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SUSAN ROTHSTEIN

Por Suzi Lima (University of Toronto/UFRJ) e Roberta Pires de Oliveira (UFRJ/CNPq)

Professor Susan Rothstein is a world-renowned scholar in the field of formal semantics and studies on the syntax-semantics interface. She is a Professor of Theoretical Linguistics in the Department of English at Bar-Ilan University and a Fellow at the Gonda Multidisciplinary Brain Research Center at Bar-Ilan University. Susan has been a leader in her field and has opened new avenues of research with her work on theories of predication, aspect and more recently the count/mass distinction, counting and measuring and bare noun phrases. Professor Rothstein's current research investigates such diverse languages as Brazilian Portuguese, Hebrew (Modern and Biblical), Hungarian, Russian and Mandarin Chinese.

Susan Rothstein was born and grew up in the UK where she obtained a degree in Philosophy and Modern Languages (with Honours) from Oxford University in 1979. She then started a Ph.D in Linguistics at MIT. In 1983, she defended her dissertation 'The Syntactic Forms of Predication'. Susan then became Assistant Professor of Linguistics at College of William and Mary (Virginia, USA) before she moved on to Bar Ilan University in 1985, where she currently is full Professor of Linguistics.

Susan has published three books, *The Syntactic Forms of Predication* (1985), *Predicates and their Subjects* (2001), *Structuring Events: A Study in Semantics of Lexical Aspect* (2004), and is also the author of *Semantics for Counting and Measuring*, to be published by Cambridge University Press in March 2017. She has edited or co-edited five books and authored over 60 papers on a variety of topics in well-renowned journals in Linguistics. Susan is also a member of the editorial board of the Journal of Semantics, Linguistic Inquiry, and The Baltic International Yearbook of Cognition, Logic and Communication.

1. Your earlier papers in Linguistics are more focused on syntax. Around the late 90's you started publishing more on formal semantics. We are wondering whether we could start this interview by asking you what motivated this change, and what role syntax plays in your current research.

Well, I was always fundamentally interested in the relation between syntax and meaning, but when I went to graduate school at MIT in 1979, semantics wasn't taught there at all. Jim Higginbotham joined the faculty there in 1980, but he wasn't doing Montague grammar or model theoretic semantics, nor was he worried about problems concerning compositional interpretation. He was primarily interested in semantic issues of a different sort: what kind of logical forms could be used to represent the meaning of sentences, and how syntax might constrain logical forms. So I worked initially on what you might call semantically relevant aspects of syntax, for example syntactic constraints on predication relations, but I became less interested in how to formalize constraints on syntactic structure and more in the question of what meanings are possible and how structures map onto meaning. And it became clear to me that if I wanted to understand what meanings are, and how and when structure constrains meaning, I was going to have to learn how to do model theoretic semantics properly, build representations using lambda-enriched formal languages, and so on, and worry about compositional interpretation. Without these tools, one might be able to identify semantically relevant syntactic constraints, but one could not be sufficiently precise about what chunks of syntax actually mean or about what contrasts in meaning actually consist in. So I started to teach myself model theoretic semantics in the early nineties. My first real semantics paper was the NALS paper[1] which was published in 1995, which means I was working on it in 1992. I am still very fond of that paper. I was still thinking about pleonastics at that time, and I was worried about sentences like (1).

1 Rothstein (1995a)

(1) I regret it every time I have dinner with him.

My syntactic theory of predication predicted that pleonastics could only appear in subject position, and that meant that, contrary to popular belief, *it* in (1) could not be a pleonastic. It turned out that the prediction was correct, and that *it* is an anaphoric pronoun denoting a variable bound by the universal quantifier *every time I have dinner with him.* But figuring out what these sentences meant, and how to assign the quantifier scope so as to get the right meaning for sentences of this kind, turned out to be a serious job, and by the time I had done that, I considered myself a semanticist. The results of that paper were quite important for the whole theory of neo-Davidsonian event semantics and thematic roles, and I found myself continuing to work on semantic questions. In particular, I realized that a compositional semantic analysis of the secondary predicates I had studies in my dissertation would link into the semantics of aspect and verbal classes, which led to the research which turned into my 2004 book.

