DO MASS NOUNS CONSTITUTE A SEMANTICALLY UNIFORM CLASS?

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Abstract: Research on mass nouns has focused on concrete terms. So, are there semantic properties shared by all mass terms? We first consider concrete nouns like milk and furniture. Contrary to Cheng (1973), we show that they can be held to refer distributively (i.e., to apply to any part of what they apply to) only if this property is understood with a new part-relation, that of N-part. In addition, they refer cumulatively: when they apply to each of two things, they also apply to the two things considered together. We then turn to abstract mass terms like beauty and love. We find, surprisingly, that they too refer distributively and cumulatively.

Introduction

Mass nouns, like milk, furniture, chair and beauty, constitute a morpho-syntactic subclass of common nouns. They can be used with determiners like much and less, but neither with a many, or few nor with cardinal numerals. They are invariable in number, mostly singular. Count nouns have a complementary distribution, admitting for instance singular and plural number. They constitute the other morpho-syntactic subclass of English common nouns (Kail and Radden 1992). Such a distributional distinction between two subclasses of common nouns exists only in English, but also in many other Indo-European languages, including French (Kleiber 1999), German (Kail 1991) and Italian (Benchimol 1998).

Researchers studying the semantics of mass nouns have focused on concrete terms (see the reviews of Perlmutter & Schubert 1989 and Kail and Radden 1991), ignoring abstract ones. By concrete terms here, we mean terms that denote material entities, like water, furniture, cats and birds; abstract terms are those that do not qualify as concrete. This ontological distinction cuts across the distributional distinction between mass nouns and count nouns.

The question we want to address in this paper is whether these unfamiliar abstract mass terms, like chaos, love and beauty, share any semantic property with the more familiar concrete mass nouns. To answer this question, we proceed in two steps. First, what are the basic semantic properties of concrete mass nouns? Then, do abstract mass terms have the same properties as concrete ones? We will show in conclusion that these properties have a bearing on two other types of phenomenon: the collective and non-collective interpretations to which are liable.
autonomy in which mass nouns appear; and the telic and atelic aspects of certain
sentences.

1. Concept Mass Noun

Let us, then, begin by examining the semantic behavior of concrete mass

terms: the milk and furniture. What are these basic semantic properties? Are

mass nouns. Distributive reference and cumulative reference, have been
attributed to these nouns.

1) Distributive Reference. Following Chen (1973; 286-287), several authors
have proposed that mass nouns refer distributively. According to Chen, "Any
part of a mass object which is W is each W.'

To formulate this property in general terms, we require a preliminary notion of
what it is for a noun to apply to an entity. We will say that a noun N 'applies to'

in the object of a definite mental expression having N for head can be used to
designate this entity. Consider, for instance, the milk in a cup. It is referred to by
the subject of the phrase, 'The milk in the cup is for the cat.' The noun milk, hence applies to

the milk in the cup. That being specified, the following definition of distributive
reference can be proposed:

A noun refers distributively if it applies to any part of what it applies to.

For instance, if one considers only the milk in the lower half of a full bottle, one
can refer to it by saying:

The milk in the lower half of the bottle is for the cat.

As a first sight, it may seem reasonable to identify the part-object relation and
the definition with the relation introduced in the formal study of the notion of part
to whole; the relation of merodetic part. This relation is very general; it

applies not only to the material and temporal domains. It is characterized by four

axioms, which make the relation anti-symmetric and transitive, and warrant the
existence of so-called weak complements and generalized merological sums; see
Simons (1987) and the Appendix.

But consider again the case of milk. Any part of the milk in a bottle is still
milk. This is really true only if the parts considered are perceivable; under the

size of a molecule, for instance, one is not anymore in presence of milk.

