Mass Terms: A Philosophical Introduction

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On an intuitive level, mass nouns are those such as

(1)  *water, cutlery, lamb* (the food), *spaghetti, mud, beer, gold, equipment, software, hardware, cheese, oats, .*...

As well, many “abstract” nouns are mass: for example,

(2)  *trust, help, intelligence, information, damage, knowledge, .*...

These are contrasted with “concrete” count nouns such as

(3)  *dog, tree, father, piano, lamb* (the animal), *biscuit, noodle, prize, child, knee, .*...

as well as to some “abstract” count nouns, for example,

(4)  *failure, belief, proposal, problem, .*...

Complex phrases are also brought into the categorization, so that *cutlery that is in the drawer* and *hot water* are mass phrases while *tree that is in the park* and *tall person* are count phrases. I use ‘mass term’ and ‘count term’ to cover both nouns and more complex noun phrases. (As well, some theorists admit other grammatical categories into the count/mass realm: some verb phrases and some adjectives have been argued to be mass/count, but I won’t follow up that line of thought in this Overview.)

When one focuses on the syntactic aspects of mass vs. count, we are told that count terms syntactically admit numeral modifiers and quantifiers that presuppose a method of counting, but mass terms do not; and related to this is the fact that count terms but not mass terms can be pluralized.

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1The issues discussed in this Overview are developed in more detail in Pelletier and Schubert [1989/2003].
Mass terms are thus always singular\(^2\), and have their own method of measurement that is not appropriate with singular count terms.

\[(7) \quad \text{much water, a lot of cutlery, little knowledge, \ldots} \]
\[(8) \quad *\text{much dog, a lot of tree, a little belief}^3\ldots\]

From a semantic point of view, the fundamental difference between mass and count terms is that count terms are true of \textit{objects}—entities that are distinct from each other and thus one can distinguish and count them—while mass terms are true of \textit{stuff} that is undifferentiated with respect to the term being used to describe it. Mass terms are therefore unlike count terms in that they are \textit{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 \textit{is water} is true of, it can be divided into parts and \textit{is water} will be true of both parts. And again, mass terms, unlike count terms, are also \textit{cumulative} in their reference: putting the water contained in two glasses into a bowl yields something of which \textit{is water} is true. But the same is not the case with a count term like \textit{dog}. Chopping up a dog does not yield more things of which \textit{is a dog} is true, nor do two dogs make a thing of which \textit{is a dog} is true.\(^4\)

The foregoing was a rough-and-ready, intuitive description of what mass terms are. This is perhaps a sufficient background for understanding many of the points made in the papers of this part of the volume, but there are many further issues that remain outstanding in linguistico-philosophical theory of mass terms. And so I would like to take this opportunity to delve deeper.

\section*{The Traditional Account}

So first, I will expand on the examples just given to show how the background theory works. After this I will consider a group of objections that seem to show that the entire theory is wrong. And it is here where linguistics and philosophical semantics would like some “outside assistance”.

As with the earlier Generics Overview, I use terminology of ‘noun’ (N), ‘common noun’ (CN), and ‘noun phrase’ (NP) respectively to designate (certain) lexical items, some adjec-

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\(^2\)With some exceptions, such as oats and smarts.

\(^3\)Little in (7) and (8) is the measure term, not a size- (or importance-) indicating adjective.

\(^4\)Other than in a Frankenstein-like scenario.
tival and relative clausal modifications of nouns, and a CN that has been “determined” by
the addition of a (definite or indefinite) article, or a demonstrative, or a quantifier. Also
relevant especially to discussions of mass terms (and also plurals) are what are known as
‘classifier phrases”. In English these usually take the form “X of”, which is then applied
to a mass term. I consider the result to be a type of CN. For example

(9) a. bowl of jello
    b. blade of grass
    c. puddle of water

and the like. In turn these can be converted to NPs by the addition of determiners and
quantifiers, so that we have.\(^5\)

