

Countable, Neat and Messy Nouns

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Dedication

This paper is a translation of a talk I gave in Dutch at the *Tiende bijeenkomst van docenten Neerlandistiek in het Middellandse Zeegebied* in Tel Aviv in November of 2010. The Dutch version appeared as Landman 2013. An earlier version of the material in this talk was first presented at *Palmyr IX: Logic and the Use of Language* in June 2010 at ILLC in Amsterdam, where I was invited by Frank Veltman and his co-organizers to give a presentation.

My teachers Renate Bartsch, Jeroen Groenendijk, Martin Stokhof and Frank Veltman provided me with a thorough training in the handcraft of using formal techniques in the study of natural language semantics. Nevertheless, during my apprentice time with them, we would often contemplate as an aesthetic ideal the model of Frege's little papers: accomplished, formally complex papers without any formal details. The present paper is an attempt in that direction. I dedicate it to them: to Renate on her retirement a few years ago, and to Jeroen, Martin and Frank on their forthcoming retirements, with pride at having been their student.

Countable, Neat and Messy Nouns

Count nouns like *girl(s)* and *marble(s)* can be counted, mass nouns like *salt* and *meat* can not be counted:

- (1) a. ✓ one *girl*/✓ two *girls*/✓ three *girls*,...
b. # one *salt*/# two *salt*/ # three *salt*,...

In semantics, count nouns are interpreted in Boolean counting structures, consisting of singular and plural objects, where the singular objects are regarded as the semantic building blocks. We count plural objects (like *the girls*) in terms of their semantic building blocks (*Lien, Coba* and *Dora*). (For an overview of the formal theory, see Landman 1991, 2000, 2004).

Why can't we count mass nouns like *salt* and *meat*?

Apparently there is something wrong with their semantic building blocks. But what?

In the literature, there are different theories about that.

One of them, which has been quite popular, says that the structures for mass nouns do not have semantic building blocks. Take a count nouns like *girls*. You can divide girls into girls and girls, but you cannot *continue* to divide, and where the dividing stops you find the semantic building blocks (*Lien, Coba* and *Dora*). For mass nouns like *salt* and *mud* you can continue to divide without reaching semantic building blocks. (This approach has been defended for instance by Harry Bunt in Bunt 1985.)

This theory is problematic for several reasons. First, there is a class of mass nouns, like *furniture* and *kitchenware*, that uncontroversially have building blocks, as argued by Gennaro Chierchia in Chierchia 1998. If (2b) is true, (2a) is true as well, but the truth of (2c) guarantees neither the truth of (2b), nor of (2a):

- (2) a. I moved the furniture.
b. I moved the pieces of furniture.
c. I exchanged two drawers in the dresser.

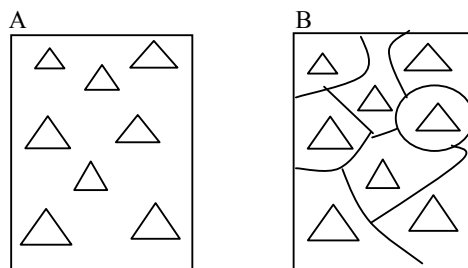
This shows that *the pieces of furniture* are the building blocks of *furniture*, and not the parts of pieces of furniture like *drawers*.

Secondly, we also use prototypical mass nouns like *salt* in situations where what there is cannot be divided into salt and salt:

- (3) There is *salt* under the objective of the microscope [one molecule's worth]
[mass]

If we have to assume for semantic reasons that what is under the objective of the microscope can still be divided into salt and salt, we have to assume a semantic world of fictional salt. It is improbable that that would be necessary.

To give another example, look at my *triangle wallpaper* in A:



We can divide it into pieces that themselves count as *triangle wallpaper*, but the pieces in B cannot themselves be divided into two pieces that both count as *triangle wallpaper*. And the question is: why can't we count *triangle wallpaper* in terms of the building blocks in B?