Moreover, there are many mass nouns in which the property, even if restricted to

perceivable parts, does not apply. Consider the furniture of a room. A chair is
furniture, but a leg of chair is not, even if the leg is part of the chair. For authors
like Blass (1979) and Gillon (1992), the property of distributive reference would
thus not be true of mass nouns in general.
An important point made by these authors is that semantics has no exceptions (unless otherwise explainable by well-understood independent reasons). Therefore, the basic semantic properties of mass nouns must be properties shared by all mass nouns. From this point of view, nouns like gold, milk or sand are in no way the best instances of their species. Nouns like furniture and silverware and nouns like chaos, love and beauty are mass nouns on an equal footing. What we have discussed shows that the conceptual notion of homogeneity found with names of substances is in no way characteristic of mass nouns.

Should we then altogether dispense with the property of distributive reference, as urged by Bart and Gillet? In fact, all depends on how the notion of part is understood. Creng says: "Any part of a mass object which is W is itself W." But what constitutes, for a noun N, part of a "mass object" to which the noun N applies? Besides the interpretations that have just been proposed, another interpretation is possible, which we put forward in our work (see also Nicolai), to appear. In such an interpretation, the parts mentioned in the property of distributive reference are those to which the linguistic expression part of the N applies. Take a sentence like:

They have stolen part of the furniture last night!

What counts as part of the furniture is one or several pieces of furniture, but not the leg of a chair, the leg constitutes part of the chair, but not part of the furniture.

As we can see, the interpretation of the expression part of the N depends on the noun N considered. This is a semantic fact. To each common noun N is associated a specific relation that corresponds to the interpretation of the expression part of the N and that holds only among certain entities of the domain of discourse. Let us call this the N-part relation. This relation is satisfied by two entities y and x if the expression part of the N can be applied to y while the nominal expression the N designates x.

We remark that concrete mass nouns (but not concrete count nouns) impose the following condition on the interpretation of the expression part of the N; it is a condition that we therefore propose to assimilate to distributive reference:

A noun N refers distributively if it applies to any K-part of what it applies to.

This property is indeed satisfied by all concrete mass nouns, be they nouns like water or nouns like furniture. And it is not satisfied by concrete count nouns. For instance, the tail of a cat can be said to be part of the cat, but not to be a cat.

Another semantic characteristic has been attributed to mass nouns, to which we now turn.
2) Cumulative Reference. Quine (1960: 91) seems to be the first to assert that mass terms refer cumulatively: "So-called mass terms like water [and] furniture have the semantic property to refer cumulatively: any sort of parts which are water is itself water." Quine's observation is generally accepted. However, given the ambiguity of the term mass, it can be interpreted in two ways. We present a first interpretation and show what problems it faces.

According to this first interpretation, the property of cumulative reference can be formulated as follows:

A noun refers cumulatively if, whenever it applies separately to each of two things, it is possible to constitute a whole of which each thing is a part and such that the noun applies to the whole itself.

This property is satisfied both by mass nouns like water and by mass nouns like furniture. For instance, one could put the furniture of a room and the furniture of another room of the same house in the hall. In the hall, one would then have furniture, of which the furniture that was in each room would constitute a part.

The problem with this interpretation is that there are count nouns, which would then seem to refer cumulatively. One counts among them count nouns like bird, cloud and like glass of continuity. Indeed, two heads can mix with one another and constitute a bigger bird. And, seeing that he has served too many glasses of whisky for his guests and himself, would not Goethe flatter to tempt to pour one glass into another, thereby obtaining a glass containing more whisky for himself?

What is at stake in such examples is the fact that one constitutes a whole from the things to which the noun applies. Without this operation of constitution, the whole does not exist, for instance, there is not one head, but two heads. It is thus relative to two distinct states of the world that a noun like bird is applied, first to each original head, then to the bird constituted from those heads. Now, such a change of world is in the course of interpretation in logical: it is always relative to a given state of the world that a nominal expression refers and that a simple empirical state is. The bird is posterior to can be attributed a truth value. The cases we have been considering must hence be thought of as invalid counter-examples.

