Some Stuff:  
On the Mass–Count Distinction

4.1 Plurals as Classifiers

4.1.1 Classifying Chinese

It is often pointed out that some languages, but not others, have a classifier system, with a classifier morpheme (free or bound) ranging over the NP, assigning it to a particular semantic or grammatical class. It has been further suggested that the absence of plural inflection correlates with the existence of classifiers, or to quote from Sanches and Slobin:

[If a language includes cardinal classifiers as its dominant mode of forming quantification expressions, then . . . it will not have obligatory marking of the plural on nouns.] (Sanches and Slobin 1973: 4)

The absence of plural marking is illustrated, for Chinese and Japanese, by (1a–2b).

(1) a. Xuesheng lai le. (Chinese; Li 1998)  
student come ASP
‘The student/s came.’

b. Mari wa hon o katta. (Japanese; Muromatsu 1998)  
Mary TOP book ACC bought
‘Mary bought a book/books.’

(2) a. yì lì mǐ  
one CL rice
‘one grain of rice’

b. yì ge rén  
one CL person

c. shénme qián  
much money (shénme: literally ‘what’)

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(3) a. *denwa ni dai
telephone two CT
‘two telephones’

b. *denwa ni hon
telephone two CT
‘two telephone calls’

c. kin ni kiro
gold two kilogram
‘two kilograms of gold’

In a recent treatment, Chierchia (1998a, b) claims that it is possible to derive not only the absence of plurality marking in classifier languages, but also the absence of articles, illustrated by (1a–b). Consider how this correlation is to be derived. Chierchia suggests that a semantic parameter distinguishes (at least) two kinds of NPs. Those which are predicates, and are marked by the feature constellation [+pred, –arg], and those which are arguments, and are marked by the feature constellation [–pred, +arg]. In languages of the former type, D (and hence DP) is required in order to shift from a predicate ((e, t)) to an argument ((e)) (down function ‘P’). In the latter, on the other hand, D is not required to give rise to arguments, as the NPs already are arguments, or more specifically, kinds. It is for that reason, Chierchia claims, that we predict (correctly) bare, article-less nouns with an argumental interpretation in languages such as Chinese, but not in Italian, for instance.2

In turn, in an argumental language such as Chinese, determiners (*three, all, etc.), in order to have a predicate restriction, must be capable of turning kinds to restrictions. It is trivial, however, Chierchia claims, to define a function DET’, corresponding to DET, such that in addition to its quantificational function, it further shifts kinds to predicates, thereby giving rise to the necessary restriction. Thus, for instance, corresponding to the determiner EVERY, with the formula (EVERY(x)(P)), there would be, in a language such as Chinese EVERY’, such that EVERY’ = (EVERY(‘x)(P)), with ‘d a function shifting kinds to predicates. But the shifting of a kind to a predicate necessarily results in the emerging predicate being mass. It therefore follows that in argumental-type languages N-predicates are always mass. In predicate-type languages, on

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1 I am abstracting away in this review from the role of existential closure in licensing argumental interpretation when ‘P returns an undefined result, as it is largely irrelevant to the ensuing discussion.

2 Chierchia suggests yet a third type of grammar, in which NPs are [+pred, +arg]. This last choice, however, reduces to NP as either [+pred, –arg] or [–pred, +arg], and does not involve the introduction of a third type of NP.
the other hand, N-predicates can presumably be either mass or count, depending on their lexical properties. In turn, the absence of plural or singular marking in an argumental language now follows from the fact that all nouns are either kind or mass, and hence the function PL could not be defined (more specifically, Chierchia 1998b argues that all mass nouns are lexically plural). It further follows that all count quantification must be preceded by the division of the mass predicate into countable portions, hence the obligatoriness of the classifier system in the context of cardinals and quantifiers.

Although in what follows I will critique Chierchia’s approach and end up rejecting it, it is worthwhile to stress from the onset a particular aspect of the Chierchia system which is shared by the account to be proposed in this work. First, I will concur with Chierchia that all noun extensions in Chinese are mass. I will depart from Chierchia, however, in arguing that this is not a fact peculiar to Chinese, or to classifier languages, but rather a fact which generalizes across all languages. More fundamentally, however, note that within Chierchia’s system, the count-mass distinction, at least in Chinese, cannot possibly be based on lexical properties, as all noun extensions are mass. It thus follows that within the Chierchia system, count is crucially a grammatically constructed notion, corresponding to a piece of structure, rather than to a set of lexical specifications, be they reducible or not to lexical semantic factors. In what follows, I will argue that this is exactly correct, and that not only count but also mass is grammatically constructed in Chinese as well as in all other languages, and that both mass and count represent properties of functional structures (or the absence thereof) and not properties of lexical, substantive items.

Turning to Chierchia’s specific proposals, and especially to the distinctions which he postulates between classifier languages and non-classifier languages, a number of relatively central problems are worth pointing out, although a full critique of Chierchia’s approach is outside the scope of this work.

First, for Chierchia, the mass property of predicates in a language such as Chinese derives from the properties of variants of determiners (DET) which

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3 For the claim that all noun denotations are mass, and that count interpretation is the property of syntactic structures within which nouns are embedded, see also Sharvy (1978), Allan (1980) and Hundius and Köver (1985). For the claim that nouns are unmarked and that structure determines their interpretation as either mass or count, see Ware (1995). I return in Section 4.2 to the comparison between the view of nouns as mass and the view of nouns as entirely unmarked, arguing in favour of the former, and suggesting, more concretely, that the ‘massiness’ of nouns, rather than being an inherent property, is a default interpretation in the absence of count structure. See also n. 7 for some more discussion of Sharvy’s (1978) view.

4 For a detailed critique of various other aspects of Chierchia’s analysis, see Cheng and Sybesma (1999). Although I concur with some of their objections, I reject their claim that the mass–count distinction is lexically encoded in Chinese. See Section 4.1.2 for a detailed discussion. The reader is further referred to A. Li (1997, 1998) for the argument that Chinese has a DP projection. See also C. Li and Thompson (1986), and A. Li (1998) for the claim that Chinese does have a plural morpheme, men, a point to which I return briefly directly below.
select kinds, rather than predicates, but which shift kinds to predicates and
which Chierchia defines as \((\text{DET}('x)(P))\)\(^{-}\). Chierchia argues, ‘being an ideal-
forming operator, assigns to the predicate counterpart of a kind a mass denota-
tion.’ From this Chierchia concludes that in languages in which NPs are kinds,
rather than predicates, ‘all nouns are going to be, in some sense, mass.’ We note,
then, that according to Chierchia, the difference between Italian and Chinese
does not consist in the presence vs. absence of a type shifter. On the contrary,
both types of language have a type shifter, notated as DET and DET’s respec-
tively, with the former shifting NP predicates to kinds (‘P), and the latter shifting
NP kinds to predicates (‘d). Nevertheless, although both language-types are
assumed to have type shifters, the Italian type shifter, DET, projects syntactically
(specifically, as D and DP), while the Chinese type shifter, DET’, does not appear
to project syntactically as a specific functional node, be it D or any other type of
functional node, call it D’.

It thus emerges that the differences which Chierchia postulates between DET
determiners with their ‘P function and the DET’ determiners with their ‘d function is far greater than it first appears. These are not just trivial variants, as
Chierchia claims, but rather, they must be assumed to be fundamentally dis-
tinct, in that one projects a functional structure while the other does not. And
yet, why should such a difference exist? Why should not we assume that DET’,
just like its variant DET, projects some kind of functional structure?

To make matters worse, Chierchia must assume the existence of null deter-
miners in, for instance, Spanish and Italian (but not in French), and further, that
null determiners must be structurally licensed very much along the lines dis-
cussed in Chapter 3. Furthermore, he must assume that such null determiners
may give rise to type-shifting of the predicate \(\rightarrow\) kind type (‘P). The absence of
corresponding DET’ null determiners of the kind \(\rightarrow\) predicate type (‘d) is
unexpected, and must be independently stipulated.

To illustrate more specifically the nature of the problem, consider what could
be, in Italian, the syntactic representation of quantifiers such as EVERY. If it is
to be claimed that the projection of EVERY involves a DP, and that EVERY is in
D, then one would have to claim that although the interpretation of EVERY is a
proper subset of the interpretation of EVERY’, the former, but not the latter, is a D. Alternatively, one could claim that EVERY is not in D, but is internal to the
NP. In this case, a proponent of the Chierchia system would have to adopt one of
two equally unattractive positions: either Italian NPs could become arguments
without a DP, through some predicate \(\rightarrow\) argument type-shifting achieved by
EVERY in a position distinct from D; or alternatively, EVERY is not in D, but D
nevertheless projects with a null head. This latter position would wrongly pre-
dict that the distribution of EVERY + NP should correlate with that of article-less
DPs in Italian (bare plurals, bare mass nouns) for whom Chierchia assumes a null D, subject to the standard restrictions. Alternatively, one could argue that in Chinese, EVERY is in D (or, for that matter, in D'), thereby making all nominal expressions which contain quantifiers D’Ps, but leaving nominal expressions such as xuesheng, 'students' in (1) as bare NPs. While this is, of course, a possibility, it requires the additional assumption that while in Italian DP may dominate a null D with the function ‘P, Chinese D’P may not be headed by a null D' with the function ‘d, a curious asymmetry. And finally, if it is assumed that Chinese has a null DET’ (in D'), shifting kinds to predicates, then the claim that bare NPs in Chinese are arguments, rather than predicates shifted to arguments with a null D, becomes unfalsifiable, and little remains of the claimed parametric variation between argumental NPs and predicative NPs. Ironically, Chierchia actually fails to predict the very absence of overt definite/indefinite articles in Chinese, which appears to motivate his account to begin with. As Chinese must have a position for DET’, within the NP or outside of it, one wonders why there are no DET’ equivalents for the definite and indefinite articles, occupying whatever position is occupied by cardinals, or any other instantiation of DET’.

The bottom line, then, is that the main empirical support for Chierchia’s analysis comes from what appears, at first sight, to be the free distribution for determinerless NPs in Chinese. Within Chierchia’s system, there should be no structural restrictions on the distribution of determinerless NPs in Chinese of the type well-known from Romance languages and discussed in detail in Chapter 3. However, this prediction is false, as noted by Cheng and Sybesma (1999), who show conclusively that the distribution of determinerless NPs in Chinese, once properly investigated, follows rather closely that of determinerless NPs in other languages. Thus Mandarin disallows an indefinite reading for determinerless NPs in pre-verbal position, and Cantonese allows determinerless NPs in pre-verbal position only under a generic interpretation. Under the plausible assumption that weak indefinites involve a null, unbound D, but indefinites and generics do not, these facts are directly explained, but only provided that D does project in Chinese. These interpretational effects, then, in and of themselves, already cast serious doubt on the claim that in Chinese, or any other language, there are indeed argumental (non DP) NPs.