This was definitely the right time to be making the move into semantics. Partee's work on type shifting in the eighties, which allowed a more flexible approach to compositional interpretation, had made 'syntactically responsible' semantics and work on the syntax/semantics interface much more possible. And neo-Davidsonian event semantics, which Terry Parsons had really initiated in 1990, and which Fred Landman was developing in his 1992 NALS paper on the progressive and in the lectures which turned into his 2000 book, was allowing a whole new approach to the semantics of aspect in the verbal and nominal domain.

Of course, 1992 was when Fred and I got together, and he was immeasurably helpful in the whole process of my turning myself into a semanticist. I still feel that intensional logic, for example, is a late-acquired second language for me, but a first language for him, and he proof-reads and correct my formulae in the same way that I ask native Hebrew speakers to proof-read and correct my formal writing in Hebrew.

I consider myself now someone who works in semantics and the syntax/semantics interface. One of the questions that really interest me is the question of how the syntax and the range of possible syntactic structures available in a language constrain possible semantic interpretations. But I try to keep my syntax as theory neutral as is compatible with the semantic problems that I am working on.

2. In your work as a theoretical linguist you investigated properties of different languages (such as English, Hebrew, Russian and Brazilian Portuguese). Could you expand on the relevance of crosslinguistic studies for your research?

Well, if one is interested in the mapping between syntax and semantics, then a very obvious question is how different languages express similar semantic contrasts in meaning and how the varying morphosyntactic properties of different languages constrain semantic interpretation. And you can only investigate that through thorough crosslinguistic studies. One issue which I think is central to the whole enterprise is the question of whether the syntax/semantic mapping has properties in common across

different languages, even though the commonality may be at a deep level and may be hidden behind the particular morphosyntax of the language. For example, it was enormously exciting to see a repeated crosslinguistic pattern in counting/measuring ambiguities, with counting interpretations of expressions like *three bottles of wine* associated with right-branching constructions and measuring interpretations associated with non-normative left-branching constructions, even though the grammatical properties which license the left-branching constructions differ from language to language. But I am equally interested in what different mechanisms languages may use to express similar semantic contrasts, and what different semantic contrasts they may want to express, or how different languages may map differently from syntax to semantics, and this of course, we can investigate only by detailed empirical investigations of individual languages, and by careful comparative work.

3. The reader of your work can observe a continuum between your work on verb categories and telicity and the count-mass distinction. For example, in your book "Structuring events" the following claim is made: "(...) A very plausible way of thinking about the telic/atelic distinction is that it parallels the count/mass distinction in the nominal domain." We are wondering whether you could expand some more on this, based on your more recent work on the count-mass distinction. In the current state of the field, what are the parallels one can establish between telicity and the count/mass distinction? How can this debate enlighten both the syntactic and semantic research on the verbal and nominal domains?

This is a really big question (or group of questions), and I can only give a very partial answer here, largely because we don't know the answers yet. There is definitely a connection between my work on event semantics and my work on the count/mass distinction. I argue in my 2004 book that the Vendlerian verb classes can be seen as classifying events in terms of how they can be individuated, put differently, that what counts as 'one event of P' depends on the aspectual properties of P. And when I started thinking about individuation in the verbal domain, I realized that I needed first to think about individuation in the nominal domain, which is why I started working on the mass/count distinction in the first place.

Ultimately, however, I don't think that the telic/atelic distinction does parallel the mass/count distinction. I already argued in my 1999 paper in NALS (as well as in the 2004 book) that all verbal predicates are countable. You can see that from the contrast that I discussed in the 1999 paper between (2) and (3):

(2) The witch made John happy three times.

(3) The witch made John be happy three times.

In (3) where the embedded predicate is verbal, *three times* can modify either the embedded predicate or the matrix verb, but in (2), where the embedded predicate is adjectival, only the matrix predicate can be modified. So at least in some sense, *be happy* is countable, while *happy* is not, and *be happy* is certainly not telic.

