On the genericity of mass (in)definites

Carmen Dobrovie-Sorin, CNRS-LLF, Université Paris 7, sorin.carmen2@gmail.com

The goal of the paper is to explain the contrast between mass indefinite DPs and definite DPs in French regarding the (im)possibility of generic readings:

(1) a. L'eau est en général liquide. the water is usually liquid. 'Water is usually liquid.'

b. *de l'eau est en général liquide **de+def** water is usually liquid

I will attribute the unacceptability of (1b) to the constraint on quantification stated in (2) below and I will analyze the acceptability of (1a) as indicating that names of kinds that are mapped onto the restrictor of Q-adverbs are not type-shifted to the corresponding property/set but instead denote partitions of kinds. A contrast similar to (1a-b) will be shown to exist for quantificational Determiners in Romanian.

1. Q-adverbs cannot bind variables that range over portions of matter. It is currently assumed that in generic sentences built with names of 'plural kinds', e.g., *Les chats sont intelligents* 'The cats are intelligent', the name of kind is shifted to the set of atomic individuals that realize the kind (Chierchia (1998) a.o.), which yields an LF of the type *GENx (x is a realization of* $^{\cap}$*cats) [x is intelligent]*, where $^{\cap}$*cats* notates the kind cats, obtained by applying the Down operator $^{\cap}$ to the plural property *cats*. The problem is that an extension of this type of analysis to generic sentences built with mass kinds cannot explain the contrast in (1a-b). Since the set of the realizations of the kind 'water' is identical to the unrestricted set of portions of water denoted by the property 'water', the LF representation of (1a) would be indistinguishable from that of (1b). [In order to simplify the discussion I will assume that Q-adverbs can quantify not only over events but also over individuals (Kratzer 1988, 1995, Diesing 1992, Chierchia 1995), a type of configuration that might be more adequately analyzed as quantification over event-individual pairs in which events and individuals are in a one-to-one relation (Farkas & de Swart 07)]

(1') a. $MOST_x$ (x is a realization of $^{\cap}$*water*) [x is liquid]

b. $MOST_x$ (x is water) [x is liquid]

Granting that (1'b) is indeed the LF of (1b), the observed unacceptability can be explained by assuming the constraint stated in (2), which is currently invoked when dealing with quantification over events/situations (Kratzer 95, a.o.):

(2) Quantifiers cannot quantify over elements ordered by the part-whole relation.

(1'b) violates (2) because sets of mass entities are ordered by the part-whole relation. In order to account for the acceptability of (1a) we need to reject the LF in (1'a), which is ruled out, on a par with (1'b). A different semantic analysis is proposed below.

2. The Semantics of Q-adverbs with entity-denoting restrictors. Consider (3), which is like (1a) in that a DP fills the restriction, but differs from (1a) in that the DP refers to a particular individual rather than to a kind:

(3) Cette eau est sale pour sa plus grande partie. 'This water is dirty for its most part.'

Central to the semantic analysis proposed below is the notion of partition, or non-overlapping cover, i.e., a set of collectively exhaustive, non-overlapping parts of an object. In (3), the entity denoted by *cette eau* 'this water' can be assigned a partition notated $R_{this\ water}$. The Q-adverb can now be analyzed as denoting the relation between the set of elements belonging to a partition of [[cette eau]] and the set of dirty entities:

(3') MOST (this water)[x is dirty] = $\exists R_{this\ water}$ [$MOST_x$ ($x \in R_{this\ water}$) [x is dirty]]

This LF does not violate the constraint in (2) because the elements belonging to a partition are by definition non-overlapping, i.e., not ordered by the part-whole relation. This type of LF can be assigned a semantic interpretation by using measure functions. Thus, (3) is true iff (4) is true, where μ notates a measure function and Σ the sum operator:

(4) $\exists R_{this\text{-}water}$ [μ (Σx ($x \in R_{this\ water} \wedge$ x is dirty)) > μ (Σx($x \in R_{this\text{-}water} \wedge$ x is non-dirty))]

In words, (4) requires that the measure of the sum of the dirty elements of the partition of [[this water]] is larger than the measure of the sum of the non-dirty elements of the partition. The partition contains parts that are homogeneously either dirty or non-dirty (a relevant threshold of dirtiness can also be used). Because the scales of size (length, surface, volume) are additive (Lassiter 11), a particular choice of a measure unit (for the same dimension) does not affect the truth conditions of proportional quantifiers, and therefore it was left unspecified in (4).