We come in the direction of the answer that I will give if we look at how we count with problematic count nouns, like the clothes I bought at *Outfits For All Occasions*. I have the following *outfits*:

- (4) *My outfits*
1. The pants and the shirt (for informal occasions)
 2. The pants, the shirt and the tie (for informal occasions with Europeans)
 3. The pants, the shirt, and the jacket (for formal occasions)
 4. The pants, the shirt, the tie and the jacket (for formal occasions with Europeans)
 5. The pants, the shirt, the tie, the jacket and the vest (in case I am invited for dinner at Court)

And I have a fitting yarmulka in case a religious ceremony is part of these occasions. All in all I have *ten outfits*! (There are in fact more combinations, but I don't have an occasion for those.)

Now we count. First at the airport:

- (5) *Custom Officer*: What's in the suitcase?
Me: My outfits.
Custom Officer: How many outfits?
Me: Ten.
Custom Officer: I am sorry, sir, but you can take only five outfits into the country..
Me: Ok, then I leave the yarmulka behind.

(5) is unnatural: this kind of counting isn't more than a joke. Real counting is what we find in (6):

- (6) The yarmulka and the vest clash a bit, so I am only really satisfied with *nine* of my outfits.

We count outfits in exactly the same way as we would count costumes that do not overlap, that is, we count as in (6), and not as in (5). Overlap makes a difference in counting. If we count *my cows* and we count *your cows*, and we want to find the right number, we have to count the overlap of *my cows* and *your cows* – the cows that we share – only once. The same holds for the overlap between *my outfits* and *your outfits*, if we share outfits. But the overlap between my different outfits above is *not* counted: for counting *this* overlap doesn't exist.

What we see here in the extreme case of *outfits* holds in general: in the interpretation structures of count nouns the semantic building blocks do not overlap, or the overlap is made inaccessible or irrelevant in context.

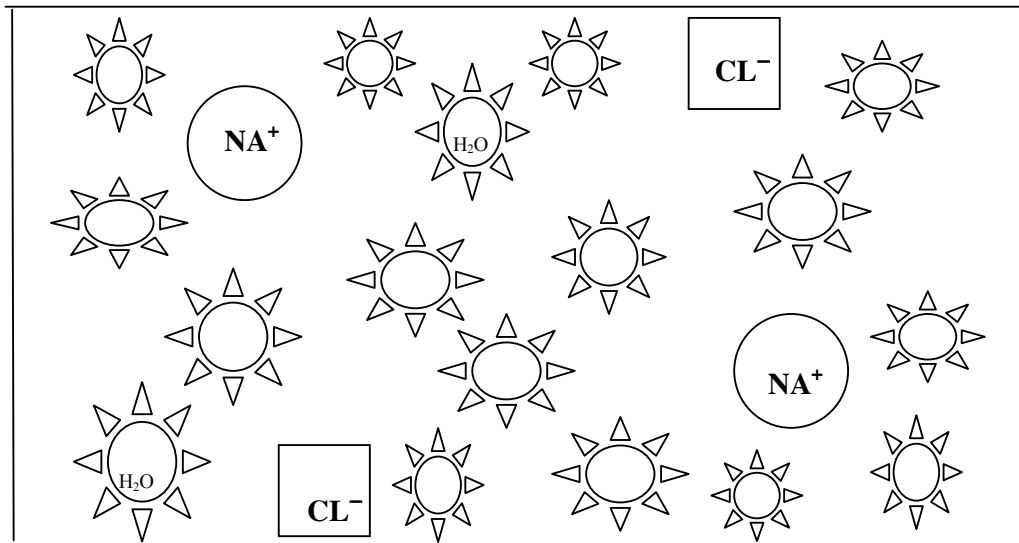
We saw before that the interpretation structures for mass nouns can just as much have semantic building blocks as the structures for count nouns. We see now that it is essential for counting that the semantic building blocks in the interpretation structures of count nouns do not overlap.

What if the building blocks overlap? Then counting goes wrong.

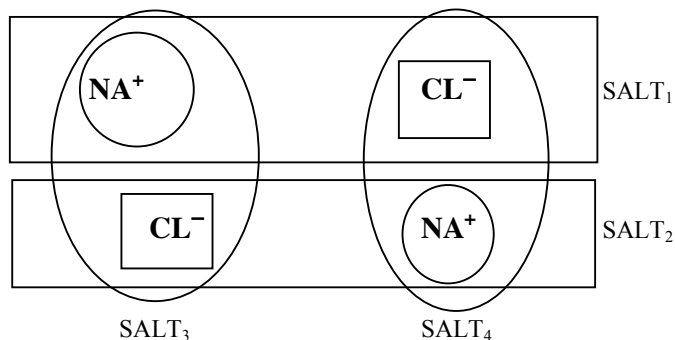
And that is my answer to the counting question: you cannot count mass nouns because the semantic building blocks in the interpretation structures of mass nouns overlap.