In order to understand the difference between telicity and countability, we need to think about the difference between countability and individuation. Individuation is a necessary condition for counting: in order for a set of entities to be countable, the entities have to be individuable. But we know that, in the nominal domain, for a predicate to be countable and for a predicate to be individuated is not the same thing. Nouns like *livestock* and *furniture* denote sets of individuated entities, but they are not countable. Countability is a grammatical property which is encoded in count nouns (in mass/count languages) and in sortal classifiers, or classifier phrases (in classifier languages), and which presupposes individuation. So the mass/count distinction is about countability. The telic/atelic distinction is about individuation. Telic verbs are verbs which contain the information as to what counts as 'one event'. This is most obvious in achievements, which denote near-instantaneous changes of state, and one change just is one event. In accomplishment predicates, individuation is via the so-called telic point, which is lexically specified, usually in terms of what happens to the theme. And here, as we well know, individuating events via the terminal point is only possible if the theme is itself sufficiently specified (this usually means neither a bare plural nor a mass noun). Atelic verbs don't specify lexically what counts as one event. If I say *John ran three times* then the individuated events of running which are being counted are individuated by their temporal properties (probably), rather than by properties expressed by the verb. And if I say *John ran to the store three times* then the telic point which is used to individuate events is added by the adverbial.

So this probably means that the telic/atelic distinction is about event individuation, while the count/mass distinction is about countability, and in order to understand how these two distinctions relate to each other, we will have to understand better the relation between individuation and counting in both the domain of individuals and the domain of events. The data in (2)-(3) suggest that in the verbal domain, unlike the nominal domain, countability does not have to be encoded grammatically in countable events – or put differently, that all verbal predicates are potentially countable. At least on the surface, individuability is a sufficient condition for countability in the verbal domain, which is why *three times* can modify *be happy* in (3) or *run* as in the examples above.

Beyond the obvious differences, this is another fundamental difference between the verbal domain, or domain of events, and the nominal domain, or domain of entities. The reason why it may be different in these two domains is, I suspect, the fundamental difference between events and concrete objects. Concrete objects can be individuated by their space/time features, while as Parsons argued, events cannot be individuated independent of our description of them. This means that individuation plays a different role in each domain.

The differences between the verbal domain and the nominal domain have been obscured by the apparent similarity between atelic predicates and mass (and plural) nouns, which has mistakenly led to the conclusion that both atelic predicates and mass/bare plural nouns are cumulative. But even here, the verbs and nouns are really different, as I argued in my 2004 book. Cumulativity as a property of nominal predicates is related to plurality: a predicate is cumulative if singular entities and sums of singular entities and sums of sums of singular entities all fall under the denotation of the predicate.

Atelicity is not to do with plurality (and thus not to do with cumulativity in any proper sense) since a predicate is atelic if a singular event in its denotation can be temporally extended into a bigger singular event in the denotation of the same predicate. We are used to saying that if John ran from 1pm to 2pm and then he ran from 2pm to 3pm, then the sum of both these events is in the denotation of the predicate *run* so the atelic predicate *run* is cumulative. But this is not the crucial issue, and in fact on this definition of cumulativity, many telic predicates are cumulative in the same way. (If John arrived at my house between 1pm and 2pm and he arrived (again) between 2pm and 3pm, then the sum of those two events is also in the denotation of the plural predicate *arrive.*) The crucial difference between *run* and *arrive* or *build a house* has to do with event identity. If John ran between 1pm and 2pm and has reached what looks like a potential endpoint, then that same single event can be extended in time to continue to 3pm, while intuitively remaining the same event. A single event of building a house or arriving cannot be extended in time once it has reached its endpoint. So what is crucial in the definition of atelicity is the fact that the single event can be extended and remain a single or 'the same' event. Fred and I have written some papers on this (Landman and Rothstein 2010, 2012a,b) and we hope to develop these ideas in the future, but we both have other projects that we have to finish first!