(10) a. the bowl of jello
    b. this blade of grass
    c. a puddle of water

A standard way to view nouns (e.g., Quirk et al. [1985], Huddleston and Pullum [2002]) is
to say that they come with certain syntactic features plus a semantic value. In describing
larger and larger phrases that contain the noun (as it occurs in a sentence), the syntactic
features are employed so as to guarantee that well-formedness conditions are met by these
larger phrases, and their semantic features are generated in some suitable way. For example,
boy might be syntactically characterized as an N that is singular and masculine, with a
semantic value of the set of all individual boys\(^6\); smart might be syntactically characterized
as an adjective with a semantic value of being a function that selects the smart objects
out of a given set of objects. Then the complex phrase smart boy could be syntactically
characterized as a CN that is singular and masculine, and its semantic value would be the
set of all individual smart boys. If we now tried to add the determiner/quantifier many
to this CN so as to form a full NP, we discover that it fails because many has a syntactic
requirement that it requires a non-singular CN as an argument. And hence *many smart
boy is syntactically ill-formed (and the question of its semantic value doesn’t even arise).
Using the to form the full NP, however, would be syntactically appropriate and the semantic
value of the smart boy is the most salient smart boy in the relevant context.\(^7\) If there is
no such item then the sentence in which this NP occurs is semantically anomalous or
maybe false (depending on the theory), but it retains its syntactic good standing. In this
general sort of view, the semantic value of complex terms (CNPs and NPs) that contain
mass or count nouns as parts are computed as some function of the semantic value of the

\(^5\)There is more to this syntactic story, but this is enough for the purposes of this Overview. See [Quirk
et al., 1985, §§5.6–5.8].

\(^6\)The semantic value is only for the purposes of this example.

\(^7\)Again, the semantic value is just for expository purposes.
embedded noun, the particular function depending on what the other parts of the complex are. Without involving ourselves in details of just exactly which functions are used for which syntactic combinations, we can give examples like: The semantic value of *dirty water* is describable as, or computed in accordance with, whatever the semantic value of *water* is, and whatever the semantic value of *dirty* is, when they are put together by the syntactic rule of an adjective modifying a noun to form a CN. This general account of how the syntactic well-formedness constraints work with the semantic values of syntactically simple pieces of language to construct the semantic values of the syntactically more complex items is called ‘semantic compositionality’, and is a touchstone for most modern semantic theories.

Applying this picture to mass terms goes as follows. Some nouns in the lexicon are marked +count while others are marked +mass\(^8\). In this picture, +mass is a syntactic feature that enforces certain well-formedness constraints so that the asterisked phrases in (6) and (8) are classified as violations of syntactic well-formedness constraints, and thus join

(11) *Dog the quickly

in being simply ungrammatical.

**Problems for the Traditional Account**

The Traditional Account is syntax-driven. As the account given above showed, the lexical items are assigned either a +mass or +count feature, and this feature controls the syntactic admissibility or inadmissibility of larger phrases. But there are many words that have both mass and count meanings, for instance

(12) a. Concrete terms
    (i) a lot of chocolate / many more chocolates
    (ii) more discipline / an academic discipline
    (iii) too much paper / write a paper
    (iv) drink beer / drink a beer
b. Abstract terms
    (i) much discussion / three different discussions
    (ii) much justification / many justifications
    (iii) a lot of difference / many differences
    (iv) much more data / many more data

\(^8\)In many places, for example Quirk et al. [1985], Huddleston and Pullum [2002], +count is used in place of +mass. But we will continue with the terminology that is more common in philosophy and psychology.
The examples in (12) are just the tip of the iceberg. There are many more of the “dual life” terms which have been illustrated in (12), and they seem to form regular patterns:

(13) Mass terms used “countily”:
   a. Pinot Noir is *wine* / Pinot Noir is *a wine*
   b. Kim produces *sculpture* / Kim is producing *a sculpture*
   c. Sandy likes *lamb* / Sandy likes *every lamb*
   d. *Beer* on the table / Three *beers* on the table / Eight *beers* on tap

