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Grammatical Number and the Count/Mass Distinction

Introduction

As a nominal category, grammatical number is generally taken to encode differences of numerosity, hence as a grammatical category which plays a role in semantic interpretation and conceptualization of the entities that nouns refer to. To appreciate the complex nature of number both as a linguistic and as a conceptual category, this paper looks at the relationship between the morphosyntax of number and its interpretation, focusing on the role that grammatical number plays in encoding the count/mass contrast, which is famously fluid in English. To understand why the count/mass partition is systematically reflected morphosyntactically in English and to gain insight into the flexibility of this distinction in English, an analysis is offered here on which linguistic countability is the function of the syntactic feature of number rather than an independent countability feature ([C]). Following Spencer (2001, 2004), the syntactic number feature is taken to have a morphological counterpart and an inflectional semantics. It is argued that the number feature makes visible at the syntax-semantics interface the principle of individuation that a noun can have for the entities in its extension either by virtue of being born lexically individuated in language or by virtue of having the individuating principle forced on its extension in syntax, generating count interpretation. Count construal of a basic mass noun arises in the presence of a specific value of the number feature assigned to the noun and conversely, mass construal of a basic count noun is generated if the noun's number feature is unspecified in syntax. Non-standard interpretations are captured under some general semantic principles of referential shift specified at the level of grammatical semantics.

The Morphosyntactic and Semantic Underpinnings of the Count/Mass Distinction

English makes a clear grammatical distinction between two types of nouns: count and non-count, also referred to as mass. Count nouns have number contrast and can appear as both singular and plural. They co-occur with count determiners (e.g. *a*, *each*, *every*), numerals (e.g. *two*, *three*, *one hundred*), and count quantifiers, i.e. quantifiers sensitive to whether the noun that the quantifier combines with can pluralise (e.g. *many*, *few*, *a few*). Mass nouns lack number contrast. Traditionally, they are analysed as either inherently singular or inherently plural. In contrast to count nouns, mass nouns do not occur with count determiners, numerals and count quantifiers. Rather, they typically co-occur with amassive determiners (e.g. (unstressed) *some/sm*) and quantifiers (e.g. *much*, *little* and *a little*). In addition, unlike count nouns, mass nouns can occur bare in syntactic structures (e.g. *We need *chair/furniture*).

The formal, morphosyntactic count/mass distinction is generally taken to correspond to a conceptual difference whereby count nouns map onto individuals whereas mass nouns map onto non-individuated entities. The difference between individuals and non-individuated entities cuts across a variety of lexically encoded categories, i.e. the criteria that underlie the grammatically encoded partition are independent of the lexical semantics of nouns (cf. Wisniewski *et al.* 2003, a.o.). For example, both count and mass nouns can denote physical objects (e.g. *dog* vs. *gold*), abstract entities (e.g. *idea* vs. *evidence*), events (e.g. *race* vs. *running*), states (e.g. *headache* vs. *hatred*), and natural phenomena (e.g. *flood* vs. *lightning*). In addition, the count/mass partition pertains as much to basic-level as to superordinate terms with individuated entities in their denotation (e.g. *vehicle* vs. *traffic*). The independence of the individual/non-individual contrast from lexical semantics explains why even in the absence of lexically specified knowledge speakers judge novel nouns in contexts like *This machine produced a lot of moops* and *This machine produced a lot of moop* as having, respectively, discrete or non-discrete referents (cf. Wisniewski *et al.* 2003).