If all the argumentation here and elsewhere is on the right track, and Chinese does project, syntactically, a nominal structure identical for all intents and purposes to that projected in Italian or English, then Chierchia can no longer derive in a compelling way the fact that all nouns are mass in Chinese. This conclusion may nevertheless be true. It certainly appears to go a long way towards accounting for the existence of a classifier system, responsible for portioning out stuff, so to speak, before quantifying it, as well as towards explaining the
absence of ‘massifying’ inflection (cf. (2c)). It might even shed light on the fact that classifier languages do not have plural inflection. The question is, however, how this property of nouns in Chinese can be derived, a question which brings us to two additional problems with Chierchia’s analysis. We note first that while Chierchia, successfully or unsuccessfully, puts in place a system which is designed to account for the absence of plural markers in classifier languages, his system is entirely silent on the absence of morphological classifiers in languages which do mark plurality. According to Chierchia’s description, which tallies with the traditional one, in languages such as English or Italian, nouns such as wine, blood, sand, and furniture are lexically marked as mass, while nouns such as dog, cat, table, and drop are lexically marked as count. The former, but not the latter, tend to require a measure/classifier phrase when they occur in the context of cardinals or other count determiners (exemplified by (4)), giving rise to an odd, coercive reading when such determiners are missing (exemplified by (5)):

(4) a. There are three types of footwear in this store.
   b. There are three drops of blood on the wall.
   c. There is a grain of sand on the tabletop.
   d. There is a pound of rice in the jar.

(5) a. #There are three footwears in this store.
   b. #There are bloods on the wall.
   c. #There is a sand on the tabletop.

To the extent that a language such as English has, according to Chierchia, (lexically marked) mass nouns, one wonders why English (and Italian, and Hebrew) do not have classifiers of the Chinese type. Specifically, we note that the measure/classifier phrases in (4) have very different properties from those which are typically associated with Chinese classifiers, in that the head of expressions such as three drops of blood is arguably drops, rather than blood, and that of blood is arguably a type of complement. Not so for the classifiers in (2a–b), which are typically assumed to be inflectional in nature, much like number or gender specification. But why should that be so?

Turning now to Chinese, especially when compared with the English paradigm, we note that in fact, to the extent that Chierchia derives the absence of plural inflection in Chinese, he does so by assuming tacitly that the output of the CL+N structure cannot be pluralized. In other words, to the extent that classifiers portion out mass denotations, Chierchia assumes that the resulting predicates

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3 This statement, accurate enough to draw a distinction between languages such as Chinese, in which morphological classifiers exist, and such languages as English and Italian, in which they do not, is nevertheless a serious over-simplification of the facts in Chinese. For a detailed discussion, see Section 4.1.2.
can serve as a restriction for quantifiers and cardinals, but that they cannot be pluralized. And yet, there is no particular explanation within Chierchia’s system for why that should be. One could suggest that, as noun denotations in Chinese are already inherently plural (being mass), there is no need for them to be pluralized. But by the same logic, portioned out mass in English, for example, *drops of water* should not be pluralizable either, and yet *drops*, the head of the classifier phrase, does pluralize. What then prevents the realization in Chinese of PL+CL+N, giving rise to a meaning corresponding exactly to English *grains of rice*, or *drops of blood*?

It therefore emerges that Chierchia cannot actually derive the absence of plural inflection in Chinese without an independent stipulation. Further, the claim that classifier languages do not have plural inflection, if correct, is not nearly broad enough in scope. Not only is it the case that classifier languages do not (appear to) have plural inflection, but languages which mark plural do not appear to have classifier inflection. In other words, it would appear that classifier inflection and plural inflection are in complementary distribution, as already observed by T’Sou.⁶

The study of nominal classifier systems suggests an important hypothesis that the use of nominal classifiers and the use of plural morpheme [is] in complementary distribution in natural language. More correctly, it suggests that either a) a natural language has either

⁶ H. van Riemsdijk (pers. comm.) notes an interesting potential counter-example to the suggested complementary distribution between classifiers and plural morphemes. In Dutch, it appears, diminutive suffixation turns mass expressions to count expressions, and would thus appear to be a classifier, but the output of such suffixation does allow plural marking. Similar effects hold in German. Some cases are illustrated in (i)-(ii):

(i) a. veel zout
   much salt
   "many salts"
   much salt:dim
   b. *veel zoutje
   "many kinds of salt"
   much salt:dim:pl
   c. veel zouten
   many salts
   d. veel zoutjes
   "many salt crackers"

(ii) a. veel brood
    much bread
    "many kinds of bread"
    much bread:dim
    b. *veel broodje
    "many bread:dim:pl"
    c. veel broeden
    many breads
    d. veel broedjes
    "many rolls"

Van Riemsdijk does note, however, that this use of the diminutive is not fully productive, and that, typically, the resulting interpretation is not fully compositional, thereby raising, at least in principle, the possibility that the use of the diminutive here is as a derivational, rather than inflectional morpheme, and hence it is not expected to be in complementary distribution with plural marking. We note that it is further possible that the diminutive affix is only licensed in the context of a classifier node, which, in turn, is associated exclusively, we will argue, with count structures. If this is the case, the diminutive would not actually be the head of the classifier, but would not be licensed if such a classifier is not otherwise well formed. If this is on the right track, then the diminutive would not be licensed in the mass expansion of salt (e.g. as in (i)) but only in its count expansions (e.g. as in (ii) or a singular equivalent).
nominal classifiers or plural morphemes, or b) if a natural language has both kinds of morphemes, then their use is in complementary distribution. (Tsou 1976: 1216)

But why should that be so, by Chierchia’s system? English and Italian do have mass nouns in Chierchia’s system, albeit lexically marked as such rather than derived. Such mass nouns do typically occur with count determiners, but typically not without the portioning out of that mass. That such a portioning is in fact needed is amply demonstrated by the availability of measure phrases and classifier phrases of the type illustrated in (4). But why should it be the case that in Italian and in English, but not in Chinese, portioning out should be accomplished through the insertion of a separate head, which in turn can be pluralized? And why should it be the case that in Chinese, but not in English, portioning is accomplished through inflection, and that its output resists plural inflection? We note that while the Chierchia system is designed to account for the presence of classifiers in Chinese, it is in principle not able to account for their absence in Italian and English-type languages, nor is it able to account for the absence in Chinese of plurals together with classifiers.

In what follows, I will adopt the rather old-fashioned view according to which complementary distribution is the hallmark of identity. Specifically, I will adopt the assumption that all nouns in Chinese are mass, but I will crucially depart from Chierchia in assuming that no parameter is in evidence here. Rather, all nouns, in all languages, are mass, and are in need of being portioned out, in some sense, before they can interact with the ‘count’ system. This portioning-out function, accomplished in languages like Chinese through the projection of classifiers, is accomplished in languages like English by the plural inflection, as well as by the indefinite article. Put differently, plural inflection is classifier inflection, thus accounting for the complementary distribution between classifier inflection and plural inflection, now reduced to the fact that they are simply distinct instantiations of the classifier system (and see also Doetjes 1996, 1997, where the parallel role of classifiers and plural inflection is explored).7 In what

7 Doetjes (1996, 1997) assumes that classifiers and number marking (including, but not restricted to plural marking) share the role of indicating the presence of countable units. Specifically, Doetjes assumes that in order for ‘count’ nouns, thus specifically, to be able to be (syntactically) counted, the lexico-semantic partitioning of what they denote must be syntactically visible, and such syntactic visibility is marked through the classifier system in Chinese, but through plurality in English. In turn, cardinals are only licit in the presence of a syntactic marker of countability, which may be either plural inflection or a classifier.

While the intuition behind the account suggested in Doetjes (1996, 1997) and the intuition proposed in our account are clearly very close, in assuming that plural marking, like classifiers, is indicative of grammatically significant divisions, and that the existence of such divisions is a pre-condition for counting, some matters of substance and of execution render the accounts quite distinct. First, for Doetjes nouns are lexically marked as count or mass (or more specifically, as count singular, count plural, count mass, and mass mass), and the grammatical marking of divisions, through either classifiers or plural marking,
follows, I will motivate the view of plural inflection and the indefinite article in English as an instantiation of the classifier function. I will further consider the interpretation of plurals in English and compare it to that of mass nouns. I will conclude, contra Chierchia (1998b), that mass nouns are not inherently plural, but rather are simply unmarked for either count or mass, and that mass interpretation is, in a sense to be defined, a default interpretation, associated with the absence of a dividing structure. Further, I will argue that the interpretation of (bare) plurals cannot be a function from singulars, but rather, follows from the role of the plural as "stuff divider."

Reviewing some prima facie intriguing evidence for the claim that plural and classifier inflection assign range to the same open value, consider the following paradigm from Armenian, brought to my attention by Michele Siegler (pers. comm.).

(6) a. **Cardinal, no classifier, no plural**

   Yergu hovanoč  uni-m.

two  umbrella have-1SG

   'I have two umbrellas.'

is a form of agreement with such lexical marking. It does not, in and of itself, determine the mass–count distinction. In the account proposed here, on the other hand, both plurals and classifiers create, so to speak, count nouns from unstructured stuff. As a consequence, the treatment of coercion, for Doetjes, still requires some form of type-shifting, which is avoided in our treatment. Secondly, for Doetjes the similarity of function between plurals and classifiers is not structurally reflected. Plural marking remains number marking (rather than classifier marking), while classifiers project as classifiers (and see also Cheng and Sybesma 1999, 2000, although they do suggest, rather informally, that the classifier is the locus for grammatical number in Chinese; a proposal that I will return to in Chapter 6, Section 6.4). In this work, it is specifically argued that plurality is not a number specification, and that plurals are, morphologically and otherwise, classifiers. Finally, Doetjes assumes that both classifiers and plurals mark sets of semantically pre-existing singulars, while I will argue that they create divisions of stuff, and that singulars, as coherent atoms, are created by the counting function, that is, by the Quantity Phrase, #. For the account put forth here, then, plurals are explicitly not sets of singulars.

A problem for the Doetjes account, noted in Cheng and Sybesma (1999) in a footnote, has to do with the existence of languages such as Hungarian and Turkish, in which plural inflection is absent in the context of cardinals, although the languages do have plural inflection. As it turns out, such cases fall out rather naturally from the account to be proposed here; see examples (36)–(37) and related discussion.

Sharvy (1978) puts forth an account which shares with our own the assumption that all noun denotations, universally, are (akin to) mass, and that in English they need portioning out as much as in Chinese. Structurally, however, Sharvy assumes the existence of a null (or deleted) classifier which creates singulars, with the plural inflection a marker on that classifier, eventually copied onto the noun head, i.e., dogs has, roughly, the structure [[classifier + plural] dogs]n]. (Similarly, Muromatsu 1998 postulates a null pro classifier for languages such as English.) Here, I assume plurals to be the actual portioning out function, rather than a marker on a phonologically null classifier. In fact, structures which include classifiers, null or overt, alongside plural inflection are excluded here in principle, precisely because I assume that plurals are classifiers (and see critique of Chierchia in this context). Further, I do not assume that classifiers, in English or in Chinese, create singulars, but rather, that they create divisions which may or may not correspond to singulars. See Section 4.4 for a detailed discussion.
b. *Cardinal, classifier, no plural
   Yergu had hovanoc uni-m.
   (two) CL umbrella have-1SG
   ‘I have two umbrellas.’

c. *Cardinal, no classifier, plural
   Yergu hovanoc-ner unim.
   (two) umbrella-pt have-1SG
   ‘I have two umbrellas.’

d. *Cardinal, classifier, plural
   Yergu had hovanoc-ner unim
   (two) CL umbrella-pt have-1SG
   ‘I have two umbrellas.’

