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#### References and further reading

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## MASS TERMS

*Mass terms are words and phrases such as 'water', 'wood' and 'white wallpaper'. They are contrasted with count terms such as 'woman', 'word' and 'wild wildebeest'. Intuitively, mass terms refer to 'stuff'; count terms refer to 'objects'. Mass terms allow for*

*measurement ('three kilos of wood', 'much water'); count terms allow for counting, quantifying and individuating ('three women', 'each word', 'that wildebeest over there').*

*Philosophical problems associated with mass terms include (1) distinguishing mass from count terms, (2) describing the semantics of sentences employing mass terms, and (3) explicating the ontology presupposed by our use of mass versus count terms. Associated with these philosophical issues – especially the third – are the meta-philosophical issues concerning the extent to which any investigation into the linguistic practices of speakers of a language can be used as evidence for how those speakers view 'reality'.*

- 1 Distinguishing mass and count terms
- 2 Semantics and ontology of mass terms

### 1 Distinguishing mass and count terms

The distinction between mass terms ('water', 'wood' and so on) and count terms ('woman', 'word' and so on) can be seen as syntactic, semantic or pragmatic. If the distinction is seen as syntactic, one might remark that mass terms occur with the quantifiers 'much' and 'little' and with the unstressed article 'some', that they are susceptible to measurement phrases such as 'litres of' and 'amount of', and that they do not exhibit a singular/plural distinction. Conversely, count expressions occur with the quantifiers 'each', 'every', 'many', 'several', 'few' and the stressed 'some', use the indefinite article 'a(n)', are susceptible to counting phrases such as 'five' and 'a score of', and exhibit a singular/plural dichotomy manifested in the count term itself and in agreement with the verb phrase.

If it is seen as semantic – a distinction between the different ways that mass and count terms refer – then one might remark that count expressions refer to discrete, well-delineated objects while mass terms refer without making it explicit how the referent is individuated (some have said that the referents of mass terms are continuous rather than discrete). This feature of mass reference gives rise to the 'cumulative reference test' (any sum of parts which are *M* is also *M*) and to the 'distributive [homogeneous] reference test' (any part of something which is *M* is also *M*).

If the mass/count distinction is seen as a pragmatic one, then one will look to how people use count terms to 'individuate' the world. This gives rise to such tests as whether there is a definite answer to the question 'How many *X*'s are there in such-and-such place?'. In the philosophical literature (following Strawson 1959), terms which pass this counting test are often called 'sortal terms' – although they are equally often called count terms – and ones that fail the test are

called mass terms. In this literature, with its emphasis on the pragmatic notions of 'identifying' and 'individuating', it is common to deny that such terms as 'thing', 'object' and so on are sortal (count), there being no definite answer to the question 'How many things are in the room?'. This is so despite the fact that such terms clearly satisfy the syntactic criteria.

All these tests – the syntactic, the semantic and the pragmatic ones – have been challenged. Writers have pointed out that mass terms such as 'wood' can also be used as count: 'a wood' might designate oak or spruce, for example. And 'wildebeest' can be used as a mass term: 'He's not really a vegetarian; he eats wildebeest'. Furthermore, a universal grinder would take an object that an alleged count term referred to – a chair, for example – and grind it up into a powder so that then there would be chair all over the floor. (This last sentence uses 'chair' in a mass manner, thereby showing that the language already has this usage of any count term in the background. And this usage exists despite the fact that we could also have said 'There is wood all over the floor'.)

The criteria just mentioned are usually seen as applying to entire noun phrases as well as to the simple nouns themselves. Furthermore, some writers attempt to apply the mass/count distinction to other syntactic categories, especially adjectives, verbs and adverbs. The application to verbs is especially interesting (see Mourelatos 1978).

## 2 Semantics and ontology of mass terms

The problem with giving a formal semantic analysis of mass terms arises because first-order predicate logic appears to assume that the entities in the domain of quantification are individuals, so it only makes sense to characterize them with count nouns. When we say, in the quantifier idiom, 'For all  $x$ , if  $x$  is  $F$ ...', it is apparently assumed that the items in the domain have already been individuated. For if  $F$  were to be interpreted as 'snow', for example, what would be the values of  $x$ ?

Famously, Quine (1960) held that mass terms are ambiguous: when in 'subject position' they are singular terms (names), but when in 'predicate position' they are general terms (predicates) which are 'true of each portion of the stuff in question, excluding only the parts too small to count'. As a name (when in subject position), Quine holds that a mass term 'differs none from such singular terms as "mama"..., unless the scattered stuff that it names be denied the status of a single sprawling object'.

This proposal has not satisfied various authors, who have objected to the nonuniform treatment and to various logical consequences of this approach. For

example, on Quine's analysis, 'Water is wet, and this puddle is water' does not imply 'This puddle is wet'; and 'Water is water' does not come out a logical truth. Writers after Quine have proposed many different approaches. Possibly the most popular alternatives involve mereology, according to which the main operator is 'is a part of'. Mass (and other) terms are taken to designate 'mereological wholes'. Some authors have grafted onto pure mereology a notion of 'having certain structural properties', so as to avoid the minimal parts problem alluded to in Quine. (The atoms, *inter alia*, which are part of water are 'too small' to count as water.) But these theories also have not satisfied all those involved in this area, usually because the treatment of certain logical inferences is thought incorrect: the formal semantic analyses do not mirror intuitive beliefs concerning logical consequence.