4. One current and relevant question in the field is the use of experimental methods in the light of formal theories. You have been collaborating with scholars from cognitive sciences in the investigation of the count-mass distinction (for example Kulkarni, Rothstein and Treves 2013, and Gafni and Rothstein 2014). In which sense do these studies (and experimental studies in general) inform our understanding of formal theories of structure and meaning?

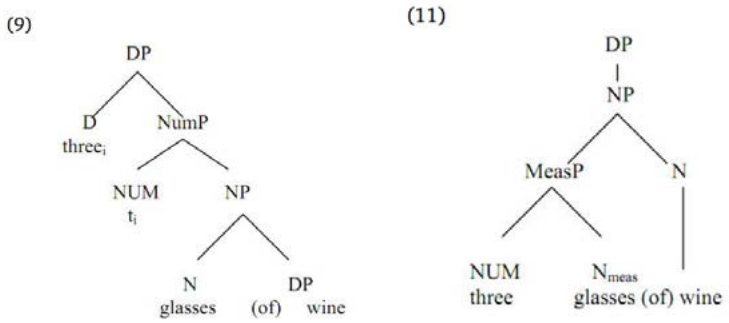
Here, I think, we have to distinguish between different kinds of empirical studies. I don't consider the work that I did with Alessandro and Ritwik experimental in the normal sense, since we were not testing a hypothesis in controlled conditions. What we did was construct a data base, and run statistical tests on it, looking for correlations between morphosyntax and semantic features which might underlie a categorization of nouns as mass or count. And in later work, Ritwik tried to build a small biologically plausible network which could learn whether a noun with certain semantic and/or syntactic features was mass or count. One of the things that we learnt was how different languages are both in terms of what properties characterize mass and count nouns, what different semantic properties influence the mass/count classification, how much shifting between mass and count there is, and also how personal is the decision as to what shifts are allowable. So it was really a project which involved a form of corpus analysis and computational neuroscience. It was very exciting, and much more difficult than we expected. The project with Chen Gafni, was much smaller, and was much more classical psycholinguistics, and we essentially replicated Grimm and Levin's (2012) results for Hebrew, using different stimuli. Grimm and Levin (2012) and our results both showed that Barner and Snedeker (2005) were wrong in claiming that object mass nouns like *furniture* and *livestock* could only be compared in terms of cardinality.

I think that all these different kinds of studies can be very useful in terms of testing hypotheses, but need to be carried out with great care, and if there is one thing that I have learned from my

limited experience in these projects, it is just how difficult they are to do properly. However, if done properly, they can be very helpful in supporting or falsifying hypotheses. Large-scale corpus studies give us a way to examine specific examples in contexts. Experimental studies can also be used to test hypotheses, but they need to be used very carefully because it is so difficult to set them up properly and so easy to read too much into the results. Experimental studies in semantics are particularly difficult because you can never really control for what your subject is thinking: You may think that you have created a sentence which favours a particular scope reading, but if your subject comes up with a context you haven't thought of, or an interpretation that you haven't thought of, you will get different results from what you project. It doesn't mean that your original hypothesis is wrong, but rather that the experiment isn't testing it.

Good experimental work is of course very insightful. Suzi's recent experimental work with the Yudja, where she runs experiments base on the Barner and Snedeker paradigm, but with improved stimuli, really show that "Who has more N?" in Yudja is much more strongly biased to a cardinal interpretation, even when the noun is notionally mass, than in English or Portuguese (Lima 2016). This supports her analysis (2014) of notional mass nouns as easily having a count interpretation. But, experimental work can only support data collection, hypothesis-building and analysis based on careful work with informants, both in underrepresented languages like Yudja and in well-studied languages like English and Portuguese. Work with informants allows you to explore why they allow the interpretations they do, or make the grammaticality judgements they do. It requires much on-the-spot thinking so that you can follow up on their reactions and responses, but that is often where the real breakthroughs come. Once you have build some really strong well-founded hypotheses, and can argue for them extensively, then experimental research can be very useful, but it doesn't replace the more traditional 'theoretical' work.