What is of interest here is the fact that while both plural morphology and classifier morphology occur (optionally) in Armenian, they never co-occur; although, we note, they are not in morpho-phonological competition with each other, the classifier being pre-nominal and an independent morpheme, the plural being a suffix. Under the system we have been developing here, and assuming the classifier head to be the open value ⟨e⟩_{DIV} with DIV standing for divided, we note that the paradigm in (6b–d) receives a direct explanation if we assume that the plural suffix and the independent classifier can both assign range to ⟨e⟩_{DIV}, and that the distinction between them stems from the fact that the ‘plural marker is a spell-out of an abstract head feature ⟨div⟩ on a moved N-stem, while the ‘classifier’ is an independent f-morph. The relevant structures corresponding to (6b) and (6c) respectively are given in (7) (where co-superscripting indicates range-assignment relations).^8

(7) a. 

    CL^{max}

    had

    ⟨e⟩_{DIV}

    hovanoc

    ‘umbrella’

    → had hovanoc

b. 

    CL^{max}

    hovanoc ⟨div⟩

    ‘umbrella’

    ⟨e⟩_{DIV}

    hovanoc

    → hovanocner

^8 Note that we opt to associate the open value dominated by CL^* and the range assigned by the plural marker with DIV, for dividing, and not with count. For reasons that will become clear in Section 4.2,
In Section 4.3 I return to an account for the plural interpretation of cases such as (6a), where, it appears, there is no range assigner available for ⟨e⟩_{DIV} altogether. We note in this context that A. Li (1998) argues explicitly that there is in fact a plural marker in Chinese, *men*, which occurs as a suffix on the head N (and see also C. Li and Thompson 1981). Crucially, however, that marker never cooccurs with a classifier, suggesting that Chinese *men*, like Armenian *ner*, realizes a head feature whose function is otherwise served by an independent classifier f-morph occurring in the left-periphery of the noun. The reader will note that here, as with range assignment to ⟨e⟩_{o}, we observe intra-language variation, rather than inter-language variation, in that both Chinese and Armenian employ side by side two distinct strategies of direct range-assignment to ⟨e⟩_{DIV}.

Dominating the Classifier Phrase, I will suggest, is the Quantity Phrase #P. I argue that #P is responsible for the assignment of quantity to stuff or to divisions of it, just like CL_{max}. #P may be missing from the structure. I will suggest that the absence of CL_{max} (within a DP structure) gives rise to mass interpretation, while the absence of #P gives rise to a non-quantity interpretation. It is the absence of quantity, and specifically, the failure of #P to project, which will turn out to be the common denominator between bare plurals and determinerless mass nouns, and which will account for the many properties which they have been observed to share.

Schematically, then, the structure of Chinese and English count and mass nominals is as in (8a–b).

\[ (8) \]

\[ (\text{DP}) \]

\[ \text{three} \]

\[ \langle e \rangle_{o} \]

\[ \langle \text{div} \rangle_{o} \]

\[ \langle e \rangle_{\text{DIV}} \]

\[ \text{ren} \]

\[ \text{cat} \]

I specifically assume that the dividing function and the counting function are distinct, and although the former is clearly necessary for the latter, the former could, and does, exist without the latter, making e.g. bare plurals *divided*, but not *count*, in a sense to be made explicit.

For expository purposes, the category label associated here with ⟨e⟩_{DIV} is marked as CL, for classifier, rather than DIV. No theoretical implications are intended.

* Cheng and Sybesma (1999, 2000) suggest that classifiers such as *di* in Cantonese, *xie* in Mandarin,
More generally, the structure for some of the DP types we will motivate here will be as follows (for discussion of the structures in (9) and (10a–c) see Section 4.3; for the discussion of (10d–f) see Chapter 6, Section 6.1; see Chapter 5, Section 5.2, for the discussion of strong quantification):

(9) Non-Quantity structures
   a. Determinerless mass
      \[ \text{DP} (\epsilon_d) \rightarrow \text{cl. dog.} (\text{div}^v) (\epsilon^v_{\text{div}}) [\text{np salt}] \]
   b. Determinerless pl.
      \[ \text{DP} (\epsilon_d) \rightarrow [\text{np dog}] \]

(10) Quantity structures
   a. Quantity (weak) mass
      \[ \text{IP} (\epsilon_d) \rightarrow [\sigma Q^v (\epsilon^v_s) [\text{np salt}]] \]
   b. Quantity (weak) pl.
      \[ \text{IP} (\epsilon_d) \rightarrow [\sigma Q^v (\epsilon^v_s) [\text{cl. dog.} (\text{div}^v) (\epsilon^v_{\text{div}}) [\text{np dog}]]] \]
   c. Quantity (weak) sg
      \[ \text{IP} (\epsilon_d) \rightarrow [\sigma \alpha^v (\epsilon^v_{\text{div}}) [\text{np dog}]] \]
   d. Definite mass
      \[ \text{IP} \text{ the}^v (\epsilon^v_d) \rightarrow [\sigma \text{ the}^v (\epsilon^v_s) [\text{np salt}]] \]
   e. Definite pl.
      \[ \text{IP} \text{ the}^v (\epsilon^v_d) \rightarrow [\sigma \text{ the}^v (\epsilon^v_s) [\text{cl. dog.} (\text{div}^v) (\epsilon^v_{\text{div}}) [\text{np dog}]]] \]
   f. Definite sg
      \[ \text{IP} \text{ the}^v (\epsilon^v_d) \rightarrow [\sigma \text{ the}^v (\epsilon^v_{\text{div}}) [\text{cl. the}^v (\epsilon^v_{\text{div}}) [\text{np dog}]]] \]

4.1.2 A little more on the mass–count distinction in Chinese

Arguing against Chierchia (1998a, b), Cheng and Sybesma (1998, 1999) claim that a lexically marked mass–count distinction does exist in Chinese. Their argument is based primarily on the fact that there are two syntactically distinct types of classifiers in Chinese; one kind (which they label massifier) is found only with (ontological) mass nouns, while the other is found only and others, are plural classifiers. The claim, however, appears problematic, as these 'classifiers', unlike the more standard variety, never occur with cardinals, or for that matter, with any other quantifiers. This would rather support their status as quantifiers, with an interpretation akin to some. This latter assumption, however, inevitably leads to the conclusion that such quantifiers in Chinese are dividing counters, on a par with the dividing counters in Hungarian and Turkish, to be discussed below (see (36)–(37) and related discussion). See Chapter 6, Section 6.4, for some additional discussion of zhe and di.
with (ontological) count nouns. Examples of both kinds are in (11)–(12):\(^\text{10}\)

(11) **Classifiers**  
  a. san ge ren  
     three CL, people  
  b. san zhi bi  
     three CL, pen  
  c. san ben shu  
     three CL, books

(12) **Massifiers**  
  a. san bang (de) rou  
     three CL, pounds of meat  
  b. liang xiang (de) shu  
     two CL, boxes of book

Classifiers and massifiers are distinct in two important ways. First, massifiers allow the optional occurrence of *de*, otherwise typically attested at phrasal boundaries internal to the DP, while classifiers do not. Second, massifiers allow the separate modification of the massifier head itself with a limited number of adjectives (*da, xiao*, 'big' and 'small', respectively) while this is never possible for classifiers, as illustrated by (13)–(14):

(13) a. yi da zhang zhi  
     one big CL, sheet paper  
  b. na yi xiao xiang shu  
     that one small box of book

(14) a. *yi da zhi gou  
     one big CL, dog  
  b. *yi da wei laoshi  
     one big CL, teacher

From this picture Cheng and Sybesma (1998, 1999) conclude that, contra Chierchia, the mass–count distinction is *lexically* represented in Chinese, as evidenced by the fact that (ontological) mass nouns are found in syntactic structures which are distinct from those in which we find (ontological) count nouns.

Indeed it does appear entirely justified, on the basis of the distribution of massifiers and classifiers, to postulate a mass–count distinction in Chinese,

\(^{10}\) For a similar discussion of these two types of classifier in Japanese, see Muromatsu (1998).
such that massifiers select mass. What is not clear, however, is that the distinction is lexically encoded, as Cheng and Sybesma claim, rather than structural.\footnote{And we note here in defense of Chierchia (1998a, b) that he does not claim that the mass–count distinction does not exist in Chinese. He only claims that to the extent that it exists, it is not represented on noun extensions.} We note first that in (12b) and (13b), massifiers are associated with *shu*, ‘book,’ certainly not a clear case of an ontologically mass noun. If indeed nouns are lexically listed as count or mass, *book*, it would seem, is count, already suggesting that the distinction at stake is not an ontological one, and thus, if lexically encoded, is arbitrary rather than lexico- semantically determined. We note further that native speakers are not uniform in their rejection of (14a–b), and to the extent that (14a–b) are acceptable, they indicate even more strongly that massifiers do not require lexically specified mass nouns as their complement, as the complements of the massifiers here are clearly not lexically listed as mass. Finally, note that even if it turns out that massifiers select mass in some sense, it is not clear that classifiers exclude mass. Considering specifically the expansions of (12) without *de*, as well as (2a), for instance, we note that rather than assume that these always involve massifiers with *de* deletion, as Cheng and Sybesma do, it might be just as plausible to assume that *de* is not always present in the structure, and that two structures are involved here, one in which *de* is present (overtly or covertly) and adjectives are possible, and another one in which *de* is not present, and adjectives are excluded, in which case (2a) as well as the *de*-less expansions of (12) are structurally ambiguous. That this is in fact plausible is suggested by the interpretational differences between *de* and *de*-less structures discussed in Cheng and Sybesma (1998), who point out that in the absence of *de*, *xiang*, ‘box,’ or *ping*, ‘bottle,’ receive a more concrete interpretation (i.e. actual box, actual bottle), while in the context of *de* a measure interpretation is favoured (i.e. boxful, bottleful). It is therefore plausible to conclude that classifiers, in Cheng and Sybesma’s terminology, select any denotation, whether ontologically or conceptually mass or count, performing a dividing function on it, much like Chierchia (1998a, b) assumes.

It may turn out that massifiers do select mass, but here, crucially, the notion of mass involved, I will suggest, is structural rather than lexical, as already indicated by the possible presence of *shu*, ‘book,’ and the acceptability of (14a–b) for some speakers. Specifically, massifiers select mass phrases rather than mass listemes as their complements. Namely, they select as their complements the structure in (8b), or possibly the #P within that structure, excluding the DP projection. As both the #P and the DP structure in (8b) are full phrases, massifiers must involve a distinct extended projection line, paralleling English measure phrases, and having in essence the structure in (15), in which the measure phrase...
is headed by a quasi-functional item, *zhang* (‘sheet’), very much on a par with the quasi-functional items *box (of books)*, *cup (of flower)*, *cake (of soap)*, etc.\(^{12,13}\)

\[(15) \ [_{\text{EP}} \ yi \ [_{\text{NP}} \ zhang \ (d) \ [_{\text{EP}} \ [_{\text{NP}} \ zhi] \ ]]] \]

Within such an account, both the possibility of being modified directly by adjectives and the occurrence of *de* receive a natural explanation, correlating quite closely with the fact that heads of measure phrases in English may be independently modified, and with the fact that measure phrases in English occur with *of*.