With this in mind, one can understand the cumulativity criterion as a constraint on what a noun applies to, each time a state of the world is fixed. Take, in a given state of the world, two entities x and y. These two things can be constituted together: x and y is an entity distinct from x and from y, which exists in the same world as x and y. This allows us to reformulate the cumulativity criterion as follows:

A noun refers cumulatively if, whenever it applies separately to each of two things, it also applies to the two things considered together.
With this new foundation of the criterion, great expressions like hard, cloud or glass of whiskey turn out not to refer cumulatively; when they apply to each of two things, they do not apply to the two things considered together. We thus have a second property, characteristic of mass nouns, at least concrete ones.

II. Intensive Nouns

So, consider abstract mass nouns, like chaos, jealousy or beauty. Do these nouns have the same properties as concrete mass terms?

1) Quantification in Terms of Intensity. We may refer to these nouns as ‘intensive nouns’, following the work of Danielle Van de Veire (1995). These nouns are semantically characterized by the fact that their quantification concerns, not matter, but the intensity to which what they apply manifests itself.

Compare:
Her guest wanted more wine.
What incredible chaos there is in the apartment!
Mary feels a lot of jealousy towards her brother.

Possible from DMM: beauty in the painting.

The first sentence describes a quantity of beverage, while the other three concern the intensity of a state (chaos), or of a feeling (jealousy) or of a quality (beauty).

Now, from a distributional point of view, intensive nouns are simply mass nouns. They can instead be freely used in all mass-constructions: too much chaos, less jealousy, little beauty. While their apposition in count constructions is conceptualized and may correct a change in meaning: one may talk of an incredible chaos, a decreasing love, or a rare patience, but it is much harder to talk of ‘twenty disorders’ or ‘fifteen jealousies’.

What semantic properties, if any, do intensive nouns have in common with the other mass nouns? We have seen that concrete mass nouns refer distributively and cumulatively. Is this equally true of intensive mass?

2) Distributive Reference. Notice first that the notion of N-part does apply to intensive nouns. Expressions of the form (part of the N-modifier) are perfectly interpretable with all intensive nouns:
I could only admire part of the disorder that you left behind you.

Part of the joy that you will feel will come from God.

During the day you can only see part of the beauty of Paris.

Moreover, the intensive noun employed not only to what the expression (part of the N-modifier) applies to: this, indeed, is already something, some N, which manifests itself to some intensity.
This is illustrated by the following dialogue with the two characters:

John: What you see here is only part of the house that the children created in the apartment.

Lucy: This house is already more than enough for me. Call the children at once!

Simultaneity for Java.

What Julius felt when meeting Romeo was only part of the love that he had for her. But this love was already too much for her.

And for beauty:

Midas: What you see in Paris is only part of the beauty that there is in France.

Rente: This beauty is more than enough for me. I do not want to go anywhere else.

We conclude that intensive nouns refer distributively. We can check that these nouns count noun-like ideas, do not refer distributively.

John: What you are hearing is only part of the idea that I have.

Lucy: ??? This idea is already more than enough for me.

Lucy cannot refer to part of John's idea in this idea.

3) Cumulative Reference. But do intensive nouns refer cumulatively? When an intensive noun applies separately to each of two things, does it also apply to those things considered together?

Imagine a situation in which one can talk of the chaos in John's room and of the chaos in the kitchen. Then one can talk of them together as the chaos in John's room and in the kitchen.

Similarly, cumulative reference is exhibited by the juxtapositions of sentences like:

John and Lucy's love (at the same time) was more than Ted could handle.

John and Lucy's beauty was more than Marc could handle.

As we see, intensive nouns refer cumulatively. Again, these tests, when applied to abstract count nouns, show that these do not refer cumulatively, the property is true of only mass nouns.

John finally understood the role played by the category of Kant and Fawcett in contemporary philosophy.