Look at (7) with the mass noun *salt* in a situation where the salt is dissolved in water:

- (7) There is *salt* in the water [two molecule's worth].



The salt consists of salt building blocks worth two molecules. But which two?
 $\text{SALT}_1 + \text{SALT}_2$ or $\text{SALT}_3 + \text{SALT}_4$?

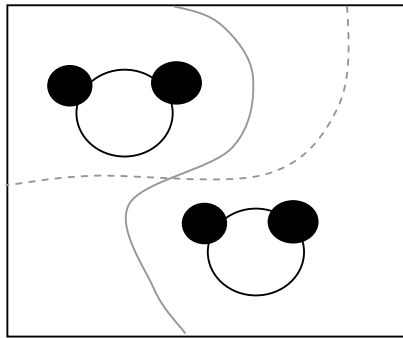


My answer is: all four!

In the countable perspective we have to make a choice between two variants with each two non-overlapping building blocks. In the mass perspective we do not make this choice and we regard the salt as consisting simultaneously of both variants.

This example is meant as inspiration. More general is the case of *triangle wallpaper*. We saw a division in pieces of triangle wallpaper that themselves couldn't be divided anymore into two pieces that each could count as triangle wallpaper. We call the pieces 'minimal pieces' (relative to a partition). Each minimal piece contains a triangle and space. Because there is enough space that has to be divided, there are *countless* different divisions into such minimal pieces of triangle wallpaper. In my proposal, the building blocks of *triangle wallpaper* are all these minimal pieces of triangle wallpaper in all those different partitions. Because these different partitions divide the same material, there is a large amount of overlap between the building blocks of triangle wallpaper.

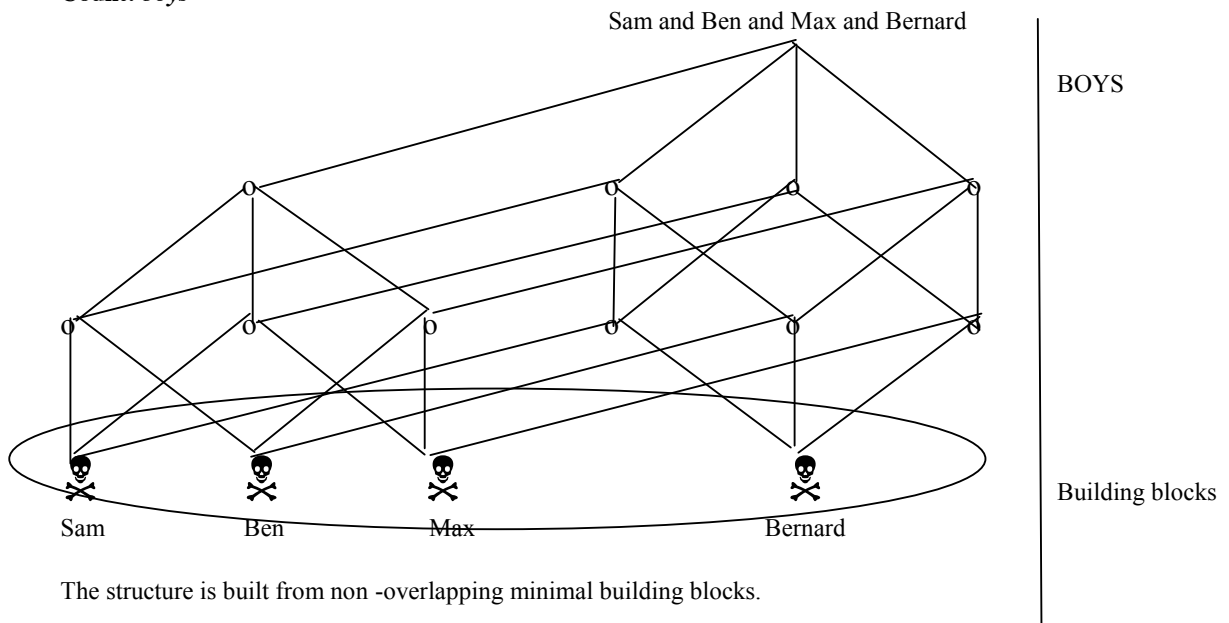
This example is also instructive for 'real' mass substance nouns like *water*. We are inclined, in dividing water, to think that 'in reality' we are dividing water molecules. But that is not correct: the space in and between the molecules is part of what we divide. This means that it isn't an abstract Mickey Mouse-like molecule that counts as a water building block, but a molecule with some space. And that space can be divided in different ways, which leads to different partitions with mutually overlapping building blocks.