\(^{12}\) We note in this context the often arbitrary match between classifiers and the classified exhibited in languages with overt classifier morphology. Thus consider Japanese (ia -c), from Downing (1984), cited in Muromatsu (1998):

(i) a. *denwa ni dai*
   telephone two cl. (typical classifier for machines)
   ‘two telephones’
   b. *denwa ni hon*
   telephone two cl. (typical classifier for long, thin, objects)
   ‘two telephone calls’
   c. *ume ni hon*
   plum two cl. (typical classifier for branches)
   ‘two plum branches’

\(^{13}\) Note, however, that classifier phrases in English select both mass and (unquantified) plurals, but never singulars:

(i) a. a box of rice
    b. a box of cigars
    c. a box of cigar
    d. a box of a cigar

I return in Chapter 8, Section 8.2, to the discussion of ‘massifiers’ in Hebrew, which turn out to have exactly the same properties as (i). In view of this, it is tempting to conclude that the restriction on Chinese massifiers, reflected by the unclear grammaticality status of (14) across speakers, may very well correspond to the exclusion of a singular reading in the context of massifiers, but the inclusion of a plural one.

I have little to contribute here to the ongoing linguistic debate on the structure of measure phrases or partitive phrases, and hence I leave things relatively vague when it comes to the label of the maximal projection dominating *zhang* (‘sheet’), and *zhi* (‘paper’, in Chinese, as well as *pound* or *cake* (e.g. as in *cake of soap*) in English, or the label of the maximal projection which dominates its complement (see Chapter 8, Section 8.2, for some more discussion). What is of significance to our purposes is the claim that the structure of massifiers in (15) has two distinct heads, and consists of two extended projection lines, as is evidenced in Chinese by the presence of the DP-internal phrasal boundary marker *de* and the possibility of independent modification, and in English, by the presence of *of*. Likewise a DP-internal phrasal boundary marker, and the fact that like its Chinese correlate, the head of a measure phrase can be independently modified. Striking a more speculative tone, we note that measure phrases as well as their heads, in English as well as in Chinese, occupy a curious twilight zone between the substantive and the functional, both in terms of their interpretational properties, often purely formal, and in terms of their correlation, or lack thereof, with conceptual values. In a computationally perfect linguistic world, there should be a way to derive from the semantics of the construction the fact that *cake*, or for that matter *cup*, when occurring as the head of a measure phrase, means nothing like *cake or cup* when they occur as the heads of an argumental DP. The reader is reminded that an extremely similar situation holds for proper names, with quasi-functional properties instantiated in functional contexts, but not in others. This specific task, however, is left to future research.
itself a marker of a phrasal nominal boundary. The fact that at least some ontologically count nouns do not occur with massifiers, then, would have the same status as the sharp oddity in English of phrases such as those in (16), a matter to which we return in Section 4.2:

(16) a. three bottles of person  
    b. two containers of table

Classifiers, in turn, have the structure in (8a). Being dependent functional heads, they may not be modified by adjectives, nor do they accommodate de. Their main function is that of dividing mass, or, more formally, of assigning a divisional value to the open value \( \langle c \rangle_{\text{DIV}} \), the head of the classifier phrase.

4.2 On the Flexibility of the Mass–Count Distinction

Having made a preliminary proposal according to which plurals as well as the indefinite article in English are actually classifiers—in that they assign value to \( \langle c \rangle_{\text{DIV}} \)—we must now backtrack and consider carefully the classical distinction between mass nouns and count nouns, aiming to investigate the extent to which this proposal can account for the range of observable facts (summary and examples based on Chierchia 1998b; # = interpretable but ‘odd’).

(17) Availability of plural inflection:
    a. There are (three) shoes in this store.  
    a’. #There are (three) footwears in this store.  
    b. There are (three) drops of blood on the wall.  
    b’. #There are (three) bloods on the wall.

(18) Availability of cardinals:
    a. There are three shoes under this bed.  
    a’. #There are three footwears under this bed.  
    b. There is one pebble on the floor.  
    b’. #There is one sand on the floor.

(19) Obligatoriness of classifier or measure phrase when combining with cardinals:
    a. three #(grains of) rice  
    b. one #(pound of) cheese

(20) Choice of determiners:
    a. Mass determiners: little, much  
    b. Count determiners
i. Singular (uninflected): every, a, each
ii. Plural: several, many, few, a few, both

c. Mass and plural determiners: all, a lot of, plenty, more, most
d. Mass, plural, or count determiners: the, some, any, no

(21) Independence of the distinction from structure of matter:
   a. shoes vs. footwear
   b. clothes vs. clothing
   c. coins vs. change

(22) (Predominantly), mass nouns can be made count:
   a. a wine, a love, a thread, a salt, a stone
   b. wines, loves, threads, salts, stones
   c. all the wines, all the loves, all the threads, all the salts, all the stones
   d. every wine, every love, every thread, every salt, every stone
   e. We store three bloods in this lab.

(23) (Predominantly), count nouns can be made mass (cf. Lewis’s fabled universal grinder):
   a. there is dog/stone/chicken on this floor
   b. that’s quite a bit of table/carpet for the money
   c. (too) much dog/chicken, (too) much stone, (too) much table, too much carpet
   d. a lot of dog/chicken, a lot of stone, a lot of table, a lot of carpet
   e. all dog/chicken, all stone, all table, all carpet

As noted earlier, I agree with Chierchia (1998b) that the roots of the grammatical mass–count distinction are not ontological, that the distinction is by and large independent of how things are structured in the world (or how we perceive of them as being structured, for that matter). The distinction, I will argue, is strictly a grammatical one, and although our perception of the world might lead us to prefer some structural combination over another in conjunction with particular concepts, considerations of world knowledge, as has already been suggested, can be and routinely are overridden by grammatical factors. Unlike Chierchia, however, I will assume that the core property of the mass–count distinction is its flexibility with respect to the actual nouns embedded within the relevant nominal phrases. Specifically, we note that while the DPs in (22)–(23) are unambiguously mass (23) or count (22), their N heads may be interpreted either as count (when in a (22)-type structure) or as mass (when in a (23)-type structure).

How can such flexibility in the denotation of N-stems be accounted for? There are several logical possibilities. One could claim that the overwhelming
The majority of N-stems in English are lexically listed as ambiguous between a mass reading and a count reading. It would be the mass reading of dog which projects the nominal structure associated with much dog in (23), while the count reading would project the nominal structure in contexts such as a dog. A variant of this proposal would involve the postulation of lexical rules mapping count entries, such as dog and table, to mass entries, making two distinct structures available for projection, and likewise, mass entries such as salt to count entries, with two distinct structures available.

This solution, characteristic of lexicalist approaches (and consistent with the approaches we labelled endo-skeletal), has the typical advantages and disadvantages of solutions of its kind. On the one hand, to the extent that there are noun stems that strongly resist the freedom illustrated in (22)–(23), within a lexicalist approach their exceptional status is easy to state and less costly to the system as a whole. On the other hand, to the extent that there is a generalization here which applies to just about all nouns, and which cuts across languages, a lexicalist approach would fail to capture it. Further, when couched within a framework that associates grammatical features with functional structures, such as the Minimalist Framework, or the model proposed in this work, such a lexicalist approach is conceptually redundant. As nouns are already marked lexically as count or mass, why should the syntax reiterate this marking by projecting distinct and unambiguous functional structure above them? Such structure could not be implicated in the assignment of mass–count interpretation, as that interpretation is already associated with the relevant listeme, and could at most be implicated in being a form of agreement with the lexically listed information, thereby marking it for a second time (and see n. 7 for a review of Doetjes 1996, where such an agreement system is proposed; see also Chapter 1, Section 1.1, for more discussion of this general point).

14 Interestingly, contexts for count uses of collective mass nouns (rather than ‘stuff’ nouns) are the hardest to establish. Hence three furnitures, many clothings, and a weaponry are considerably more difficult to get than e.g. three wines or three sands. I am informed by native speakers of Hebrew, however, that šloka rihatim, three (types of) furniture, šerbe levašim, many clothings, maspiq neškim, enough weaponry, etc. are fully grammatical, in spite of the fact that count terms, often derived from the same root, are available as well (e.g., rehut-im, ‘piece-of-furniture’ pl.; and maḵna-im, ‘article-of-clothing’ pl.). It might be suggested, rather plausibly, that it is precisely the group interpretation associated with these English nouns which makes both their singular and their plural grammatical manifestations difficult to conceptualize. Such an account, however, falls short of explaining the grammaticality of similar group terms in Hebrew.

15 An interesting variant of the lexical approach is put forth in Muromatsu (1998), where it is suggested that nouns are in actuality triplets, consisting of a concept, a mass noun, and a count noun, with an increasing degree of structural complexity as in (i):

(i)  a. N  concept  (1-dimensional)
b. [wc N measure] mass  (2-dimensional)
c. [wc wc N measure] classifier count  (3-dimensional)
Let us then consider a less redundant system, thereby eliminating one of these specifications. Note now that the need for a distinct grammatical structure for mass and count nominals is unquestionable, given the selective availability of plural marking, the distinct realization of otherwise semantically similar determiners, etc. Thus the syntax must represent the mass–count distinction, and redundancy can only be eliminated by dispensing with the mass–count lexical encoding on listeners. But here a number of logical possibilities are available. Suppose we consider first the possibility that noun stems do come marked, lexically, as either count or mass (dog is count, salt is mass, etc.). However, a specific grammatical (rather than lexical) operation, available in particular grammatical contexts, or indeed, reflected by specific grammatical structures, could modify that value. 16

A semantic variant of this proposal is put forth in Chierchia (1998a, b). Chierchia crucially assumes that mass nouns (in an Italian-type language) are lexically marked as plural, and that their count occurrences, either as singlars or as grammatically marked plurals, is mediated through type-shifting (i.e. implicit classifiers would turn mass to count, while a covert ‘part–of’ operator would turn count to mass). Consider, however, the ungrammaticality of the examples in (24)–(25):

(24) a. *There is rabbits in my stew.
    b. *There is a portion of rabbits in my stew.
    c. *A rabbits was singled out.

(25) a. *Much rabbit are hopping about.
    b. *There is a lot of rabbits in this stew.