5. In earlier versions of your work on container/classifier phrases (for example Rothstein 2011) you discuss Landman's 2004 analysis according to which we have two different structures for these phrases, as represented below:



(From Rothstein 2011)

Since then much work has explored further divisions of the interpretation of the so-called non-measure and measure interpretations (Partee and Borschev 2012, Khrizman, Landman, Lima, Rothstein and Schvarcz 2015, for example). Our question is about how these semantic papers

that proposed further subdivisions of types of measure and non-measure interpretations could impact the syntactic analyses that proposed two potential structures for these phrases?

Here you are asking about work that still remains to be done, and we will have to look very carefully at the relevant examples. Semantically, it seems that the unmarked case would be for counting readings to have right branching structures, while measure readings would have structures like (11). And the reason is that I have argued that numerals have two different uses in counting and measuring constructions. In counting constructions numerals are cardinal predicates that modify plural predicates intersectively. In *three glasses of wine*, *three* modifies *glasses of wine* and denotes the set of pluralities in the denotation of *glasses of wine* which have three atomic parts. And it shouldn't matter semantically whether the classifier *glasses* is a container classifier so that the NP denotes pluralities of glasses containing wine, or whether it has shifted to a contents classifier as KLLRS (2015) suggest, and the NP denotes pluralities of discrete quantities of wine individuated by the glasses which contain them. So if the cardinal is a numerical modifier, it must have a sister to modify. In measure readings such as (9), the predicate is *three glasses* and it modifies *wine.* It denotes a measure property, the property of being assigned the value 3 on the measure scale. Assume that a scale is a triple consisting of a dimension (here volume) a unit of calibration (here a glass) and a range of potential values. The measure property denoted by *three glasses* is the property of being a quantity which is assigned the value 3 on dimensional scale calibrated in glass-units. Since any measure property must contain information about both the numerical value and the unit of measure (and also the dimension, which is presupposed by the unit of measure), measure predicates ought (it seems) to consist of both the numeral and the measure head denoting the unit.

So certainly I would expect that semantically, all measure readings involve combining the measure head and the numeral into a predicate which then modifies the N denotation, while the counting reading (at least in English) is right-branching. If the syntax reflects the semantic structure, then we would expect that the two different structures in (9) and (11) are matched with count readings and measure readings respectively (with or without movement in 9). And, as I have shown there is evidence in support of this in Hebrew and Mandarin, English and possibly French.

However, it is also possible that different languages have different ways of composing measure predicates and/or counting predicates. Fred Landman in recent work (Landman 2016) has argued that while the structure in (11) is plausible for measure readings in Mandarin and Hebrew, measure structures in Dutch are syntactically right branching as in (9). Since he assumes the semantics for measure phrases which I have just outlined, he argues that there must be a mismatch between the syntax and semantics semantic interpretation for measures. There are other possibilities too. Yasutada Sudo has recently (2016) argued that in Japanese counting constructions, classifiers combine with the numeral to form a counting modifier, and that the numeral + classifier string is semantically equivalent to the cardinal modifier in (9). And Keren Khrizman (2017) suggests that Russian has two sets of numerals for counting, one which behaves like the English cardinals, while the other behaves more like the Japanese cardinals syntactically, although with a measure-like semantics. So, I think we

really need to keep an open mind and do as much careful empirical work as possible in many different languages to see what the syntax/semantics mappings actually are.

6. In your new book – "Semantics for Counting and Measuring"- you propose that counting and measuring are two distinct semantic operations. Could you comment on these two operations and maybe on how this theoretical approach relates to your empirical investigation of languages, in particular how it clarifies the data of languages where numerals can be directly combined with notional mass nouns (Blackfoot, Halkomelem [Wiltschko 2012], Yudja [Lima 2014], Innu-aimun [Gillon 2010], Ojibwe [Mathieu 2012], among others). Could you also comment on the relation between these two semantic operations and cognition?