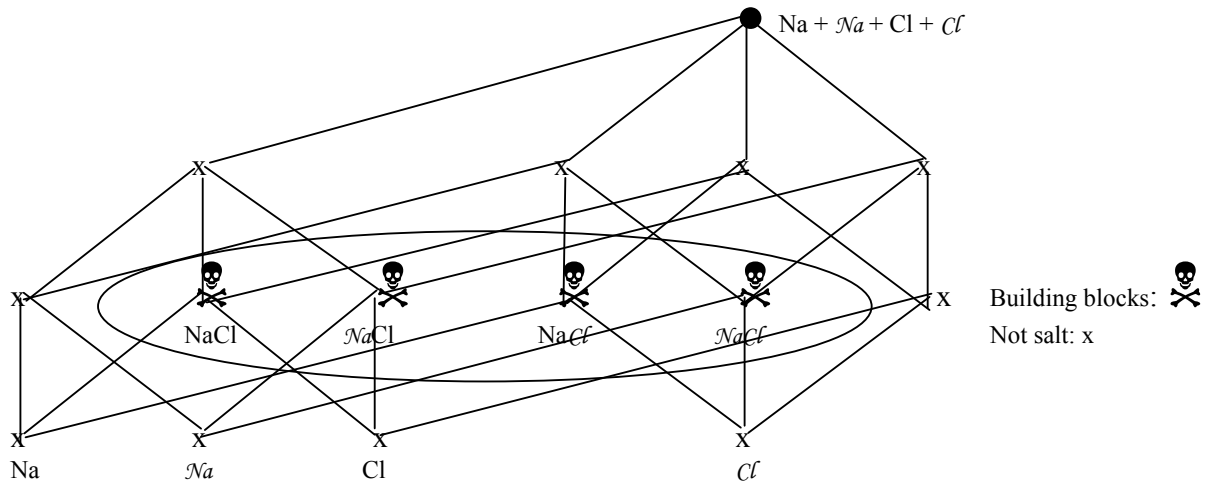
Counting is counting of building blocks. If you insist on counting mass salt, water, or triangle wallpaper, you will count overlapping building blocks without being able to work away the overlap, and counting is guaranteed to go wrong!

In Landman 2011 I develop the formal theory of these structures. The theory generalizes the mathematical theory of Boolean counting structures to structures with overlapping building blocks. The theory has a highly interesting consequence: it allows three sorts of structures, one count, and two mass.