The structures in (i) represent syntactically projected aspects of conceptual structure (much on a par with the argument structure of particular verbs, lexico–semantically derived and syntactically projected, according to common accounts) and are hence lexically driven, thereby accounting for the ungrammaticality (or coerced reading, under our interpretation) of honey/s (honey being a two-dimensional N, i.e. mass). We note that as nouns are in fact specified lexically as to whether or not they are two-dimensional (mass) or three-dimensional (count), the projection of the correlative syntactic structure is a form of agreement, and cannot be assumed to actually generate mass or count structures, respectively. As such, the system largely reduces to that of Docxies (1996, 1997), briefly discussed in n. 7, albeit with different primitives. On the other hand, to the extent that any count noun involves the addition of dividing structure to a mass noun, this system is reminiscent of the claims made by Chierchia (1998a, b), and in this work, although for Muromatsu, as well, divisions of mass are singulars, contrary to the claim made here.

We note as an aside that it is rather puzzling, within Muromatsu’s system, why massiness, and specifically, the measure function, is never grammatically marked, but countability often is, in the form of an overt, discreet classifier. As for the concept level, justified by Muromatsu (1998) on the basis of non-referential occurrences of nouns (e.g. truck in truck–driver), I will argue in Section 4.5 that the interpretation of such modificational nouns follows trivially from their occurrence in non-functional contexts, and does not require postulating a unique level of lexical representation.

16 A syntactic execution of such an idea is a particular variant of Baker’s (1988) UTAH, in that it allows the syntax to modify the projection possibilities associated with a particular lexical item, but does not allow the lexicon to do so.
What (24)–(25) illustrate is the complete impossibility of coercibility, or type-shifting, whenever the noun in question is marked by means of overt inflection or functional structure. *Rabbit* may be interpreted as either mass or count, but not *rabbits*, which must be interpreted as plural and count, leading to the ungrammaticality of (24a–c). Likewise, no degree of favourable context could override the properties of mass determiners, as (25) illustrates. Thus grammatically marked plurality cannot be coerced into a mass interpretation, nor can grammatically marked mass phrases be coerced into a count interpretation. If Chierchia is right, and mass nouns are lexically marked plurals which, in turn, can be type-shifted by means of a covert classifier, this asymmetry is entirely unexpected, especially since Chierchia is committed to a grammatical, rather than ontological, view of the mass–count distinction. Specifically, why can *salt*, for instance, be type-shifted by a covert operator, but not *much salt* or *rabbits*? Likewise, why can *rabbit* be type-shifted into a mass noun through a covert ‘part–of’ operator, but not *a rabbit*? That the ungrammaticality of (24)–(25) cannot be overridden by any context, no matter how salient, thus suggests that the mass–count distinction, however characterizable, is not grammatically marked on the listemes themselves, but rather, on the structure within which they embed. That unmarked nouns can be coerced indicates that whatever bias is associated with their interpretation is fundamentally different from that associated with functional, inflectional marking. Further, the coercibility of mass nouns—as opposed to the resistance to coercion of bare plurals—strongly suggests that mass nouns could not be inherently plural, as Chierchia suggests, or it must be the case that lexical plural marking is a fundamentally different grammatical creature from grammatical plural marking.  

Of particular interest in this context are *pluralia tantum*, expressions which are semantically singular but inflectionally plural, such as *trousers* and *scissors*. Just like regular plurals, they cannot be coerced into a mass context:

(26)  
- a. My trousers tear(*s) easily.  
- b. *There’s too much scissors around this house.

If there is any good candidate for lexically specified plurality, it is *pluralia tantum*, the plurality in question here being inflectional rather than semantic. This plurality, however, cannot be overridden by the grammar, unlike the plurality of *salt*, for example, which, by Chierchia’s assumption, is semantic, but not inflectional. We are thus led to the somewhat unfortunate conclusion that semantic plurality is formally weak enough to be liable to type-shifting, but inflectional

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17 Chierchia could rescue his type-shifting account of coercion by assuming that it applies exclusively to lexical heads and never to phrases. We note, however, that it could not be the case that type-shifting in general applies only to lexical heads, to wit, it applies to phrases, for Chierchia, when mapping kinds to predicates and vice versa.
plurality, which is semantically vacuous, is too robust to be affected by such type-shifting.

The issue here is, in fact, more general than whatever execution difficulties are associated with Chierchia's specific view of mass nouns as lexical plurals, and extends to any attempt to mark N stems as either count or mass (or both). Within standard approaches, mass nouns are not lexical plurals, but rather, quite simply mass nouns, with a set of grammatical properties which are distinct from those of count nouns. But if that were the case, then it would emerge that the grammatical feature plural must be assumed to have a very different status from the grammatical features count or mass. While the former is absolutely incoercible, the latter are fully coercible. At the very least, then, proponents of the lexical distinction between mass and count would have to assume that the grammatical properties mass and count, as associated with, for instance, salt and table, have an altogether different formal status from the grammatical property plural. While such an approach is of course feasible, we note that by assuming that the mass–count distinction as associated with listemes is conceptual, rather than grammatical in nature, we are not introducing a redundant formal distinction, quite to the contrary. We opt to leave within the linguistic computational system precisely those features which the grammar cannot override or ignore, relegating those which the grammar does regularly override to a different cognitive component, the conceptual one. If this is indeed the division of labour, the coercibility of the (ontological) mass–count distinction with respect to N-stems emerges quite simply from the fact that the grammar performs computations based on those formal features which it recognizes, and the fact that N-stems, as such, have none. The grammar does associate distinct structures with mass and count interpretations, but it does so regardless of the conceptual properties of the N-stems embedded within these structure. Coercion, then, is but the conflict that emerges when the grammar returns a computation which is not fully compatible with the conceptual properties of listemes embedded within these structures.

Having rejected all approaches in which any grammatical marking is associated lexically with the mass–count distinction, we now move on to approaches in which it is structure exclusively that gives rise to the mass–count distinction. Again, two logical possibilities present themselves. According to one possibility, the mass–count distinction is entirely unmarked. Instead, nouns (or stems which are thus categorized) come from the lexicon, or any other vocabulary list, neutral or underspecified with respect to the mass–count distinction, and their correct mass–count value is assigned in a mass structure or in a count structure. Yet another possibility is that the grammar projects only one functional structure, associated with either mass or count (but not both), and that the other
value is that associated with nominalized listemes in the absence of functional structure, and is thus in a sense default. If this is the correct analysis, then one of the values is structurally embedded within the other, with the superordinate structure acting upon the subordinate to give rise to the required interpretation.

Before we proceed, note that both options entail that the grammatical mass–count distinction is purely formal and is a property of structures, and that the perceived interpretation of nouns embedded within these structures is determined structurally and not by the (nominalized) listeme itself. Within either one of these executions, any mass–count interpretation of isolated listemes, or in grammatically undetermined contexts, is the reflection of salient world knowledge and is grammatically inert. Insofar as this perspective on the division of labour between the grammar and the lexicon (or what remains of it) is advocated throughout this work, I will take the formal simplicity of accounting for the mass–count distinction which emerges when no lexically encoded specification is postulated to be evidence in its favour.

Two important questions must now be addressed: first, is there a ‘default’ value underlying the mass–count distinction, and second, if there is, is it mass or count? These questions are to some extent empirical in nature: if there is no default value for the mass–count distinction, we should find, within a given grammar, two competing structures: one which is responsible for the assignment of mass specification to unspecified noun stems, and the other which is responsible for the count specification of these stems. If, on the other hand, nominals do have a default interpretation associated with the absence of some relevant structure, we expect an asymmetry: the ‘default’ interpretation will be associated with ‘less’ structure, so to speak, than the non-default interpretation.

In view of this, let us return to Chinese. Recall that I concurred with Chierchia

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10 Another important question concerns the universality of the emerging system. In principle, it is possible that all variants mentioned here (including those involving mass–count specification associated with substantive listemes) are instantiated in some language. On the other hand, I have assumed that syntactic language variation never involves the encyclopedia, but only the functional lexicon, thereby excluding the possibility that some languages specify, as part of the encyclopedic meaning of (bare) listemes, what others accomplish through functional structure. As to the possibility that languages project distinct functional structures, I assume, pending evidence suggesting otherwise, that the inventory and interpretation of functional structure is identical across all languages, and that to the extent that the output differs, it must be due to the mode of range assignment selected in a particular structure by a particular language. (Alternatively, variation may be attributable to fusion in the sense of Giorgi and Pianesi 1997; see brief discussion in n. 24 as well as Chapter 1 at n. 12 and Chapter 3 at n. 6). As I will suggest below, noun stems ‘default’ to mass, not due to any particular lexical or functional structure, but due precisely to the absence of structure. Finally, although Chierchia (1998a, b) proposes that semantic parameters do exist, and more recently, Higginbotham (2006a) suggests lexical semantic parameters, I remain skeptical of their necessity. See Chapter 1, Section 1.2, as well as the conclusion to Volume II (Chapter 11, Section 11.3), for some more discussion.
that all (predicative) NPs in Chinese are mass. In fact, it is because of their mass specification, as we saw, that the structure in (8a) had to include a classifier node, dividing the ‘stuff’ denoted by the mass noun. In mass-noun constructions, on the other hand, as in (23b), no such classifier node was necessary. We rejected, however, the claim that the mass properties of nouns in Chinese derive from a type-shifting operation deriving predicates from kinds (with the resulting ‘instance of a kind’ predicative interpretation). Instead, we proposed, NPs (rather than DPs) are always predicates, in Chinese as well as in other languages. In turn, the need for a classifier projection to license counting vs. the absence of classifiers in the context of mass interpretation confirms the claim that in the absence of classifiers, N-predicates in Chinese are interpreted as mass. Thus at least for Chinese there is direct evidence that count interpretation must be structurally licensed, but mass interpretation need not be. If indeed the default properties assumed here are universal, then in English as well count cannot be the default interpretation associated with absence of structure. Rather, it must be the case that some well-defined piece of structure signifies count, while its absence signifies mass.

Viewed from a different perspective, recall that I suggested that listemes do not have any formal properties, and are, in this sense, tantamount to raw material, ‘stuff’ which is poured into the structural mould to be assigned grammatical properties. If this metaphor has any formal substance to it, it follows that nouns, by themselves, are stuff, and that stuff, as such, is simply the absence of any grammatical specification. Should this stuff be divided, it would be, so to speak, cast into mould(s) which would in turn make counting possible. In the absence of such moulds, stuff will remain unformed, or differently put, it will revert to a mass interpretation. Importantly, by this logic mass is not a specification, lexical or grammatical, but the absence of one.

We now turn to English. I suggested that all nouns are born unspecified for any properties, including count or mass, and that as a default, and unless more structure is provided, they will be interpreted as mass. If this is indeed the case, then we must postulate in English, as evidenced in Chinese, a portioning-out structure, a CLmass headed by CL\textsuperscript{a}, to give rise to count interpretation. Such a structure cannot be that associated with classifier or measure phrases in English, akin, as we already suggested, to Chinese massifiers (see Section 4.1.2.), as portioning-out is required in DPs that do not include measure or classifier structure—that is, simple nominal expressions such as a dog, three dogs, and the dog. Assuming that these are, in accordance with common wisdom, count rather than mass, we need to find out why a dog or the dog does not receive a mass interpretation, and how three can combine with dogs, in the absence of an apparent classifier to partition the mass noun dog into countable portions.
We already suggested the direction in which an answer to this question must be sought. In English, it is the plural inflection and the singular indefinite article which are in effect the classifiers partitioning N mass, serving exactly the same function as Chinese classifiers. True, neither plural marking nor the indefinite article seem to have the richness associated with Chinese classifiers, leaving the specific form of the portioning-out rather vague in nature, and hence not always transparent. An even more striking difference, to which I return in Chapter 6, Section 6.4, is that the output of the Chinese classifier system is a well-defined portion, while the output of the English classifier system is an arbitrary division. But it is portioning-out nevertheless, and is exactly what renders (22a–c) well-formed.