I argue that counting and measuring are two fundamentally different ways of giving quantity evaluations. Counting is giving a quantity evaluation to a plurality in terms of cardinality. In English it answers the question "how many", and it asks how many atomic parts a plurality is made up out of. It requires identifying the atomic parts and putting them in one-to-one correspondence with the natural numbers. The set of counting values is fundamentally the set of natural numbers, which is a set of discrete values. Counting the atomic parts of an object means that you have access to the part-of structure of the plurality. (We know this because plural predicates denote Boolean lattices, or semi-lattices depending on your theory. Since up to isomorphism there is only one Boolean structure for any plurality with n atomic parts, when you know how many atomic parts a plurality has, you also know its Boolean part-of structure.) Measuring involves giving a very different kind of quantity value. When you measure, you give an overall value to an accumulation or a sum in terms of a calibrated dimensional scale. So while a cardinal value can be just "3" or "33" or "103", meaning that a plurality has three or thirty-three or a hundred and three atomic parts, a measure value is "3 kilos in weight", meaning that the sum of stuff (or objects) gets the value "3" on the dimension of weight calibrated in terms of kilos. And this difference is reflected in the different semantic interpretations which I outlined in response to your previous question. Note that measure predicates don't tell you anything about the part-of structure of the sum that they measure. So if our sum weighs three kilos, we don't know anything about what kind of part-of structure the sum has. Crucially, you don't decide that the weight of the sum is three kilos by dividing the whole into kilos and counting them. For example if you carry home four watermelons, three of which weigh half a kilo and one of which weighs one-and-a half kilos, you will have carried home three kilos of watermelon, but *three kilos of watermelon* only tells you the overall weight of the sum of fruit and not anything about its internal structure, i.e. what objects the sum consists of. What I argue in my book is that in a number of languages, these two different operations are reflected in two different uses of numerals: in the languages I looked at, expressions of counting cardinal numerals are used as adjectives. Thus in *three watermelons, three* is an adjective modifying the N *watermelons* and the NP denotes pluralities of watermelons which have the property of having three atomic parts. In measure expressions like *three kilos of watermelon*, *three* denotes an abstract object 3 which combines with *kilos* to form a measure predicate which modifies *watermelon.*

The interesting consequence of counting and measuring being two different operations is that it becomes perfectly plausible for a language to use one operation and not the other – i.e. to give only one kind of quantity evaluation. It seems that there is evidence that in Yudja, for example, numerical quantity judgements are cardinal. There are no Yudja words for units of measure, they apparently express quantities only in terms of cardinal values, and *x is more than y* usually means *x has more atomic parts than y.* (Lima 2014, 2016). So quite possibly, Yudja is a language which has counting, but no measuring. This leads to two very obvious questions – are there other languages like Yudja? And are there any languages which have only measuring and not counting? We don't yet know the answers to this, although the crosslinguistic fieldwork project that Suzi and I are coordinating may well bring some answers.

My guess is that we are more likely to find languages which use numericals only in counting because counting does seem to be conceptually prior to measuring operations, and because children seem to make cardinal comparisons over pluralities before they make measure comparisons (see Lima 2014, Lima and Snedeker 2015). But again, we will only find out by doing a lot of fieldwork.

What does this tell us about languages where numerals apparently directly modify notional mass nouns? Well, in the absence of other information about the properties of these languages, it doesn't tell us anything at all. In Yudja, Suzi has shown that the use of expressions like *three water* makes it look as if *three* is being used to count discrete units of water. And what is striking to me is the fact that Yudja not only allows direct counting of notional mass nouns, but does not have any formal expressions of measure within the language. All nouns apparently have both kind-denoting interpretations, and count interpretation.

So, as I argue in my book, this supports the hypothesis that the mass/count distinction is related to the measure/count distinction. We by now tend to accept the idea that count nouns have countable denotations, and I have suggested (Rothstein 2010, in press) that non-count nouns, i.e. mass nouns, have measurable denotations. What the Yudja data suggest is that mass-predicate denotations are not necessary when there are no measure operations expressed in the language.

I don't know enough about Blackfoot, Obijwe, or other languages where numerals can modify notional mass nouns to say anything about what is going on there. Obviously, if I were involved in researching these languages, I would immediately want to try and find out what gets counted in these languages and what sort of measuring operations there are.