Count: *boys*



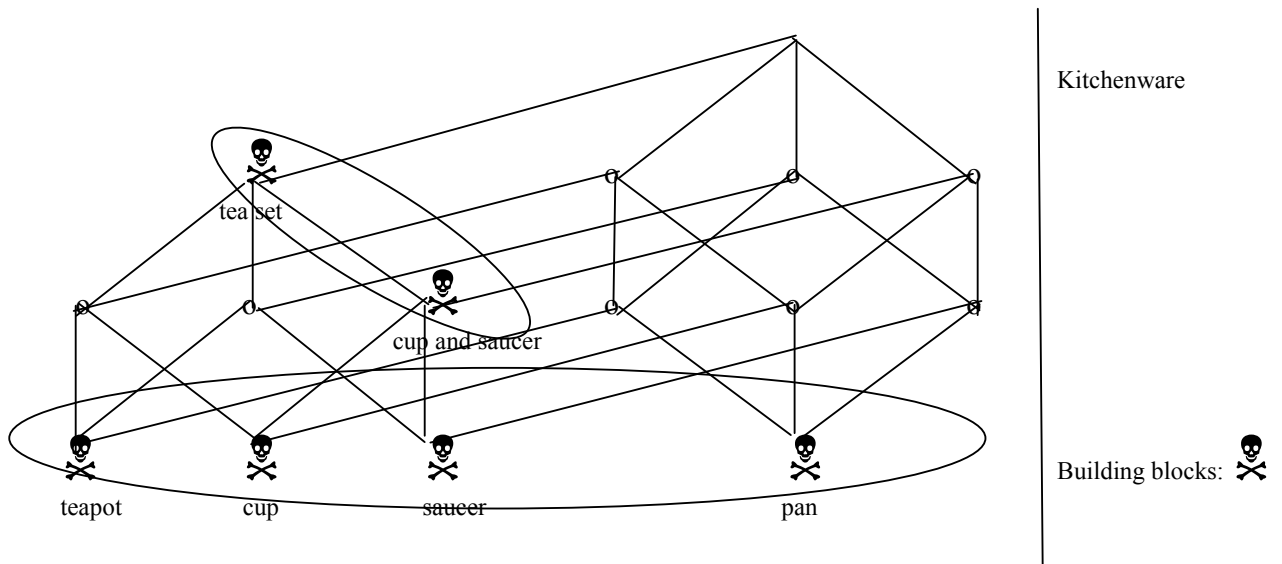
Mass: salt



The salt building blocks consist of two non-overlapping salt variants: $NaCl + NaCl$ and $NaCl + NaCl$. Together, the building blocks overlap: For instance, $NaCl$ and $NaCl$ overlap in their Na -ion. And if we count, we have to regard the salt in the water as consisting of four molecules, which is nonsense, because ultimately there are only two molecules.

Mass: Kitchenware

The theory allows mass structures that are built from minimal and non-minimal building blocks. In that case it is possible that the building blocks overlap, but the *minimal* building blocks don't (just like the building blocks in the case of count nouns). I propose that these are the correct interpretation structures for nouns like *furniture* and *kitchenware*.



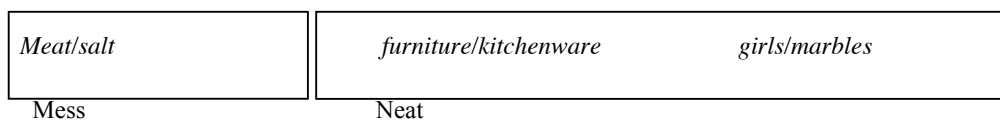
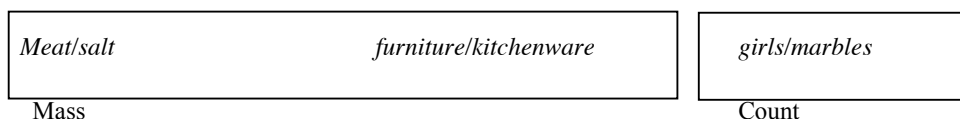
The building blocks are what we would want to count intuitively in context as one. The difference with count nouns is that Max and Ben together do not count as *boy* and as one, but that the cup and saucer does count as *kitchenware*, and can also count as one, for instance on an inventory list on which everything is listed that is sold as one item and has its own price. The difference with mass nouns like *salt* and *meat* is that the *minimal* building blocks do not overlap, de overlap is only vertical: a plural object and its parts count simultaneously as one.

And again counting goes wrong: the tea-set is built from five building blocks: the teapot, the cup, the saucer, the cup and saucer, and the tea-set itself. That is of course nonsense!

What we see is that the theory produces two natural semantic contrasts: the contrast *count/mass* and the contrast that I will call *neat/mess*:

-A noun is *count* if its interpretation structures do not have overlapping building blocks; *mass* if these do have overlapping building blocks.

-A noun is *neat* if its interpretation structures do not have overlapping *minimal* building blocks, *mess* if these do have overlapping minimal building blocks.



The hypothesis is that these two contrasts are semantically robust and active: within one language and also cross-linguistically semantic phenomena form clusters around these two natural semantic borderlines.