In the next section, we embark upon making the workings of the classifier system in English explicit. We note, before proceeding, that the dog presents a special problem here, in having no plural marking or singular article associated with it, and involving a determiner which is entirely oblivious to the count/mass properties of its restriction. In Chapter 6, Section 6.1, I turn specifically to the definite article, showing it to be, in actuality, an extremely well-behaved piece in this jigsaw puzzle.

4.3 A Classifier Phrase for English

Stems which are marked as plural now become count by definition, as we define the plural inflection as the realization of an abstract feature which assigns range to the $\langle e \rangle_{REV}$ open value that heads a Classifier Phrase. In turn, once a $CL_{\text{max}}$ phrase has been established, with range assigned to $\langle e \rangle_{DIV}$, it may be within the domain of a restrictor which assigns specific quantity to the mass divisions created by the plural marking. That role is assumed by the open value $\langle e \rangle_{\#P}$, which heads a $\#P$, and which is assigned range, in English, by cardinals and by quantifiers. Focusing on the classifier projection and the quantity projection, the syntactic structure of a nominal expression such as three cats is as in (27).

(27)

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(\langle e \rangle_{\#P})
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In (27), *three* is an f-morph which merges a copy with # and assigns range to \( \langle e \rangle \), \( \langle e \rangle_{\text{inv}} \), on the other hand, is assigned range by an abstract head feature \( \langle \text{div} \rangle \), in turn requiring the movement of the L-head *cat* to be realized, and spelled out, phonologically, as *cats*. \( \langle e \rangle \), note, is not assigned range in (27), and we will return to its status in Chapter 5.\(^{19}\)

Consider now the structure for mass nominal expressions. We concluded that mass interpretation does not derive from a particular feature, but rather, from the absence of a dividing structure. In the absence of a dividing structure, we suggested, nouns will always be interpreted as mass. There seems little reason then to assume that there is a \( \text{CL}^{\text{mass}} \) in mass nominal expressions (and see already (8b)). Thus the structure of *much salt* is as in (28).

\[
\begin{array}{c}
\text{DP} \\
\downarrow \\
\text{D} \quad \#P \\
\downarrow \\
\langle e \rangle_\delta \\
\downarrow \\
\text{much} \\
\downarrow \\
\langle e \rangle_\epsilon \\
\downarrow \\
\text{L} \rightarrow \text{N} \\
\downarrow \\
\text{salt}
\end{array}
\]

Consider now singular nominal expressions, such as *a cat* or *one cat*. Singularity is not overtly marked on listemes in English. Given our conclusion that bare nouns default to mass in the absence of dividing structure, something must assign range to \( \langle e \rangle_{\text{inv}} \) in singular structures, given that they are count. Several possibilities come to mind for English. One could assume that singular nouns in English support an abstract singular head feature, presumably the head of a classifier phrase, and that the configuration ‘stem.sc’ quite simply fails to return an output which is phonologically distinct from that returned by a bare stem. If this is indeed the case, then the derivation of singulars parallels that of plurals, outlined above, with the sole difference being the degree of phonological marking associated with the head feature. Within such an approach the indefinite article *a* could be analysed either as a cardinal, on a par with *one* or *three*, that is, heading a #P, or alternatively, as an indefinite D. Such an approach, however, has at least one obvious disadvantage: it fails to explain why singular nouns in English require an article (be it a number or a determiner), but plurals do not.

\(^{19}\) Should it be the case that all N movement in English is covert, including N to CL, this would require a convention which allows the combination *cat* (\( \langle \text{div} \rangle \)) to be phonologically realized in the position of the relevant copy. I set aside here as largely orthogonal the choice between these two options, only noting that if N to CL is overt in English, it would require an accompanying assumption that adjectives may never project between CL and NP. See Chapter 3 at n. 10 for some relevant comments.
In addition, as we will show below, rejecting the idea that bare stems in English are ever singular actually leads to considerable explanatory advantage.\textsuperscript{20}

The other obvious option is to assume that singular interpretation is derived in English through the mediation of the indefinite singular article \textit{a}. However, in addition to assuming that the indefinite article could function as a classifier of sorts, in portioning out mass, \textit{a} would also have to be assumed to be a quantity head, assigning range to \langle e \rangle_2. We note that even if \textit{a} does have a classifier function, morphologically it falls into a class with other English determiners, in being an f-morph, rather than with plural inflection, an abstract head feature. Further, the affinity between it and other quantity expressions, such as cardinals and quantifiers, is semantically obvious and cannot be overlooked. In effect, then, we are suggesting here that while plural marking does not accomplish any quantifying function and is restricted to the division of mass (and see Section 4.4 for specific semantic argumentation), the indefinite article is a true counter. As a result, an \langle e \rangle_{\text{DIV}} open value is, by assumption, assigned range quite differently by plural marking and by \textit{a}. While in the former case, plurality divides mass but fails to count the resulting divisions, for singulars, the dividing function and the counting function are one and the same, strongly suggesting that the indefinite article \textit{a} is a species of the \#P projection, in addition to being a species of the CL\textsuperscript{max} projection.

Suppose we assume that \textit{a} (as well as \textit{one}) assigns range simultaneously to \langle e \rangle_{\text{DIV}} and to \langle e \rangle_\textit{N}, in essence establishing an identity between \langle e \rangle_{\text{DIV}} and \langle e \rangle_\textit{N}. More specifically, suppose we assume that the open values \langle e \rangle_{\text{DIV}} and \langle e \rangle_\textit{N} in this case are fused (alternatively, coindexed in some fashion) to give rise to complex open values of the form \langle e \rangle_{\text{DIV,N}}, \langle e \rangle_{\text{DIV},\textit{N}}.\textsuperscript{21} In fact, to the extent that the fundamental meaning of \textit{a}, or the cardinal \textit{one}, does involve both a division and a counting function over that division, the semantics of singulars \textit{must} be associated with this conjunction of properties. Other cardinals in English, (as well as plural-selecting quantifiers) are pure counters, which cannot perform

\textsuperscript{20} Additional evidence that English bare stems are never singular comes from a contrastive comparison of the singular in English and the singular in Hebrew, where, I will argue, the bare stem may be singular in some contexts. I return to this issue in Chapter 7, Section 7.1.

\textsuperscript{21} At least some of the well-known differences between the distribution of \textit{one} and \textit{a} would derive from the fact that the latter, but not the former, is a phonological clitic—an obligatory head—explaining the ungrammaticality of e.g. (ia), compared with the grammaticality of (ib):

(i) a. *Kim has a cat and I have a too.
   b. Kim has a cat and I have one too.

I return to other differences between \textit{one} and \textit{a}, notably, the obligatory indefiniteness of the latter, but not the former, in Chapter 6, Section 6.2. Here, and elsewhere, we set aside the (pluralizable) pronominal use of \textit{one}, as in (ii):

(ii) Kim has a feral cat and I have three/many domesticated ones.
a dividing function. That latter function is restricted to plural marking, which creates divisions of mass, subsequently counted by cardinals. It is precisely for that reason that (29a–f) are ungrammatical:

(29) a. *two meat/boy
    b. *several meat/boy
    c. *many meat/boy
    d. *a few meat/boy
    e. *both meat/boy

The ungrammaticality of (29) can be readily accounted for if we assume that bare stems in English are never singular, and further, that the cardinals and quantifiers in (29), and in general those determiners which require plural restriction, are pure counters and never dividers. They cannot combine with a bare stem, such as boy or meat, because such bare stems are mass unless divided by plural marking, and mass cannot be counted. In turn, the ungrammaticality of the co-occurrence of plural determiners (e.g. several) with the indefinite article (*several a boy) stems from the fact that although a boy is rendered a division by a assigning range to ⟨e⟩DIV, just like plural inflection assigns range to ⟨e⟩DIV in the case of boys, a boy, but not boys, is counted already by a, which, assigning range to ⟨e⟩, is in complementary distribution with other counters, including several. Finally, it is precisely because for singulars the dividing and the counting function are identified that it is possible for a bare stem which is not marked as singular to nevertheless receive a singular interpretation in the context of one or a.

Put differently, for singulars, but not for plurals, the dividing function and the counting function can never be separated.22

It is worthwhile noting here that contrary to most accounts of cardinals, we take counters to be counters, and not multipliers, in that we do not assume counters to be operations on singulars, but rather, operations which function on previously established divisions. At least from the perspective of simple arithmetic, a singular cannot be counted, it can only be multiplied. Thus, for example, cardinals, in a theory which assumes that pluralities are sets of singulars, are in actuality multipliers of singulars. Here, it is claimed that cardinals are a counting function on previously introduced divisions, and more specifically, that they

22 An interesting case, noted to me by B. Schein and by B. Ritter, is in (i), where the dividing function for the singular (by assumption a) and the counting function (many) are separated:

(i) many a boy

Noting the unique status of many in this respect (*few a boy, *several a boy, *some a boy, *no a boy), we speculate that many a functions, in this case, as a complex divider counter, rather akin in its structure to each, giving rise to the structure in (ii):

(ii) \[ \left[ \text{DP} \{ \text{many a} \ (e)_{\text{DIV}} \} \right. \left. \text{CL} = \text{many a} \ (e)_{\text{DIV}} \} \{\text{boy} \} \} \]
choose compatible divisional structures with the requisite number of cells from among the infinite ones introduced by the division function, as I will outline below. Crucially, this means that the existence of a singular atom is not necessary for the emergence of plural marking.

In turn, if indeed cardinals in particular, and quantifiers which select plurals in general, are countable rather than multipliers in this specific sense, we must now assume that quantifiers such as every and each, which take a non-plural restriction but which nevertheless return an interpretation that is compatible with non-singular, are capable of accomplishing both division and quantification, or counting. Within the system presented here, then, we must assume that quantifiers such as every and each, just like singulars, involve the assignment of range by the same f-morph to both $\langle \epsilon \rangle^{{\text{DIV}}} \text{ and } \langle \epsilon \rangle^{{\text{a}}}$, or put differently, to the complex open values $\langle \epsilon \rangle^{{\text{DIV}}} \text{ and } \langle \epsilon \rangle^{{\text{DIV(a)}}}$, much like a and one. On the other hand, cardinals and other plural-selecting quantifiers assign range only to $\langle \epsilon \rangle^{{\text{a}}}$.

To make the account more concrete, syntactically, we will assume that the assignment of a double range by a single morpheme, be it a or each, can be accomplished through the successive merger of each or every, or a or one, with the two distinct occurrences of the complex open value, $\langle \epsilon \rangle^{{\text{DIV}}} \text{ and } \langle \epsilon \rangle^{{\text{DIV(a)}}}$, the first projecting $\text{CL}^\text{max}$, and the second projecting $\#P$. The proposed structures for plural and singular taking quantifiers, as well as for the indefinite article, are given in (30a–c).

