988). Oats and wheat: Mass nouns, iconicity, and human categorization, in A. Wierzbicka (ed.), *The Semantics of Grammar*, John Benjamins, Amsterdam, pp. 499–560.
- Wierzbicka, A. (1996). *Semantics: Primes and Universals*, Oxford UP, Oxford.
- Wisniewski, E., Imai, M. and Casey, L. (1996). On the equivalence of superordinate concepts, *Cognition* **60**: 269–298.
- Wisniewski, E., Lamb, C. and Middleton, E. (2003). On the conceptual basis for the count and mass noun distinction, *Language and Cognitive Processes* **18**: 583–624.