As is well-known, there are many phenomena that distinguish between the classes count and mass nouns, like:

	Mass	Count
1. Plurality:	✓ <i>salt</i> /# <i>salts</i> ✓ <i>furniture</i> /# <i>furnitures</i>	✓ <i>girl</i> /✓ <i>girls</i>
2. Counting words:	# <i>one salt</i> /# <i>two salt</i> # <i>one furniture</i> /# <i>two furniture</i>	✓ <i>one girl</i> /✓ <i>two girls</i>
3. Quantifiers:	# <i>Each meat</i> # <i>Each furniture</i>	✓ <i>Each girl</i>

Here we will look at phenomena in Dutch that distinguish between the classes neat nouns and mess nouns.

1 The individual classifier *stuks*.

Jennie Doetjes observes in Doetjes 1997 that *stuks* in Dutch can be used with (what I call here) neat nouns, but not with mess nouns. *Stuks* behaves in this way just like *individual classifiers* in Chinese (see for those Rint Sybesma's book, Sybesma 2009).

- (8) Count:
- a. Hoeveel *hemden* neem je mee op vakantie? Drie *stuks*.
How many *shirts* take you with on vacation? Three *items*.
 - b. Hoeveel *croquetten* heb je gegeten? Zes *stuks*.
How many *meat rolls* have you eaten? Six *items*.
- (9) Mass but neat:
- a. Hoeveel *meubilair* heb je besteld? Drie *stuks*.
How much *furniture* have you ordered? Three *items*.
 - b. Hoeveel *keukenwaar* heb je aangekruist in the catalogus? Acht *stuks*.
How much *kitchen ware* have you marked in the catalogue? Eight *items*.
 - c. Hoeveel *vee* heb je gekocht? Drie *stuks*, twee schapen en een koe.
How much *cattle* have you bought Three *items*, two sheep and a cow
- (10) Mess:
- a. Hoeveel *kaas* heb je gekocht? #Drie *stuks*.
How much *cheese* have you bought? #Three *items*
 - b. Hoeveel *vlees* heb je gegeten? #Drie *stuks*.
How much *meat* have you eaten? #Three *items*

Stuks can also occur attributively, but that is most natural in list-contexts:

- (11) *In the 'shopping basket' of an Online Department store:*
U heeft drie *stuks* meubilair, zes *stuks* keukenwaar, twaalf *stuks* fijne vleeswaren,
You have three items furniture, six items kitchenware, twelve items cold cuts,

en zes *stuks* sportartikelen aangekruist.
and six items sports products marked

The singular *stuk* occurs in *per stuk*:

- (12) a. De *bloemen* worden niet *per stuk* verkocht, maar *per tien stuks*.
The *flowers* are not *per item* sold, but *per ten items*
b. De *keukenwaar* wordt niet *per stuk* verkocht, maar *per tien stuks*.
The *kitchenware* is not *per item* sold, but *per ten items*
c. #Het *vlees* wordt niet *per stuk* verkocht, maar *per tien stuks*.
#The *meat* is not *per item* sold, but *per ten items*

A warning is necessary here. As can be found out easily by searching the internet, workers in the food sector, and in particular the catering industry, do not make a careful distinction between the individual classifier *stuks* and the plural noun *stukken* (which itself can be used as a non-individual classifier). This means that you can find on the internet data that contradicts the findings in (8)-(10). (13a) is a compilation, but many comparable examples are easily found:

- (13) a. Een bitter garnituur bestaat uit zes *stuks* worst, zes *stuks* kaas en zes *stuks*
A bitterball-dish consists of six items sausage, six items cheese and six items

bitterballen. [worst, kaas here are mess nouns]
mini meat-rolls

I leave open the question whether this is linguistic innovation or sloppiness. For Jennie Doetjes, for me, and my informants, (13a) is completely ungrammatical, and you have to say (13b):

- (13) b. Een bitter garnituur bestaat uit zes *stukjes* worst, zes *stukjes* kaas
A bitterball-dish consists of six *pieces* of sausage, six *pieces* of cheese
- en zes stuks bitterballen.
and six items mini meat-rolls.

I will ignore this innovation here.