Although the main function that nouns have in language is to make possible reference to pieces of external reality, the count/mass distinction is independent of the structure of matter (cf. McCawley 1975, a.o.). For example, while *toast* has individuated, countable objects in its extension, it is still a mass noun. In addition, the same entity can be referred to using a count or a mass noun, as is demonstrated by the count noun *pebbles* and the mass noun *gravel*. Further-

more, the same entity can be referred to countably or uncountably under the same nominal predicate (e.g. *They ordered pizza/a pizza*). Thus, the individuals that count nouns denote are linguistic constructs. The notion of a linguistic individual is generally associated with notions of unity (atomicity), identity ((re-)identifiability), and countability. What count nouns share regardless of their lexeme-inherent information is that they divide their reference. In other words, they provide an individuating principle of application and a counting criterion on the entities in their extension (cf., a.o., Jespersen 1924; Bunt 1985; Rothstein 2004). Like count nouns, mass nouns carry criteria of identity which allow for the (re-)identification of the entity referred to as one and the same, but in contrast to count nouns, they do not determine what counts as a unit of what they apply to. Although many English mass nouns have discrete entities in their extension, e.g. *furniture, jewellery, pottery, footwear, mail*, they do not provide the means of referring to them as linguistically enumerable units (e.g. *I have two/many pots* vs. **I have two/many potteries*). Thus, what is at the heart of linguistic individuation in the nominal domain is the criterion of countability: count nouns come with a criterion that allows for the enumeration of their referents while mass nouns do not have this criterion in their lexico-semantic structure.[1]

If the countability criterion underpins linguistic individuation, it is easy to understand why the grammatical distinction between count and mass nouns hinges on possession of number contrast in English. Grammatical number is often understood as a linguistic means of encoding numerosity differences (cf., among others, Cruse 1994), typically the difference between 'one' and 'not-one.' Assertion of exact numerosity presupposes the existence of individuals in the denotation of the noun that can be referred to as countable units. In all the languages with grammatical number, reference to 'one' is the function of the singular and reference to 'not-one' is mainly the function of the plural, but how 'not-one' is interpreted depends on how many number distinctions the language grammaticises (cf. Corbett 2000). Mass nouns do not determine what counts as 'one' unit of what they apply to and as a result, they do not have number contrast and cannot occur as both singular and plural.

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[1] Views on how the countability criterion is determined differ greatly in the philosophical and linguistic literature. Among the notions most often taken to underpin linguistic countability are internal structure, inherent shape, boundedness, and heterogeneous part-structure. See Willim (2006) for an overview.

The Flexibility of the Count/Mass Distinction

In grammatical analysis, the morphological and distributional differences be-
tween English nouns are traditionally captured with the labels 'count' and
'non-count' (or 'mass'), respectively. If the labels correspond to the opposing
values of a binary formal, morphosyntactic feature, e.g. [C], the inclusion of
the feature [+C] for 'count' and [–C] for 'non-count' in the lexical entry of
the noun can capture the following generalizations about the morphosyntactic
properties of English nouns (cf. Gillon 1992):

(1)   (a) nouns are assigned syntactic features [±C], [±PL].
          [–C] nouns may be marked either [–PL] or [–PL].
          [–C] nouns are marked [–PL] except for lexically listed exceptions like *odds*,
          remains, *groceries*, *dregs* etc.
      (b) nouns, quantifiers, and determiners agree in their number specification, i.e.
          a [±PL] noun requires a [±PL] quantifier or determiner.

What follows from (1) is that only [+C] nouns have both singular and plural
forms and that in contrast to [–C] nouns, whose number specification is in-
variable, the number specification on [+C] nouns is determined in the syntactic
structures in which nouns occur.Thus, linguistic (un)countability seems to be
a systematic property of the syntactic environment in which a noun is used.
If a non-plural [+C] noun requires a [+C] determiner and/or quantifier while
a noun marked [–C] combines only with [–C] determiners and/or quantifiers,
there seem to be two kinds of syntactic frames in which nouns are inserted from
the lexicon: count and mass. Count syntax is a syntactic structure in which
a number-variable noun is inserted, licensing count determiners and quanti-
fiers. Mass syntax is a nominal projection in which number-invariable nouns
and mass determiners and quantifiers are admitted.