(14) Count terms used “massily”
   a. Leslie has more *car* than *garage*
   b. Chris Pronger, 6'6" worth of Anaheim Duck *defenseman*...
   c. He’s got *woman* on his mind
   d. What a hunk of *man*!
   e. Some people like *data* better than *theory*

And then there’s 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. One inserts 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.9 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 or amount 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 any use, then there will be a count term that describes this amount, such as *a beer* or *an ice cream*. In fact, 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 amounts (so that two instances of the same one-ounce serving count as only one amount), or true of the different kinds of scotch 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

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9This is true despite the fact that we might have some other term, e.g., *felt*, that also describes what is on the floor.
the traditional theory just doesn’t work. 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.

So we need to find some alternative approach.

A Semantic Approach?

A semantic approach would be one that interpreted the features +mass and +count as descriptions of the semantic value of nouns and common noun phrases, etc. Thus, they would 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. In such a picture, the 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 we have seen above, many words have both a natural mass and a natural count sense. So the basic thing 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 not pause over that here, and simply assume that there is some way that this can be done. But even if we can assume this, there nonetheless seem to be some serious difficulties that are mirrors of the syntactic approach just given in the earlier sections.

We have already seen what theorists have asserted about the semantics of mass terms, in contrast to count terms:

(15) a. Mass terms are true of stuff  
    b. Mass terms are divisive in their reference  
    c. Mass terms are cumulative in their reference  
    d. Stuff that mass terms are true of cannot be counted  
    e. Stuff that mass terms are true of can be measured

Some theorists take the divisiveness and the cumulativity conditions together to be called the homogeneous in reference condition. Many formal semanticists (e.g., Link [1983], Chierchia [1998b,a], Pelletier and Schubert [1989/2003]) take the characteristics in (15) 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.
Problems for a Semantic Approach

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

(16) furniture, cutlery, clothing, equipment, jewelry, crockery, silverware, footwear . . .

Clearly there are atomic parts of these, and 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 by extension, 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.

In any case, perhaps we should further examine the presumption that there are any words at all that obey the condition on divisiveness. Or put another way, are there really any words that are atomless – that have no smallest parts? Doesn’t water, for example, have a smallest parts: H₂O molecules perhaps? Certainly coffee has smallest parts, as do other mixtures. 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?). In turn this suggests a notion of semantics that is divorced from “the world”, and so semantics would 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”. This very puzzling state of affairs is something that theoreticians from philosophical and linguistic semantics would welcome clarification about from psychological studies of the sort carried out in the present conference.

Further problems with the semantic approach to the mass-count distinction comes from the fact that there are 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.

(17) a. Concrete terms
(i) baklava vs. brownies
(ii) spaghetti vs. noodles
(iii) garlic vs. onions
(iv) rice vs. beans

b. Abstract terms
(i) success vs. failures
(ii) knowledge vs. beliefs
(iii) flu vs. colds

And along the same lines, one and the same item of reality can be referred to by means of a count term in one language and a mass term in another.

(18) a. *dandruff vs. les pellicules
    b. dishes vs. la vaisselle

The cross-linguistic facts are much more widespread and intricate than these few examples between French and English might suggest. Some discussion is in Bunt [1985], Krifka [1995], Chierchia [1998a], Krifka [1998], Borer [2005], and many other places. For instance, Chierchia [1998a] mentions that, even though Italian matches English in having both a mass noun corresponding to hair (capello) and a count noun corresponding to hairs (capelli), in English one says

(19) a. *I cut my hairs
    b. *I cut my hairs

while in Italian one says

(20) a. Mi somo tagliato i capello
    b. Mi somo tagliato i capelli

It would seem that the same activity is described in the two cases, so there can’t really be anything in the choice of mass vs. count.

How can all these observations be reconciled? That is an important question that philosophical and linguistic semanticists would like to have some input from psychological studies, both of the adult behavioral type and of the developmental sort. Perhaps a wider net of collaborators with a wider range of phenomena under investigation can yield a pleasing answer. At least, that is a hope for the present volume and the research being reported.
References