An alternative is to retain the idea that mass terms name some kind of object – a 'substance' – and to invoke a relational predicate such as 'is constituted of'. This presents a number of tricky issues and there are types of sentences for which such an analysis is not obviously suitable, but still various authors have adopted it. Besides the formal differences entailed by these two approaches (mereological calculus of individuals versus classical logic with a relational constant of constitution), there is an ontological difference, for mereological wholes are generally taken to be physical whereas substances or kinds are often viewed as abstract entities (see SUBSTANCE).

Another formal semantics of mass terms invokes sets as their denotation. Differences among theorists can then be seen as differences about what the sets contain. One question on which theorists differ is whether the sets contain only 'minimal entities' – the smallest items to which the mass term refers (flakes, maybe, for 'snow'; the items and size vary according to the mass term in question) – or whether it should contain 'ordinary objects' (flakes, drifts, snowmen, snowballs and so on; any object which can be said to be snow). The former proposal has not gained many adherents due to the difficulty of specifying a set of 'minimal entities' for such mass terms as 'garbage', 'speed' and 'information'. The latter proposal runs into difficulties in trying to account for the denotation of definite noun phrases (NPs) such as 'the snow on the table'. It is generally not true that there is exactly one snow-thing on the table. (There is one ball and also many flakes making it up, for example.) So the only reasonable proposal is for the NP to designate *all* the snow-things on the table. But then certain measurement sentences – for example, 'The snow on the table weighs one kilo' – come out wrong, since we will count the same snow-entities many times over.

Theories of mass terms show a fundamental division between those that are committed to abstract substances and those that are physicalistic in nature, invoking mereological wholes. On the physicalistic side are those theories which propose that the ontologically basic objects are the minimal entities, those which claim that the larger entities are 'constructions' out of these minimal entities, and those theories which propose that all these entities are equally basic. On the other side of the gulf are the various styles of substance theories, which usually invoke a lattice structure of kinds. Such ontological issues are discussed in Pelletier and Schubert (1989) and in Burkhardt and Smith (1991).

See also: LOGICAL AND MATHEMATICAL TERMS, GLOSSARY OF; MEREOLOGY

**References and further reading**

- Bunt, H. (1985) *Mass Terms and Model-Theoretic Semantics*, Cambridge: Cambridge University Press. (This is the longest and possibly most thorough work on mass terms. It is aimed at a computer implementation of a natural language understanding system which will include mass terms. It invokes 'ensemble theory', which is a type of atomic mereology.)
- \* Burkhardt, H. and Smith, B. (1991) 'Mass Terms', in *Handbook of Metaphysics and Ontology*, Munich: Philosophia. (This entry goes into the metaphysical and ontological presuppositions of mass terms in more detail than is possible here. It includes some speculation about how the mass/count distinction might have arisen in natural language.)
- Lønning, J.-T. (1987) 'Mass Terms and Quantification', *Linguistics and Philosophy* 10: 1-52. (An example of the direction that research into the mereological interpretation of mass terms has taken.)
- \* Mourelatos, A. (1978) 'Events, Processes, and States', *Linguistics and Philosophy* 2: 415-34. (Mourelatos draws explicit attention to the relationships that hold between certain types of verbs and verb phrases and the mass/count distinction.)
- Pelletier, F.J. (ed.) (1979) *Mass Terms: Some Philosophical Problems*, Dordrecht: Reidel. (This anthology includes many of the classic articles on the topic of mass terms, especially in the philosophical tradition. It also includes a comprehensive bibliography up to 1978.)
- \* Pelletier, F.J. and Schubert, L.K. (1989) 'Mass Expressions', in D. Gabbay and F. Guentner (eds) *Handbook of Philosophical Logic*, Dordrecht: Reidel, vol. 4, 327-407, esp. 391-4. (The most

thorough summary of the work done on mass terms, both linguistic and philosophical. It also proposes two theories to account for the phenomena, and includes a comprehensive bibliography of work from 1978 to 1988, plus earlier work where relevant.)

- \* Quine, W.V. (1960) *Word and Object*, Cambridge, MA: MIT Press, 91-100. (Although this book has only a small section on mass terms, it formed the starting point of most future formal work on the topic. Quine proposed his 'dual analysis' here and asserted that mass terms come from an 'early, primitive stage in linguistic evolution'.)
- Quirk, R., Greenbaum, S., Leech, G. and Svartvik, J. (1985) *A Comprehensive Grammar of Contemporary English*, London: Longman. (The most thorough descriptive account of the grammar of the English language, with a section about the mass/count distinction, especially as it is used in normal speech. It does not deal particularly with the formal semantics of the distinction.)
- \* Strawson, P.F. (1959) *Individuals: An Essay in Descriptive Metaphysics*, London: Methuen. (It is here that the distinction between 'feature-placing universal' and 'sortal universal' was drawn. Many writers wished to put mass terms in the former category, giving rise in the philosophical literature to the opposition 'mass/sortal'. Other writers thought of mass terms as a type of sortal term, while still others argued for a third category.)

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**MASSILIANISM** see PELAGIANISM

**MATERIAL IMPLICATION, PARADOXES OF** see INDICATIVE CONDITIONALS

**MATERIALISM**

*Materialism is a set of related theories which hold that all entities and processes are composed of – or are reducible to – matter, material forces or physical processes. All events and facts are explainable, actually or in principle, in terms of body, material objects or dynamic material changes or movements. In general, the metaphysical theory of materialism entails the denial of the reality of spiritual beings, consciousness*