   The fact that linguistic (un)countability is associated with the potential for
the possession of two number forms suggests that the feature [±C] is redun-
dant. Assuming that the feature of number is the primary marker of nominality
in English, a noun is a lexeme that has a formal number feature in its com-
plex of features. In this scenario, a count noun is simply a lexeme inserted in
a syntactic structure in which the value of the number feature is determined
as [–PL] or as [+PL]. Following Spencer (2004), the syntactically determined
features [–PL] and [+PL] can be analysed as adding to the semantic struc-
ture of the noun numerical predicates encoding reference to 'one' or 'not-one'
unit that the noun specifies. In this scenario, the syntactic number feature is

an interpretable formal feature which is associated with grammatical semantics. Pluralia tantum nouns have their number value fixed lexically. Because number is not valued on such nouns in the syntax, to the extent that their forms can be analysed to contain the root and a separate morpheme, in the case of *snows*, *waters*, *depths*, *valuables*, *dregs* etc., the non-root morpheme is not a numerosity operator quantifying over individuals, but rather, it introduces into the lexical entry a semantic predicate that contributes the notion of amplification or magnitude, manifoldness, or some other lexically specified non-numerical notion (e.g. collectivity). In other words, the plurality of pluralia tantum nouns is lexical, morphological and syntactic (as the number feature of pluralia tantum nouns participates in syntactically resolved agreement). Semantically, they are numberless. So-called singularia tantum nouns like *gold* have the number feature in their complex of formal features, as number makes for their nominality. Although such nouns are generally analysed as singularia tantum (cf. (1c)), they are in fact nouns for which the morphology provides one output: the root. Strictly speaking, as they are not marked with the feature [−PL] mass nouns like *gold* are not 'singular' and they trigger default agreement.

Dispensing with the feature [±C] has the advantage of simplifying the analysis of highly flexible nouns, i.e. nouns that are equally well used as count and as mass. Common examples include *cake*, *onion*, *ice cream*, *chicken*, *fish*, *cover*, *football*, *stone*, *rock*, *string*, *rope*, *glass*, *fire*, *tile*, *meatloaf*, *steak*, *pizza*, *trouble*, *justification* etc. The problem that such nouns raise is that if nouns are lexically born specified as either [+C] or [−C], the examples above need to be analysed as either underspecified for the value of the countability feature or else special rules need to be postulated to change the specification from [+C] to [−C] or from [−C] to [+C]. Neither solution seems well-founded. If nouns which may occur both as count and as mass are underspecified for the value of [C], most if not all nouns may have to be analysed as underspecified for countability. It is often observed in linguistic analyses that many nouns are flexible with respect to their count/mass status (cf., among others, Gleason 1965 and Pelletier 1979), as the following quote from Gleason (1965: 136–137) makes clear:

> ... *book* and *shelf* are both fairly typical count nouns. With the present vogue of speaking-animal stories, we can imagine one termite concerned over her child: *Johnny is very choosy about his food. He will eat book, but he won't touch shelf.* This is far-fetched, of course. But it does suggest that every noun, given the right context, can occur in either type of usage, count or mass.

In a similar vein, Huddleston and Pullum (2007: 86) write that "nouns that have only a count interpretation or only a non-count interpretation are in a minority." But if most nouns are underspecified for a specific value of the feature [C], the feature does not seem to capture any significant fact about English grammar. Rather, a noun underspecified for the value of the feature [C] is a noun which may equally well occur as singular (e.g. *I'd like a cake*), plural (e.g. *I'd like some cakes*), and as unmarked for number (e.g. *I'd like some cake*) and it is grammatical number and not the [C] feature that encodes linguistic (un)countability.

The consequence of capturing the flexibility of the count/mass distinction with the help of lexical rules shifting lexemes specified as [+C] to related lexemes specified as [–C] and lexemes with the feature [–C] to lexemes with the feature [+C] is that the lexicon practically doubles in size. This is because on the assumption that referential shifts are the function of lexical derivational rules as postulated by, among others, Jackendoff (1991), Copestake and Briscoe (1995) and Pustejovsky (1995), every flexible noun comes in two varieties, as illustrated for the lexeme *cake* in (2):

(2) **cake₁**   **cake₂**
    N: Count   N: Mass
    Individuated   Non-individuated