Semantically the individual classifier *stuks* forms a count interpretation out of the interpretation of a neat noun, by selecting or creating from amongst the building blocks a variant, a variant without overlap. How? That depends on the semantics of the neat noun. For some neat nouns, like *vee(cattle)*, the *minimal* building blocks are *conceptually* non-overlapping: it is completely clear what the minimal building blocks of *vee(cattle)* are, the animals. In that case *stuks* selects the minimal building blocks. But for other neat nouns, like *kitchenware*, you have in context a choice within the set of building blocks concerning which variant of non-overlapping building blocks to choose for the interpretation of *stuks* (for example, the teapot, the cup and saucer, and the pan). The interpretation that *stuks* chooses (in context) is count: *stuks vee(items of cattle)* and *stuks keukenwaar(items of kitchenware)* are (complex) count nouns.

2 Distributive adjectives.

Roger Schwarzschild (in Schwarzschild 2009) and Susan Rothstein (in Rothstein 2010) note that distributive adjectives distinguish neat nouns and mess nouns. In other words, these adjectives regard count nouns and neat mass nouns as one class.

Distributive adjectives, like *klein(small)*, *groot(big)*, *rond(round)*, *vierkant(square)*, but not *lawaaiig(noisy)*, *succesvol(succesful)* do not allow collective readings for count nouns, but distribute to building blocks.

- (14) a. De jongens zijn *lawaaiig*.
The boys are *noisy*
b. De jongens zijn *klein*.
The boys are *small*

(14a) is ambiguous. (14a) can mean that the individual boys are noisy, but also that the boys are noisy as a group. (14b) is not ambiguous. (14b) can only mean that the individual boys are small.

The semantics of distributive adjectives specifies that a plural object counts as *kleine jongens* (*small boys*) if it counts as *jongens* (*boys*) and as a plural object of which *all semantic building blocks are klein* (*small*).

We now compare mess and neat nouns.

- (15) a. Het *meubilair* is groot.
The *furniture* is big
b. Het *grote meubilair* is uitgesteld op de derde verdieping.
The *big furniture* is displayed at the third floor.

- (16) a. Het *vlees* is groot.
The *meat* is big
b. Het *grote vlees* ligt in de andere vitrine.
The *big meat* is in the other display counter.

For *meubilair* (furniture) in (15) we find exactly what we found for count nouns: (15) does not have a collective reading; (15) cannot mean that all the furniture together is big. (15b) tells us that the big pieces of furniture, like the sofa's and the pianola's, are to be found at the third floor..

This kind of reading does not exist for mess nouns like *vlees* (meat) in (16). (16a) does not mean that all meat-building blocks are big (it is likely that the building blocks of meat, whatever they are, are small).

In the semantics of count nouns, distributivity is associated with the semantics of *each* as in (17):

- (17) a. The boys got a cookie.
 b. Each boy got a cookie/The boys each got a cookie.

The problem is how to fit this with the semantics of neat mass nouns, because *ieder meubilair* (each furniture) and *ieder vee* (each cattle) is ungrammatical. My proposal is that the semantics of distributive adjectives can make use of individual classifiers like *stuks* without lexically realizing them.

Concretely this means that the semantics of *klein* (small) specifies that a plurality counts as *klein vee* (small cattle) or *kleine keukenwaar* (small kitchenware) if it counts as *vee* (cattle) or *keukenwaar* (kitchenware) and as a plural object of which **all stuks** are *klein* (small). For *vee* (cattle) this means that the individual animals are small. For *keukenwaar* (kitchenware) this means that all items of kitchenware are small, where it can vary from context to context what counts as items of kitchenware.

What this means is that distribution doesn't really take place in the mass structures, but that the semantics of distributive adjectives in mass structures can, so to say, *hijack* the count semantic via an implicit individual classifier.

3 Neat comparisons.

We now look at comparisons with *de meeste/het meeste* (most).

(18) *Mess nouns*

- a. Het meeste *vlees* wordt gegeten op zon – en feestdagen.
 Most meat is eaten on sun- and holidays
 b. *Meer* vlees wordt gegeten op zon- en feestdagen dan op andere dagen.
 More meat is eaten on sun- and holidays than on other days

Vlees (meat) is a mess noun, and the comparison in (18) relies on a *measure* as in (19a). (18) does not have a reading that compares numbers, as in (19b):

- (19) a. *meer* = more in volume/weight... etc.
 b. *meer* = more in number of building blocks, minimal building blocks,...

