Kinds, containers, instances: Mass nouns and plurality

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In this talk, we will present an approach for a systematic analysis of mass terms and plurality. It is based on a fine-grained nominal classification resource (BECL, Kiss et. al. 2014, 2016) that eschews both a binary distinction and a lemma-based approach to countability.

Instead of using the small set of staple examples usually found in research on the count-mass distinction, we started with a set of approximately 15,000 English nouns extracted from the *Open American National Corpus* (OANC, *http://www.anc.org*). They were enriched with their sense definitions from WordNet (Fellbaum, 1998), and annotated independently by four native speakers responding to six pattern test questions regarding their syntactic and semantic behavior. The resulting classification of approximately 11,800 noun-sense pairs provides 18 different subclasses in four major groups (*regular count, regular mass, both count and mass* and *neither count nor mass*). The resource is publicly available (*www.count-and-mass.org*).

The existence of formally realized plurality in the domain of mass nouns is a major challenge, especially if the hypothesis is taken that mass nouns possess some kind of "built in" plurality as their main distinguishing feature compared to count nouns (e.g. Chierchia, 1998). Other approaches stress the general similarity of mass nouns and plural expressions, leaving out the field of plurality *of* mass nouns (e.g., Lasersohn, 2011).

To determine the distribution of plural occurrences of apparent mass nouns, we have used the Stanford NLP system[1] to parse sentences containing nouns from two mass noun classes of the database (528 and 510)[2] and extracted sentences that showed plural occurrences despite the nouns being classified as *mass nouns exclusively* (528) and *dual use nouns* (510) (cf. Figure 1 for information on the classes). Mass nouns of class 528 should not possess a morphological plural, while plural occurrences of mass terms from class 510 should be accompanied by a meaning shift (cf. Borer, 2005; Chierchia, 1998 on plural meaning shifts on mass terms).

The sentences contained approximately 1,900 plurality examples for class 528 (167 lemmata) and approximately 5,400 examples for class 510 (241 lemmata. Both classes showed regular mass-to-count type shifting. Type shifting, for this matter, would indicate an arising interpretation as a *kind*, a *unit* or an *instantiation* of an act, event or result (cf. Figure 2 for examples).

Nevertheless, the distribution of shifting interpretations strongly differs, resulting in a stronger preference for a *unit interpretation* for dual use nouns and as an *instantiation* for proper mass nouns. The data extracted thus provide the basis of an account of the varying effects of plurality within the class of "mass terms". Further research will extend to similar countability classes as well as analyzing the general semantic and pragmatic nature of pluralization of mass nouns.

Figure 1: Countability Class Patterns

528 (regular mass)	**510 (both mass and count)**
can be combined with *more*, the resulting sentence uses a mode of measurement other than number	can be combined with *more*, the resulting sentence uses a mode of measurement other than number
more + morphological plural is *not applicable*	*more* + morphological plural is possible and semantically equivalent to a sentence with an explicit classifier
singular form can be subject of a classification or definition combined without, but not with an indefinite determiner (*A *sense* is a kind of X)	singular form can be subject of a classification or definition combined without, but not with an indefinite determiner (*A *sense* is a kind of X)

[1] Included in the parser software package (*http://nlp.stanford.edu/software/nndep.shtml*).
[2] The neutral class names are an artifact of the initial classification process in R (*https://cran.r-project.org*).

Figure 2: Type-Shifting Examples

Unit interpretation:

Three carboxy-terminal tyrosines (positions 624-6), hypothesized to play regulatory roles, were replaced by *phenylalanines*.

Kind-of interpretation:

The universe, in short, is breaking *symmetries* all the time by generating such novelties, creating distinctive molecules or other forms which had never existed before.

Instantiation interpretation:

The reaction products were purified by means of three repeated gel *chromatographies* using water saturated Sephadex G-50 in Millipore/ Multiscreen filtration plates according to the instructions provided by the supplier and dried under vacuum.

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