Two additional problems arise in this scenario. One is the directionality of the shifts and the other is the meaning changes that the rules effect. The first problem is acknowledged in Leech (1969: 104), who notes in connection with flexible nouns that it is not always clear which lexeme is basic and which is derived. If this is correct, whether the noun is count or mass cannot depend of the feature [±C] whose value can be manipulated under a derivational rule but rather, it is decided in the syntactic environment in which the lexeme is inserted (cf. also Allan 1980). Moreover, while lexical rules are generally taken to effect a specific, well-defined semantic change (e.g. deriving reference to edible parts of an animal from a lexeme denoting an animal, as in the case of lexemes like *chicken, fish, rabbit* etc.), a referential shift may be semantically underspecified. For example, in (3a) there does not seem any clearly defined lexical semantic difference between the count and the mass uses of the lexeme *dilemma* except for the fact that the noun is interpreted countably under the predicate *a dilemma* and uncountably in *much dilemma*. In (3b), the shift is not to reference to edible parts of the animal, but rather, it is to the material parts of a material whole:

(3) (a) He claims to be caught on the horns of *a dilemma* but I see no horns nor *much dilemma* in his situation.
    (b) After several lorries had run over the body, there was *rabbit* splattered all over the highway.

The problems pointed out above speak against analysing count-to-mass and mass-to-count coercion in terms of lexical rules. A more fruitful approach is to take the referential shifts that are correlated with morphological and distributional differences to be the function of some very general semantic rules of referential transfer that operate on the post-syntactic level of grammatical semantics, where syntactic structured get interpreted (cf., among others, Nunberg and Zaenen 1992; Wiese and Maling 2005). Three general, productive and semantically transparent rules of referential transfer are suggested in the vast literature on the topic. Count-to-mass coercion is often captured under the so-called Universal Grinder. This semantic function maps count noun denotations onto mass noun denotations and can be compared to a device that takes as its input discrete objects and returns as output homogeneous masses. The examples in (4) include basic count nouns (in italics) used uncountably:

(4) (a) There's not enough *table* for everyone to sit at.
    (b) Emmy finds squashed *spider* more nauseous than the thing alive.
    (c) The scrap-yard is full of smashed *car* awaiting recycling.
    (d) Badger hams are a delicacy in China while *mole* is eaten in many parts of Africa.

Mass-to-count coercion is generally captured under two functions: packing and sorting. The Universal Packer/Packager can be compared to a device that takes as its input homogeneous masses and which returns discrete, enumerable portions. The Universal Sorter can be compared to a device which inspects homogeneous masses and divides them into different discrete kinds according to some criterion which is the basis for individuation (cf., among others, Pelletier 1979; Bunt 1985; Jackendoff 1991):

(5) (a) Would you care for a *coffee*?
    (b) I ordered a *pizza*, not a slice of pizza.
    (c) He came to find in her a *love/beauty/daring* he had never suspected.
    (d) This is a very special *honey*.
    (e) The store sells seventeen *coffees*, each from a different country.

In this scenario, grinding, packing and sorting are semantic functions which take the basic denotation as input and which generate an enriched, non-standard

interpretation. The processes yield predictable semantics, but their application is subject to pragmatic license and conventionalisation. Hence, the availability of grinding, packing and sorting with particular nouns is subject to both inter- and intra-linguistic variation (cf. Allan 1980; Wiese and Maling 2005; a.o.). For example, packing is not accepted with all substance-denoting mass nouns, as illustrated in (6), where the question mark in brackets indicates relative (un)acceptability of the packaged reading of *soil*, on which reference is to conventionalised portions of potting soil such as bags. Plant-to-cooking oil coercion illustrated in (7) is generally unacceptable except in special registers in English (cf. Nunberg and Zaenen 1992):

(6) (?) I'll have two large potting soils.

(7) (??) We fried the chicken in olive/safflower.

While English allows both names of animals and trees to be used uncountably in reference to, respectively, the edible parts of animals and the wood made from trees, the former is disallowed while the latter is licensed by conventions of use in West Greenlandic Eskimo (cf. Nunberg and Zaenen 1992).