3. Measuring Kinds: Ratios. Coming back to (1a), it differs from (3) in that the Q-adverb takes a kind in its restriction; $R_{\cap water}$ = partition of the kind water. The LF (1"a) should thus be assumed instead of (1'a):

(1"a) MOST(∩water)[x is liquid] = $\exists R_{\cap water}$ $MOST_x$ ($x \in R_{\cap water}$) [x is liquid]

In order to check whether (1a) is true we need to check whether (5) is satisfied;

(5) $\exists R_{\cap water}$ [$\mu(\Sigma x(x \in R_{\cap water} \wedge$ x is liq.$)) > \mu(\Sigma x(x \in R_{\cap water} \wedge$ x is non-liq.$))$]

(5) requires that the measure of the sum of the liquid elements of the partition of the kind water is bigger than the measure of the sum of non-liquid elements of the partition of the kind water. The problem is that run-of-the mill measure functions (relying on measure units) are not defined for indeterminate/infinite entities such as kinds. The solution is an analysis in terms of ratios, which is possible for additive/ratio scales such as size. We take the measure of the kind as a whole to be 1, the minimum is Ø, and the measure of any other element of the domain is a ratio comprised between Ø and 1 ($0 < r < 1$). (5) is satisfied iff the ratio of the sum of all the liquid elements of the partition of the kind water is larger than the complement of that ratio wrt to 1.

Summarizing our proposal, (1a) as well as (3) satisfy the constraint in (2) because the restrictor is filled with a partition (of the entity, individual or kind, denoted by the DP mapped onto the restrictor), which is a set of non-overlapping elements. (1b) differs from (1a) in that the Theme of the generalization is an indefinite expression, which does not contribute an entity to the semantic representation (specific indefinite DPs may be entity-referring, but generic indefinites cannot be assumed to be specific), but only the characteristic function of a set of entities; since mass NPs denote join semi-lattices, the constraint in (2) is violated.

4. Partitive Proportional Determiners. The contrast exhibited by Q-adverbs in (1a) vs (1b) is expected to be found with quantificational Determiners (Q-determiners). The parallelism can be illustrated only partially for French, which has only *partitive* proportional Q-det's e.g., *la plus grande partie de l'eau* 'the largest part of the water', where the complement of *the largest part* is a DP marked for Genitive Case. As expected, such proportional Q-determiners allow mass quantification, on a par with examples like (1a) and (3): *La plus grande partie de l'eau est liquide.* 'The largest part of the water is liquid.' We also expect mass quantification to be blocked with proportional Q-determiners corresponding to the Q-adverbs in (1b), which have properties/sets (rather than entities) in their restriction. French does not have this type of Q-determiner, but the prediction can be verified in Romanian, which - in addition to *partitive* Q-det's e.g., *cea mai mare parte a apei* 'the largest part GEN water-the_{Gen}', "the largest part of the water" - has *non-partitive* proportional Q-det's e.g., *cea mai multà apà* 'the more much water', "(the) most water', where the superlative of *mult* 'much' takes an NP (rather than a DP) as a complement. In such configurations the complement NP denotes the set of (overlapping) water entities denoted by the mass NP, and we correctly predict ungrammaticality, on a par with (1b): **Cea mai multà apà e lichidà* '[The] most water is liquid.'

5. Generic Bare NPs in English. Given the results obtained above, English generic bare mass NPs should not be analyzed as indefinite-like expressions but rather as kind-referring. Moreover, for the purposes of the semantic interpretation, the kind is not type-shifted to the corresponding property/set but instead it is assigned a partition, as explained above for (1a).

Selected References. Carlson, G. N. 1977. A unified analysis of the English bare plural. *L&P 1*; Chierchia, G. 1998. Reference to Kinds across Languages. *NLS 6-4*, 339-405; Diesing, M. 1992. *Indefinites*. MIT Press; Farkas, D. & de Swart, H. 2007. Article Choice in Plural Generics, *Lingua*; Kratzer, A. 1995. Stage-level and individual-level predicates. Lassiter, D. 2011. *Measurement and Modality*, NYU diss.