7. Descriptively, one could say that Munduruku counts only until 5, and Pirahã only until 3. In languages some of the numerals were said to have an approximate interpretation, to estimate quantities. This is different from counting in English which is an exact language, and numbers are infinite (Pica, P., Lemer, C., Izard, V. & Dehaene, S. (2004), among others). Do you think counting is different in these languages? How is counting related to numbers? Would you say that the plural morphology in languages as English is related to counting?

Well, again, I don't know enough about either Munduruku or Pirahã to comment in any serious way. I do not, though, necessarily expect numerals to have the same usage cross-linguistically, or even within the same language. Keren Khrizman, in her dissertation, (Khrizman 2017) shows that cardinal and so-called collective readings of numerals in Russian have very different semantics, and when we recently heard a talk by Dan Hyde at the Baltic Winter School (December 2015), which included data on Munduruku, it sounded very much as if the Munduruku numerals had a semantics similar to the Russian so-called collectives.

The relation between counting and numerals is not as straightforward as one might think. (Note, by the way, that I am talking about the relation between numerals and counting, rather than numbers and counting.) Counting as an activity really does require use of numerals. While we know from work by Spelke and others that prelinguistic infants can make cardinality judgements and so these judgements cannot be dependent on knowing numbers, actually counting does requires knowing and understanding numerals as names for numbers. In English, cardinal numerals are basically names for numbers, and when we count objects, we are essentially assigning each object a (temporary) name from the lists of numbers, indicating where it stands in the list. So counting a plurality is counting the number of atomic parts of a plurality. But there can be other numerals which are not directly related to counting. In English, expressions like *hundreds, thousands* and so on, are 'number words' which do not directly name numbers, and which are not used for counting. So in *hundreds of cats, hundreds* does not tell you how many cats there are, but indicates the range within which the value would be if you were to count the cats. This seems to involve a process of estimating cardinal values, rather than counting, and it shows that some (non-cardinal) numerals have a semantic interpretation which does not involve direct counting. As I have argued in my book, as well as assigning cardinal values directly via counting, you can also give a cardinal value to a plurality not by counting, but by assigning a value on a cardinal scale. It seems that estimating cardinalities will naturally use cardinal scales rather than direct counting.

Counting is in fact only one among a number of possible numerical operations, so the fact that different languages may use numerals in different numerical operations should not surprise us. Again it is an empirical question what these operations are and how they are expressed.

Plurality is a separate issue, and I don't know how directly related to counting it is. In English, count nouns distinguish between singular and plural morphologically, so when cardinals above *one* modify count nouns, they always modify plural count nouns. But plurality works very differently in different languages. In Hungarian, for example, which has a mass/count distinction and a singular/plural distinction, cardinals always modify morphologically singular count nouns. So we don't really know the relation between so-called semantic plurality and plurality as agreement, and that is another big topic which is waiting to be explored.

REFERENCES:

Barner, David and Jesse Snedeker, 2005. Quantity judgments and individuation: Evidence that mass nouns count. *Cognition*, *97*(1), pp.41-66.

Gillon, Carrie. 2010. The mass/count distinction in Innu-aimun: implications for the meaning of plurality. In *WSCLA 15: The Fifteenth Workshop on Structure and Constituency in Languages of the Americas*, 12-29.

Grimm, Scott, and Beth Levin, 2012.'*Who Has More Furniture?* An Exploration of the Bases for Comparison'', Mass/Count in Linguistics, Philosophy and Cognitive Science Conference, École Normale Supérieure, Paris, France, Dec. 20-21, 2012

Khrizman, Keren, 2017. *Numerous issues in the semantics of numeral constructions in Russian.* Ph.D. dissertation, Bar-Ilan University.