The referential shifts captured under grinding, packing and sorting generate non-standard readings of basic count or mass nouns. They can be thought as the ways in which semantics handles insertion of a count noun in a mass syntactic frame and a mass noun in a count syntactic frame. A count noun carries the principle of numerical identity in its logical structure and the numerical scale is the default dimension for evaluating its reference. However, the grammar is flexible and does not force a basic count noun to be used countably.[2] When it is not, its number feature remains unvalued and discrete reference is blocked. In such a case, the referents of the noun can only be evaluated along some other dimension, e.g. volume or intensity. Grinding captures this sort of change, as the output of grinding is a mass concept denoting an entity with homogeneous part-structure. Conversely, when a basic mass noun is used in a count syntax, i.e. when the number feature in its complex gets valued as [−PL] or as [+PL], the

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[2] This is similar to the situation in the verbal domain, which is often analysed in terms of the telic/atelic distinction. Telic verbal predicates denote events with an inherent limit or endpoint, e.g. *build a house, break a vase, deliver a letter*. Atelic verbal predicates, e.g. *fly, lie, walk*, do not provide an inherent individuation boundary on the events in their denotation. This does not mean that telic verbs can only be used in reference to delimited events and atelic verbs can only be used for events that do not have a specified endpoint. For example, *Jane has been building a house three times since I met her* illustrates an atelic use of a basic telic predicate and *John walked for an hour* illustrates a telic use of a basic atelic predicate (cf. Rothstein 2004).

semantic predicate 'one' or 'not-one' is added to its logical structure, enriching its denotation. Packing and sorting are the means of interpreting the denotation of a noun that does not provide a lexeme-inherent countability criterion in ways compatible with a numerical predicate in its semantic structure. What this suggests is that syntax provides the means of encoding the basic lexeme-inherent logical properties of nouns by providing two different types of frames: count and mass. By manipulating the syntactic frames into which nouns are inserted, basic count nouns can be de-individuated/massified while basic mass nouns can become individuated linguistically (cf. also Wiese and Maling 2005). The linguistic means on which these distinctions rest is grammatical number: a specified value of the number feature forces individuated construal while an unspecified number feature does not force such construal. The flexibility of the count/mass distinction has its source in the optionality of the assignment of a specified value of the number feature to a noun in syntax (cf. also Panagiotidis 2003). While the grammar allows for the count/mass distinction to be fluid, it is the pragmatic principles and conventions of use that decide on the noun's countability status in language. As the grammar provides other means of linguistic individuation apart from grammatical number, namely classifiers, that mass nouns such as *information*, *research*, *lightning* etc. must be used in classifier constructions to be interpreted countably (e.g. *an item of information, three clasps of lightning*) rather than in count syntax, in which they have a specific value of the number feature (e.g. **an information, *there lightnings*), is not determined grammatically. Rather, it is determined by the linguistic practices of the English speech community, which are conventionalised and require the speakers' license to be overridden. In other words, the grammar makes available both scenarios for individuation (*an item of information* and *an information*), but only one is licensed by the speakers of English and must be learned as part of the learning of the licenses and linguistic practices of the speakers of the language. Pragmatic principles and conventions of use may sanction only one of the grammatically available options for linguistic individuation or they may be more flexible, allowing both kinds of count constructions with particular nouns. Common examples include nouns such as *beer*, *wine*, *coke*, *cake*, *pizza* etc. (e.g. *I'll have two beers/two bottles of beer*).