The phrase the category of Kant and Fawcett refers to a single category shared by Kant and Fawcett. It cannot refer to a category that would consist in that of Kant and that of Fawcett taken together.
Conclusion

So, do mass nouns constitute a semantically uniform class? Our study suggests that they do; they can occur with intensive, mass nouns refer distributively and cumulatively.

The property of distributive reference may appear to be quite specific: a constraint on the interpretation of the partitive construction part of the N when N is a mass term. In fact, a similar constraint is imposed on the interpretation of all partitive constructions with mass nouns. Consider expressions like all of, each of, many of, most of, some of, half of, or most of, followed by a definite nominal expression. When the nominal expression is mass (the furniture, the living), it applies to what the partitive construction applies to. But when it is count (the car, the idea), it does not apply to what the partitive construction applies to.

How is what precedes linked to other phenomena in which mass nouns are involved? What we have studied are basic semantic properties of mass nouns (distributive and cumulative reference) that contain their denotation. This denotation plays a crucial role in the determination of the truth conditions of sentences where mass nouns appear.

In particular, such sentences are often liable to several construals, including collective and non-collective interpretations (Vilain 1992). Now, non-collective interpretations are available only because of the noun's peculiar denotation. Consider: This foliage is touching that wiring, an example due to Laura Carden (1980). Our interpretation is collective: there is a single pile of foliage that touches a piece of wiring. But there are also non-collective interpretations, in which there are several piles of foliage and pieces of wiring, each piece of wiring touching a single pile of foliage. Such non-collective interpretations are available only because parts of foliage are foliage and parts of wiring are wiring. That is, they stem from the peculiar denotation of mass nouns, which in turn is due to the properties of distributive and cumulative reference.

Also, the telic or atelic aspect of certain sentences depends on the nominal expression used. As noted by Verkuyl (1997), sentences like Lucy ate chocolate / much chocolate / a crumant / a crumant / many crumants are atelic only if the direct object of the verb is a buzz mass noun (chocolate) or a bare plural count noun (crumants). Now, bare mass nouns and bare plurals are the only nominal expressions that apply both distributively and cumulatively. So, these two properties are jointly necessary for getting an atelic interpretation, at least with verbs of consumption and creation.
Appendix. A Formal Characterization of the Relation of Merological Part

The relation of merological part, $P$, is usually characterized by four axioms (cf. Simons 1987). To state them, the following relations must be defined first:

- $w$ is an improper merological part of $x$ ($\text{IP}_{x}w$) if $w$ is identical to $x$ or if $w$ is merological part of $x$: 
  $$\text{IP}_{x}w \equiv \text{Id}(w, x) \lor \exists z \text{mer}_{x}(z, w)$$

- $y$ and $z$ overlap ($\text{O}_{x}$) if they have a common improper merological part: 
  $$\text{O}_{x}y \equiv \exists w \text{IP}_{x}w \land \text{IP}_{x}z$$

- $w$ is the generalized merological sum of the individuals satisfying a given predicate $F$, if the individual $s$ such that for any individual $a$, $b$, and $z$ overlap if and only if there exists $y$ satisfying $F$ and such that $y$ and $z$ overlap: 
  $$\text{SUM}(F)w \equiv \exists z \text{mer}_{s}(a, z) \land z \text{mer}_{s}(b, z) \land \exists y \text{mer}_{s}(Fy)$$

The relation of merological part is then characterized by the following axioms:

(P1) $\forall x \forall y (\text{IP}_{x}y \rightarrow \exists y \text{SUM}(F))$  
**Anti-symmetry**

(P2) $\forall x \forall y (\text{IP}_{x}y \rightarrow \exists y \text{SUM}(F))$  
**Transitivity**

(P3) $\forall x \forall y (\exists y \text{mer}_{x}(y, z) \rightarrow \exists y \text{mer}_{z}(y, z))$  
**Weak complementarity**

(P4) $\forall x \forall y (\text{SUM}(F)) \rightarrow \exists y \text{mer}_{x}(Fy)$  
**Uniqueness and uniqueness of the generalized merological sum**

REFERENCES