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23 In fact, we are guilty here of abstracting away from the distinctions between each and every, characterizing accurately the distribution of each, but not fully that of every. Cf. (i)–(ii):

(i) a. Every three students shared a pizza.
   b. Every few students shared a pizza.

(ii) a. every three weeks
   b. every few weeks

The occurrence of two quantifiers in (i) and (ii) and the distributive function which every can have over the quantifier embedded under it suggest that the distributive function of every cannot be fully reduced to its occurrence in $\text{CL}$ and its assignment of range to $\langle \epsilon \rangle^{{\text{DIV}}} \text{ or, like each, it would be predicted to occur solely with bare stems, as indeed each does. One particular way to go would be to relax what otherwise appears true of all other determiners (including proper names and the, as I will argue in Chapter 6, Sections 6.1 and 6.2), namely, the requirement that all range assigners to $\langle \epsilon \rangle^{{\text{a}}}$ merge no higher than $\langle \epsilon \rangle$, and move to D. I set this issue aside here, hoping that some future research may shed light on it. For a meticulous description of the distinct properties of each and every, couched within an agreement-type system (i.e. syntactic structures which agree with the inherent semantics of their heads), see Beighelli and Stowell (1997).

24 Another possible execution presents itself in connection with the assignment of range to $\langle \epsilon \rangle^{{\text{DIV}}} \text{ and } \langle \epsilon \rangle^{{\text{DIV(a)}}}$ by portmanteau morphs. One could suggest that for singulars and portmanteau morphs, $\#P$ and $\text{CL}^\text{max}$ are fused, in the sense of Giorgi and Pianesi (1997), giving rise to a single maximal projection which dominates a single open value, as in (i):

(i) $[\#P \ldots [\#P, \text{ CL}^\text{max}] \\ one/each \langle \epsilon \rangle^{{\text{DIV}}} \langle \epsilon \rangle^{{\text{DIV(a)}}} \langle \epsilon \rangle^{{\text{DIV}}} \langle \epsilon \rangle^{{\text{DIV(a)}}}]$]

The choice among the structures in (30a, c) and the structure in (i) must ultimately rest on several important factors. One concerns architectural considerations which may exclude phrasal fusion but
(30) a. The indefinite article, cardinal one (output: a boy, one meat):
   \[ DP [\_ \_ \_ one/a (e)_a|DIV] \_ [CL_{\max} \_ \_ \_ one/a (e)_a|DIV(e)] [\_ \_ \_ NP meat/boy)]\]

b. Plural-taking quantifiers, cardinals other than one (including zero) (output: three boys, several meats)
   \[ DP [\_ \_ \_ three/several (e)_a | CL_{\max} meat.(div)/boy.(div) (e)_DIV \_ \_ \_ [\_ \_ \_ NP meat/boy)]\]

c. Singular-taking quantifiers (output: every boy, each meat):
   \[ DP [\_ \_ \_ every/each (e)_a|DIV] \_ [CL_{\max} every/each (e)_a|DIV(e)] [\_ \_ \_ NP meat/boy)]\]

Fundamentally, this proposal amounts to the suggestion that a and one, alongside quantifiers such as every and each, are portmanteau morphemes, assigning range to more than one functional open value. That universal distributors are indeed portmanteau morphemes combining a universal function with a distributive function has been specifically suggested by Gil (1995). Adopting this important insight, I will nevertheless disagree with Gil on one important point. Gil claims that the portmanteau nature of quantifiers such as every and each is crucially linked to their universal nature. However, I propose here that the portmanteau nature of every and each, assigning range both to (e)_{DIV} and to (e)_a, is shared by the singular range assigners a and one, as well as by the divider-counter cardinals attested in Hungarian, Turkish, and Armenian (see below).

The account proposed here postulates an inherent asymmetry between the behaviour of the cardinal one and the behaviour of other cardinals, in that one is a portmanteau divider/counter, while all other cardinals are solely counters. Evidence for the system proposed here, including the asymmetry between one and other cardinals, is provided directly by the behaviour of the cardinal zero, especially when contrasted with that of the negative article no:

allow an open value fusion (or the other way around). Or the choice may be an empirical matter, in that evidence may be available for the projection of two, rather than one, phrases intervening between NP and DP for both singulars and plurals. Pending evidence that the phrasal structure of (quantity) plurals is somehow more complex than that of singulars, I will opt for equal phrasal complexity, and for the fusion of open values rather than phrasal nodes. The ultimate choice, however, remains largely outside the domain of this study, and is thus set aside here. We return to some relevant matters concerning the structure and interpretation of singulars in Chinese (Section 6.4) and in Hebrew (Chapter 5, Section 5.2, and Chapter 7).

It is worthwhile noting that the preference of phrasal fusion, i.e. a single structural node with a double value, over two structural nodes assigned value by a single morph (e.g. through successive head movement) is largely motivated for Giorgi and Pianesi by the assumption that there exists an isomorphism between inflective morphology and the syntactic tree. As only one (portmanteau) morpheme is implicated here, within isomorphic morpho-syntactic approaches, this would mandate a single functional projection, and indeed, the assumption that (quantity) plurals are syntactically more complex than either singulars or expressions with f-morphs such as each. In this work, however, I have explicitly rejected the claim that there exists an isomorphism between syntactic structure and inflection (see Chapter 2, Section 2.2, as well as Boror, forthcoming, for more discussion). There is thus no particular reason here
(31) a. *zero boy (with singular reading for boy)
b. zero boys
c. zero meat\(^{25}\)

(32) a. no boy
b. no boys
c. no meat

Given the grammaticality of (32a), it is not possible to attribute the ungrammaticality of (31a) to logical or conceptual incoherence. Rather, it appears, the negative quantifier may (but need not) have a dividing function (and see directly below). Not so for zero, being a species of (non-dividing) counter, like its paradigm-mates the cardinals. To obtain a count reading, then, a dividing structure must be projected—that is, a CL\(^{\text{max}}\)—and a division operator must be provided. If indeed English bare N-stems are never singular, such a division can be accomplished through plural marking, or alternatively, through the projection of divider/counters such as a, one, each, and every. As other cardinals or quantifiers are not dividers, ‘plural’ inflection is obligatory. No interpretational problem emerges, of course, as ‘plural’ inflection is not in actuality plural, nor does it imply the existence of singulars, but rather it is divisional in nature. In turn, zero can have a mass restriction precisely because, although it is grammatically a counter, its semantics is compatible with the absence of divisions altogether. The possible occurrence of zero with (undivided) mass nouns follows directly. We note that in fact any decimalized number in English, including fractions less than 1 and 1.0, must be accompanied by ‘plural’ inflection, making the assumption that the inflection in question is indeed semantically plural extremely questionable, and the assumption that it is divisional extremely plausible.\(^{26}\)

(33) 0.2 apples/*apple
     0.1 apples/*apple
     1.5 apples/*apple
     1.0 apples/*apple

The properties of zero also provide evidence for the fact that the indefinite article cannot be viewed as a pure singular marker, associated with CL\(^{\text{max}}\), and to postulate a different phrasal structure for plurals and singulare, should empirical evidence turn out to favour an equally complex structure for both.

\(^{25}\) It appears that for at least some speakers, the occurrence of zero with a mass restriction (essentially with the meaning of no) is restricted (and hence ??zero meat, but zero tolerance).

\(^{26}\) The fact is noted in Krifka (1989), who suggests that expressions such as zero or 1.0 are morphologically specified to trigger plural agreement, presumably semantically vacuous here. Krifka further notes that any amount, including amounts smaller than 1, triggers plural agreement in English, although the consequences for the analysis of (bare) plurality and plural inflection are not pursued further.
assigning a singular range to \( (e)_{CNY} \), but not to \( (e)_{S} \). If that were the case, we would expect the grammaticality of (34), contrary to fact. If, on the other hand, "zero" and "a" are both grammatical counters, their complementary distribution follows directly:

(34)  
\[* \text{zero a cat} \]

The pure counter function of English cardinals could not be assumed to be a universal, just as the dividing properties of universal quantifiers could not be assumed to be universal (although one could presumably argue that the semantics of each does include a division, by definition). As is well known, not all universal quantification requires a singular restriction. To the extent that we have a universal restriction without any dividing properties, we expect it to behave just like zero. Specifically, a mass restriction in these cases would require no marking, but a count restriction is expected to emerge exclusively in the presence of an overt divider—that is, plural inflection. This prediction is directly confirmed by the behaviour of the universal quantifier all:

(35)  
a.  
all meat  
b.  
all boys  
c.  
* all boy (under plausible singular reading for boy)

In turn, in some languages, cardinals do appear to have a dividing function. In Hungarian, where plural inflection does exist, it nevertheless never co-occurs with cardinals or quantifiers. Thus we have the following picture (similar facts hold for Turkish, as reported e.g. in Ortman 2000):

(36)  
a.  
kalap(-ot)  
the hat(-ACC)  
b.  
egy kalap(-ot)  
a hat(-ACC)

\[* \] A similar rationale applies, of course, to the ungrammaticality of one a cat or three a cat. We note, interestingly, the grammaticality of half an apple which does seem to involve the existence of a halved singular, especially when compared with the ungrammaticality of half apple with a count interpretation. The existence of such a singular interpretation is hardly surprising, given the fact that we have here an apple, by assumption a singular. We must, however, conclude that as an is assigning range to \( (e)_{S} \), half may not be assigning range to \( (e)_{S} \), and must be a separate head, making half an apple a partitive or a measure phrase of sorts. We further note that the optional absence of of is not possible for any other portion, and hence third 'of' an apple; quarter 'of' an apple; tenth 'of' an apple, etc. We return briefly to apple portions when we discuss the determiner system of Hebrew, in Chapter 7, Section 7.2.

Some care needs to be taken here to distinguish the referential reading of an apple in half an apple from the modification reading that might be associated with apple in half apple (as in this pie is half apple and half pear), and which occurs with a non-plural restriction. This reading, I believe, involves a measure phrase in which N is a modifier, rather than a full referential DP, and is thus largely orthogonal to the subject matter of the text discussion.
A simple account is available for the Hungarian paradigm within our approach. Suppose Hungarian cardinals, on a par with every and each, are both dividers and counters. On a par with the structure proposed for each and every, then, Hungarian cardinals merge with \(\langle c\rangle_{\text{DIV}}\), and are subsequently raised and adjoined to \(\langle e\rangle_s\). The resulting structure is as in (38). On the other hand, in the absence of cardinal dividers, \(\langle c\rangle_{\text{DIV}}\) is assigned range by the plural inflection, on a par with English:

(38) a. Dividing cardinals
   \[
   [\text{exp} \ [\text{top} \ \langle c\rangle_{\text{DIV}}] \ [\text{cl} \ \langle c\rangle_{\text{DIV}}] \ [\text{np} \ \langle c\rangle_{\text{DIV}}]]
   \]
   b. Plural
   \[
   [\text{exp} \ [\text{top} \ \langle e\rangle] \ [\text{cl} \ \langle c\rangle_{\text{DIV}}] \ [\text{np} \ \langle c\rangle_{\text{DIV}}]]
   \]

The reader may now recall that in Armenian, where both classifiers and plural marking exist, but where they can never co-occur, it was also possible for plurality to emerge, in the context of cardinals, without either plural marking or classifiers (relevant paradigm repeated here as (39)):

(39) a. Cardinal, no classifier, no plural
   Yergu hovanoc uni-m.
   two umbrella have-1sg
   ‘I have two umbrellas.’
b. **Cardinal, classifier, no plural**
   Yergu hovanoc uni-m.
   two cl. umbrella have-1sg
   ‘I have two umbrellas.’

c. **Cardinal, no classifier, plural**
   Yergu hovanoc-ner unim.
   two umbrella-pl have-1sg
   ‘I have two umbrellas.’

d. **Cardinal, classifier, plural**
   *Yergu had hovanoc-ner unim.
   two cl. umbrella-pl have-1sg
   ‘I have two umbrellas.’