In conclusion, in the account suggested here, nouns are born in language lexically individuated or non-individuated. The former provide a countability criterion for the entities in their extension and the latter do not divide their reference. Grammatical number is the linguistic means that encodes the presence of the countability criterion in the logical structure of a noun in syntactic

structures and in the semantics. A noun with an individuating criterion in its logical structure is interpreted countably if its countability criterion is made visible to the grammar (e.g. *There is a chicken in the pen*) and uncountably if the countability criterion is not made visible to the grammar (e.g. *There is chicken in the soup*). The countability criterion is lexeme-inherent: nouns like *toast, spaghetti* and *garlic* do not have it in English regardless of the fact that the entities in their extension are as discrete as the referents of the nouns *roll, noodles, onion* and *tangerine*. However, the countability criterion can also be added contextually and for a coherent reading to arise, the grammar provides rules that capture the referential shifts (Packing and Sorting). Also the referential shift that is generated if the lexeme-inherent counting principle is not made visible to the grammar is captured under a general semantic rule of meaning transfer (Grinding).

The Grammatical Representation of the Count/Mass Distinction

As has been argued above, count construal is enforced by a specific value of the number feature assigned to a noun in syntax. Examples like (8) below from Gillon (1992) show that discrete reference and quantification does not require count syntax: the italicised nouns in (8) are all grammatically mass nouns and as such they are numberless. In all the examples, reference is to the minimal part or parts in the denotation of the noun (e.g. discrete pieces of jewellery, furniture, footwear, ammunition and to animals such as cows or sheep). Importantly, (8b) can be true of the individual pieces of furniture in the extension of the noun and false about their collection:
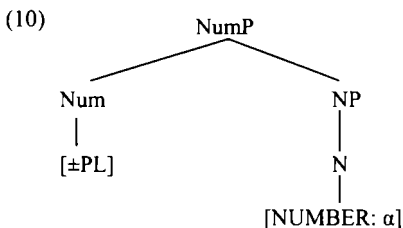
(8) (a) This *jewellery* contains just one ounce of gold.
     (b) This *furniture* is light.
     (c) Some *footwear* in this store sells for under thirty dollars.
     (d) All *ammunition* found by the police was fifty calibre.
     (e) No *livestock* in this pasture weighs more than one hundred kilograms.

What this means is that number-variability is sufficient but not necessary for a countable interpretation to be triggered. At the same time, a grammatically mass noun can have a discrete reading only if it has discrete elements in its lexico-semantic structure. The contrast between (8a), in which reference with the noun *jewellery* is to discrete pieces such as earrings, rings etc. made of gold, and (9) below, in which reference is not to individual pieces of gold but rather, to the entire mass of gold on the table that can be constituted by discrete

pieces of jewellery (cf. Gillon 1992), follows if the noun *jewellery* defines what counts as a minimal part of what it applies to even if it does not provide the means for referring to its extension as a unit, while the noun *gold* does not have any grammatically specified minimal parts in its denotation (but see Chierchia 1998 for a different stand):

(9) The gold on the table weighs 7 ounces.

To explain the role that number assignment has in guaranteeing countability in the syntax and in the semantics, I suggest that the syntactic environment which enforces count construal is a syntactic projection of the noun in which the lexical nominal domain is embedded under a functional head that hosts the syntactic number feature, as shown in (10) (cf. also Willim 2000 and Acquaviva 2005, a.o.) and the syntactic number feature in Num values the syntactic number feature of the noun 'from outside':

(10)

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                NumP
            ___/    \___
          /              \
        Num              NP
         |                |
       [±PL]              N
                          |
                   [NUMBER: α]
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As already explained the noun's syntactic number feature can in principle be valued as either [−PL] or [+PL] in English. The assignment of one of the values of the number feature is arbitrary, but if a noun is assigned one value of the number feature in syntax, the entailment is that the noun can in principle be assigned the opposing value. Following the Word-and-Paradigm approach to morphosyntax, the syntactic feature [NUMBER:−PL/+PL] can be taken to have a morphological counterpart: [Number:−pl/+pl]. The morphological feature triggers particular realization rules at the level at which morphological features are spelled out, i.e. at the level of Phonetic Form (cf. Spencer 2001, 2004). In English, the number contrast is a paradigm-based inflectional contrast, i.e. count nouns have two paradigmatically related forms, one realizing the feature value [−PL], and the other realizing [+PL]. The forms instantiating the value [−PL] are interpreted as encoding the numerosity 'one' and the forms instantiating the feature [+PL] are interpreted as encoding reference to the numerosity 'not-one' if the number forms are related paradigmatically. In this sense, the paradigm-based inflectional contrast is associated with a paradigm-