Khrizman, Keren, Fred Landman, Suzi Lima, Susan Rothstein and Brigitta Schvarcz, 2015. Portion readings are count readings not measure readings. In: T. Brochhagen,

F. Roelofsen & N. Theiler (eds.) *Proceedings of the 20th Amsterdam Colloquium*. pp 197-206. http://semanticsarchive.net/Archive/mVkOTk2N/AC2015-proceedings.pdf

Kulkarni, Ritwik, Susan Rothstein and Alessandro Treves, 2013. A statistical investigation into the crosslinguistic distribution of mass and count nouns: morphosyntactic and semantic perspectives. *Biolinguistics* 7, 132-168.

Landman, Fred, 1992. The progressive. *Natural language semantics*, 1, 1-32.

Landman, Fred, 2000. *Events and plurality: The Jerusalem lectures*. Berlin, Springer

Landman, Fred, 2016. Iceberg semantics for count nouns and mass nouns: classifiers, measures and portions," *Baltic International Yearbook of Cognition, Logic and Communication*: Vol. 11. http://dx.doi.org/10.4148/1944-3676.1107

Lima, Suzi, 2014. The grammar of individuation and counting. Ph.D. dissertation, University of Massachusetts at Amherst.

Lima, Suzi, 2016. Container constructions in Yudja: locatives, individuation and measure, *Baltic International Yearbook of Cognition, Logic and Communication*: Vol. 11.http://dx.doi.org/10.4148/1944-3676.1109

Lima, Suzi and Jesse Snedeker. 2015 Individuate, then measure: on the acquisition of container phrases in English. Third ANPOLL International Psycholinguistics Congress. UFRJ/PUC-Rio, Brazil, March 2015.

Mathieu, Eric. On the mass/count distinction in Ojibwe. *Count and mass across languages* (2012): 172-198.

Parsons, Terence, 1990. *Events in the semantics of English: A study in subatomic semantics.* Cambridge, MA, MIT Press.

Partee, Barbara, 1987. Noun phrase interpretation and type-shifting principles. In J. Groenendijk, D. de Jong and M.Stokhof, (eds.) *Studies in Discourse Representation Theory and the Theory of Generalized Quantifiers.* GRASS 8, Foris, Dordrecht 1987, 115-143.

Partee, Barbara H. and Vladimir Borschev, 2012. Sortal, relational, and functional interpretations of nouns and Russian container constructions. *Journal of Semantics* 29,4. pp. 445-486

Partee, Barbara and Mats Rooth, 1983. Generalized conjunction and type ambiguity. In R. Bäuerle, C. Schwarze and A. von Stechow (eds.). *Meaning, Use and Interpretation of Language*, Walter de Gruyter, Berlin 361-383.

Pica, Pierre, Cathy Lemer, Véronique Izard, and Stanislas Dehaene. 2004. Exact and approximate arithmetic in an Amazonian indigene group. *Science*, *306*(5695), 499-503.

Rothstein, Susan, 1995a. Adverbial quantification over events. *Natural Language Semantics* 3, pp1-31.

Rothstein, Susan, 1995. Pleonastics and the interpretation of pronouns. *Linguistic Inquiry* 26, pp499-529.

Rothstein, Susan, 1999. Fine-grained structure in the eventuality domain: the semantics of predicate adjective phrases and 'be'. *Natural Language Semantics* 7, pp 347-420.

Rothstein, Susan 2004. *Structuring Events: a study in the semantics of lexical aspect.*

Rothstein, Susan, 2010. Counting and the mass count distinction. *Journal of Semantics* 27.3: pp343-397 doi 10.1093/jos/ffq007

Rothstein, Susan, 2011. Counting, measuring and the semantics of classifiers. *The Baltic International Yearbook of Cognition, Logic and Communication.* Volume 6 doi:http://dx.doi.org/10.4148/biyclc.v6i0.1582

Sudo, Yasutada 2016. The Semantic Role of Classifiers in Japanese, *Baltic International Yearbook of Cognition, Logic and Communication*: Vol. 11. http://dx.doi.org/10.4148/1944-3676.1108

Wiltschko, Martina. 2012. Decomposing the mass/count distinction: Evidence from languages that lack it. *Count and mass across languages*, 120-46.