The reason is clear: comparison of numbers requires counting, and counting goes wrong. For count nouns we find the opposite:

(20) *Count nouns:*

- a. De meeste *koeien* zijn buiten in de zomer.
 Most cows are outside in the summer
 b. *Meer* koeien zijn buiten in de zomer dan binnen.
 More cows are outside in the summer than inside.

In this case the only reading is a reading that compares numbers, as in (19b). The same holds for (21) with classifier *stuks*:

- (21) a. De meeste *stuks vee* zijn buiten in de zomer.
 Most *items cattle* are outside in the summer
 b. *Meer* *stuks vee* zijn buiten in de zomer dan binnen.
More *items cattle* are outside in the summer than inside.

We look at neat mass nouns:

- (22) *Neat mass nouns*.
 a. Het meeste *vee* is buiten in de zomer.
 Most *cattle* is outside in the summer
 b. *Meer* *vee* is buiten in de zomer dan binnen.
More *cattle* is outside in the summer than inside

(22) here forms a natural class with count nouns: the most prominent reading is the reading on which numbers are compared (19b).

Here too we see, when we look more closely (see Landman 2011) that the generalization is that the comparison is in terms of *stuks vee* (*items cattle*), *stuks meubilair* (*items furniture*), and *stuks keukenwaar* (*items kitchenware*), so that the semantic analysis can be based on the same idea as that of distributive adjectives: the counting-meaning of *de meeste* (*most*) compares the *vee* (*cattle*) that is outside with the *vee* (*cattle*) that is inside *in terms of the numbers of stuks* of each. The semantics of the counting reading of *most* for neat nouns takes place in the count domain via an implicit individual classifier.

This mean for *vee* (*cattle*) that we compare numbers of animals, but for *keukenwaar* (*kitchenware*), that we compare numbers of *stuks keukenwaar* (*items kitchenware*), where it depends on the context what we count as *stuks keukenwaar* (*items kitchenware*).

We have studied in detail three semantic phenomena where neat mass nouns form one class with count nouns in opposition to mess nouns. With that I have shown that the distinction *neat/mess* is indeed semantically robust and active.

I end with an observation which shows that, besides the well-known criteria of counting and plurality, there are other phenomena that treat neat mass nouns and mess nouns as one class in opposition to count nouns.

Comparison in terms of numbers is the only possible reading for count nouns like *koeien* (*cows*) and *stuks vee* (*items of cattle*) in (20) en (21), and without any doubt the most prominent reading for neat nouns like *vee*(*cattle*) in (22).

But neat nouns *do* allow readings with a measure-comparison. Assume that in our village the *vee* consists of cows and chickens [we see here that *vee* really means ‘domesticated farm animals’ rather than ‘cattle’; chickens are *pluimvee* (feathered farm animals)]. The cows are kept outside; the chickens are less lucky, they are in battery cages. There are more chickens than cows in the village, but in terms of biomass, there is more cow than chicken in the village. We compare (23a) and (23b):

- (23) a. ✓Wat biomassa betreft, wordt het meeste *vee* in ons dorp
 As biomass concerns, is most *cattle* in our village
 buiten gehouden.
 outside kept
- b. #Wat biomassa betreft, worden de meeste *stuks vee* in ons dorp
 As biomass concerns, are most *items cattle* in our village
 buiten gehouden.
 outside kept

(23b) is weird, because it isn't clear what the expression *wat biomassa betreft* (with respect to biomass) has to do with the rest of the sentence, because the rest of the sentence clearly compares *numbers of stuks vee* (items of cattle). (23a) is not at all weird, the expression *wat biomassa betreft* (with respect to biomass) makes a *measure-comparison* prominent, and, just as for *mess* nouns, a *measure-comparison* is possible for *vee*.

The semantic theory postulates two natural distinctions - *count/mass* and *neat/mess*. In the theory proposed the distinctions are not just name-tags, they are defined in terms of (non-)overlap of building blocks and (non-)overlap of minimal building blocks, and it is these semantic distinctions, and not the labels *count/mass* and *neat/mess*, that are used in the semantic analysis of the phenomena (worked out in Landman 2011) of which I have here suggested some details. I have shown that both distinctions are semantically robust and active.

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