based semantic contrast (cf. Spencer 2001, 2004). The number feature may but need not be valued in the syntax (cf. also Panagiotidis 2003). If it is not, it is simply underspecified, i.e. it is neither [−PL] nor [+PL]. A noun with an underspecified number feature is treated as numberless, i.e. as a noun with a zero number feature. The zero number feature is subject to a realization rule that stipulates that nominal lexemes with an underspecified number feature in their complex of features are realized with the lexical root form (e.g. the root of the lexeme DOG is *dog*). The root is the default exponence of the number feature in English and is also used to realize the feature [−PL]. As the [−PL] feature is not spelled out with dedicated morphology and the distinction between zero-number and [−PL] is not manifested, determiners and quantifiers take over the function of making [−PL] visible to the grammar, enforcing a count construal. By contrast, plural number morphology makes the number feature and the countability criterion of the noun visible to the grammar and no determiner is required to co-occur with a count plural noun in English. This captures the obligatoriness of count determiner/quantifier or plural morphology in nominal structures with a count construal in English, which means that *dog* cannot be interpreted countably in the absence of a determiner/quantifier marked with the feature [−PL] or [+PL] or plural morphology, as the contrast between *I like dog* and *I like every dog/I like dogs* demonstrates.

As has been discussed earlier, there are determiners and quantifiers in English which are sensitive to whether the noun they combine with is number-variable or invariable. However, English determiners and quantifiers do not simply combine either with count or with mass nouns. Some determiners co-occur both with mass and count plural nouns and some are unrestricted and can combine with any grammatical kind of noun. The co-occurrence restrictions are summarised in Table 1 (cf. also Chierchia 1998):

I suggest that count singular and count plural determiners combine with count singular and count plural nouns, respectively, because they come in the lexicon marked with a specified value of the number feature. By virtue of having the feature [−PL] or [+PL] in their entries, these determiners can enter into morphosyntactic agreement with nouns marked as [−PL] or [+PL]. Quantifiers that combine only with grammatically mass nouns (e.g. *much*) and quantifiers that combine with grammatically mass and count plural nouns (e.g. *enough*) are extensive measure functions which apply to homogeneus predicates (cf. Filip 1999). This explains why they do not combine with count singulars, which have heterogeneous part-structure. On the grammatical side, that *much* cannot combine with a count singular predicate can be explained on the assumption

Table 1. The co-occurrence restrictions on nouns and determiners in English.

Type of noun	Type of determiner	Examples
mass	*much, a little, little*	*much feeling/*speck/*specks* *little furniture/*idea/ *ideas*
count singular	*a, each, every, either, neither*	*each car/*each cars/*each cattle* *either solution/* solutions/*advice*
count plural	*several, many, few, a few, both*	*both sons/*son/*water/*fruit* *a few books/*book*/pottery*
mass and plural	unstressed *sm*, unstressed *any*, *all, a lot of, plenty, more, most, enough*	*enough poetry/poems/*poem* *more change/coins/*coin*
unrestricted	*the, this/these, that/those, no, my*, stressed *some*, stressed *any*	*the dog/dogs/electrified wire* *any pot/pots/pottery*

that it lacks the number feature in its lexical entry. The assumption is plausible, as *much* can modify not only nouns but also verbs, adjectives and adverbs (e.g. *I liked it very much/*many*; *He felt so much/*many better that day*; *This is much/*many less likely now.*). Not having the number feature in its entry, *much* cannot make the number feature [−PL] of the noun visible to the grammar and enforce count construal. As a result, combined with *much*, a basic count noun can only be interpreted uncountably (e.g. *They have never cooked so much dog before*). Unlike *many*, *much* also cannot combine with a count plural noun (e.g. *much apples*). This can be explained on the assumption that *much* and *many* are in morphological competition for the expression of the notion of a vague large measure and *many*, which is lexically marked with the feature [+PL], wins the competition in the context of a noun with the feature [+PL].[3] Although unrestricted determiners and quantifiers such as the definite determiner *the* do not themselves have number-variable forms, they still can flag count syntax, make the number feature on the noun visible to the grammar, and enforce count interpretation.[4] Otherwise, the following contrast would be unexpected:

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[3] That *a lot (of)* can combine both with a mass and a count plural noun can be explained on the assumption that while it lacks a number feature in its entry, there is no other monomorphemic lexical quantifier it is in competition with for the expression of a vague large measure. The same reasoning that applies to the *much/many* contrast also obtains in the case of *(a)little/(a)few*.

[4] The forms that realize the proximal deictic determiner is English are *this* and *these*, depending on the value of the number feature. The forms of the distal deictic determiner are *that* and *those*. The morphology provides only one output for all other unrestricted determiners.

(11) (a) John ordered a beer. (??) He drank the beer for 15 minutes.
      (b) John ordered beer. He drank the beer for 15 minutes.

(11a) is unacceptable in contrast to (11b) and a plausible explanation is that the predicate *drink the beer* is telic in (11a) and atelic in (11b), as *for*-adverbials combine only with atelic predicates. For the predicate *drink the beer* to be telic, *the beer* must denote a discrete beer portion, i.e. the noun *beer* in *the beer* must be count in (11a). In (11b), the noun *beer* is mass (and numberless). If unrestricted determiners and quantifiers have an unvalued number feature in their complex of features, the definite determiner is marked [–PL] in (11a) on agreement with the [–PL] noun *beer*. In (11b), the noun has an unvalued number feature and also the determiner has an unvalued number feature on agreement with the noun. A count reading of *the beer* is not enforced and as a result, it is blocked in (11b).

Conclusion

In conclusion, the morphosyntactic and the semantic components of English work in tandem in the expression of the individual/non-individual contrast in the nominal domain. The nouns *apple, idea* and *collection* individuate linguistically in that they have a paradigm-based inflectional number contrast and a paradigm-based number semantics in English and occur in count syntax by default. The nouns *water, garlic, evidence, footwear* and *furniture* do not individuate linguistically on their basic, non-coerced readings. These nouns lack paradigmatically related number forms. The structure of the world tells us that entities in the extension of *dog* and *table* come in natural atomic units, but atomicity is a linguistic construct (cf. also Rothstein 2004). The structure of the world tells us that also the entities in the extension of *garlic, corn, toast* and *pottery* also come in natural units, but still they are referred to with nouns lacking number contrast. Thus, linguistic individuation and perceptual as well as conceptual individuation need not necessarily coincide. Rather, in the account proposed here, which follows the Paradigm-and-Word approach to morphosyntax developed in Spencer (2001, 2004), individuation which is part of language is the function of the formal, morphosyntactic number feature. I have argued here that it is the number feature and not an independent countability feature that generates count syntax and makes visible to the grammatical system the numerosity predicate that is added to the lexical entry of the noun when the noun is inserted in a count syntax and assigned a specific value of the number

feature. Nouns with a specific value of the number feature have number-based reference, because specific values of the number feature are interpreted in the semantic component as enumerating the noun's referents either as 'one' or 'not-one.' An underspecified number feature does not force discrete reference and quantitative evaluation is based on some other dimension in such a case, e.g. intensity, volume, etc. (cf. Barner and Snedeker 2005). That the determiner system is highly sensitive to the value of the number feature on the noun can be linked to the fact that morphology does not spell out the [–PL] feature and does not manifest a distinction between stems encoding the [–PL] and the zero-value of the number feature. While count syntax is not necessary for reference to individuals to arise (cf. (8)), grammatically encoded individuals cannot be ignored in the semantics: unlike *beer*, which can be interpreted countably in a mass syntax (e.g. *a great selection of beer*), *a/one/every beer* cannot be interpreted uncountably in English.

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