We therefore conclude that in Armenian, all three modes of assigning range to \( \langle e \rangle_{DIV} \) discussed thus far exist side by side: \( \langle e \rangle_{DIV} \) may be assigned range by an abstract head feature giving rise to ‘plural’ inflection ((39c)); \( \langle e \rangle_{DIV} \) may be assigned range by an f-morph, giving rise to an independent classifier, to the left of the stem ((39b)); and finally, \( \langle e \rangle_{DIV} \), in conjunction with \( \langle e \rangle_{s} \), may be assigned range by (optionally) dividing cardinals, requiring, subsequently, neither a classifier nor plural marking, as in (39a).\(^28\)

Consider the emerging typology of quantifier restrictions, assuming them to vary along two dimensions: ±counter and ±divider. We note, for the sake of clarity, that while counters assign range to \( \langle e \rangle_{s} \), they may only assign range to it if range has already been assigned to \( \langle e \rangle_{DIV} \). \( \langle e \rangle_{s} \) can be assigned value in the absence of \( \langle e \rangle_{DIV} \), of course, but in this case the resulting reading is that of quantified mass, and not of counted divisions.

I return in Chapter 6, Section 6.1, to a detailed discussion of the properties of the definite article the. Concerning other aspects of the table in (40), note that we must assume that quantifiers such as some, any, and no (the latter plausibly not + any) must be specified as ±dividers in order to give rise to the emergence

---

\(^{28}\) It is predicted directly by the system proposed here that a range assigned by an f-morph cannot be embedded under a range assigned by a head feature and supported by an L-head. It thus follows that a head feature merging above an f-morph cannot be supported by an L-head, as that L-head cannot move over the f-morph to support it. The fact that divider cardinals are f-morphs in Hungarian, but the plural marker is the spell-out of a head feature, is entirely consistent with this picture. For a detailed discussion of the morphological predictions here in the context of the structure of Hebrew DPs, where definiteness, a high open value, is a head feature, see Chapter 7, Section 7.2.1. We leave open here the possibility that f-morphs themselves may support head features merged above them. While such a possibility does not appear to be instantiated by any of the structures considered in this work, its compatibility with UG may not be excluded at this point in a principled manner, and at first sight, it is an attractive possibility for the instantiation of various tense head features on auxiliaries, rather than on a verbal L-head. See Chapter 2 at n. 3 for some discussion.


(40) A typology of English determiners and the mass–count distinction

<table>
<thead>
<tr>
<th></th>
<th>± Count</th>
<th>± Dividing</th>
<th>Syntactic realization</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. <em>little, much</em></td>
<td>-</td>
<td>N/A</td>
<td>Cl\textsuperscript{max} not projected</td>
</tr>
<tr>
<td>b. <em>every, each,</em></td>
<td>+</td>
<td>+</td>
<td>both (c)\textsubscript{rev} and (c)\textsubscript{s}, assigned range by each, every</td>
</tr>
<tr>
<td>c. <em>a, one</em></td>
<td>+</td>
<td>+</td>
<td>both (c)\textsubscript{rev} and (c)\textsubscript{s}, assigned range by a, one</td>
</tr>
<tr>
<td>d. i. <em>several, many, few, a few, both</em></td>
<td>+</td>
<td>-</td>
<td>(c)\textsubscript{rev} assigned range by head feature (div), triggering spell-out as 'plural' marking on a moved L-stem</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>ii. Cl\textsuperscript{max} not projected (identical to (40a))</td>
</tr>
<tr>
<td>e. <em>all, a lot of, plenty, more, most</em></td>
<td>unspecified</td>
<td>-</td>
<td>i. (c)\textsubscript{rev} assigned range by the head feature (div) (identical to (40d))</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>ii. Cl\textsuperscript{max} not projected (identical to (40a))</td>
</tr>
<tr>
<td>f. Hungarian cardinals</td>
<td>+</td>
<td>+</td>
<td>both (c)\textsubscript{rev} and (c)\textsubscript{s}, assigned range by cardinals</td>
</tr>
<tr>
<td>g. <em>some-1, any-1, no-1</em></td>
<td>unspecified</td>
<td>-</td>
<td>identical to (40e)</td>
</tr>
<tr>
<td>h. <em>some-2, any-2, no-2</em></td>
<td>+</td>
<td>+</td>
<td>both (c)\textsubscript{rev} and (c)\textsubscript{s}, assigned range by any, some, no</td>
</tr>
<tr>
<td>i. <em>the</em> (a discourse anaphor)</td>
<td>(N/A)</td>
<td>(N/A)</td>
<td>(N/A)</td>
</tr>
</tbody>
</table>

of a class of determiners that can range over singulars, on the one hand, and plurals and mass, on the other (as will become obvious, the is in fact devoid of any properties of its own, and hence does not actually cluster with any of the determiners in (40)). It might be worthwhile to note, however, that to the extent that a natural class combining mass nouns and plurals emerges from the picture in (40) (so much so that the existence of unrestricted determiners forces us to assume that they are ambiguous), natural class mostly consists of being distinct from the singular. The singular, by definition, makes reference to a well-defined quantity. Not so for plural and mass nouns, both requiring a distinct #P for reference to a well-defined quantity to emerge. Since for 'plural's Cl\textsuperscript{max} projects while for mass nouns it does not, the common denominator, it emerges, must be stated at the #P level, which for singulars is assigned range by definition. As we
will see directly, it is precisely the absence of such an (overt) #P node that will give us the common behaviour of determinerless mass nouns and bare plurals, often observed and commented on. Note that singling out the singular, rather than looking for a common denominator between mass and plural, not only accounts for the existence of determiners which select both mass and plural, but not singular, but also accounts for the absence of any determiners which select singualrs and plurals, but not mass, a somewhat surprising gap if plurals and singulars share the property of count, and if plurals are functions from sin-
gulars. Finally, note that in many languages, [−divider] determiners, other than cardinals, are not specified with respect to their counting function, in effect allowing the same determiner to occur with mass and plural, but excluding the singular, thereby lending strong support to the typology in (40).  

4.4 Creating Individuals

An important and atypical aspect of our analysis is, recall, the claim that the plural is not a function from singualrs. To the extent that there are indeed indi-
vidual cats understood to exist from expressions such as three cats, we must account for their existence through the interaction of the division function (marked as the plural on cats) and the counting function three. Of course, common wisdom has it that the denotation of an expression such as cats consists of individual cats, but our claim here is that the grammar (as distinct from world knowledge) gives us no such information. Consider, in this context, the well-
known interpretation of the bare plurals in (41):

\[(41) \begin{align*}
\text{a. } & \text{Kim ate apples this afternoon} \quad \text{(for an hour) (*in an hour).} \\
\text{b. } & \text{Pat built houses (all summer)} \quad (* \text{in two months).} \\
\text{c. } & \text{My kid sister drew circles (all morning)} \quad (* \text{in half an hour).}
\end{align*}\]

As is well known, the interpretation of the bare plurals in (41) is consistent with an interpretation whereby no single complete apple has been eaten (but, say,

\[29\] The system presented here is conceptually different from many which seek to characterize the common denominator between mass and count, primarily in that it puts forth an analysis in which it is the singular which is special, and mass and plurals have in common the fact that they are different from singualrs in not being inherently quantified. To the extent that the system presented here captures correlations between the behaviour of mass nouns and plurals without resorting to the lexical marking of mass nouns as plurals, it provides further evidence for the absence of such marking, already noted as problematic in the discussion above.

\[30\] I am very grateful to Denis Delfitto for illuminating discussions of the material in this section.

\[31\] Special care is taken in (44) to avoid generic or habitual predicates, which, as is well known, are particularly susceptible to a semantic incorporation reading, in which the direct object is, in effect, a modifier of the predicate and no commitment is necessary to the existence of particular apples, houses, or circles implicated in the relevant actions. Native speakers do judge the sentences in (42a–c) to be false if there exist no house divisions, apple divisions, or circle divisions such that the actions in (42a–c) have applied to them.
a number of chunks from assorted apples, perhaps no more than one), no whole house was built (by Pat or anybody else), and my kid sister’s drawing gave rise to assorted arcs and incomplete circles, none of which actually qualifies as a circle. It is further well known that (41a–c), with bare plurals, fail to give rise to a telic interpretation in contexts where the corresponding examples (43a–c) with non-bare plurals, (optionally) do:

(42)  
  a. Kim ate three apples (in an hour).
  b. Pat built more than three houses (in two months).
  c. My kid sister drew some circles (in half an hour).

Finally, as is also well known, bare plurals share with bare mass nouns both the undetermined nature of the quantity involved in utterances such as (43), and the failure of telicity to emerge, when similarly contrasted with non-bare mass nouns, as in (44):

(43)  
  a. Kim ate meat (*in an hour).
  b. Pat built furniture (*in two months).
  c. Robin sifted sand (*in half an hour).

(44)  
  a. Kim ate more than enough meat (in an hour).
  b. Pat built most furniture (in two months).
  c. Robin sifted (too) much sand (in half an hour).

Within join semi-lattice type approaches to plurality and mass interpretation, the affinity between bare plurals and mass nouns is attributed to the fact that the interpretation of plurals is vague in the following sense. Suppose the denotation of plurals consists of all or any subsets of singularities, as the diagram in (45) shows:

(45)  
\[
\begin{array}{c}
\{a, b, c, d, \ldots \} \\
\{a, b, c\} \quad \{a, b, d\} \quad \{b, c, d\} \quad \{a, c, d\} \quad \ldots \\
\{a, b\} \quad \{a, c\} \quad \{a, d\} \quad \{b, c\} \quad \{b, d\} \quad \{c, d\} \quad \ldots \\
\end{array}
\]

\[a \quad b \quad c \quad d \quad \ldots = \text{Atoms}\]

Suppose now that we talk about circles. The number of atoms implicated in circles remains entirely vague, as it can consist of any of the sets above the atom line in (45). Mass nouns such as sand suffer from similar vagueness, as the actual quantities of sand involved are under-determined by any utterance. It is on that level, then, that the commonality of mass nouns and bare plurals can be defined so as to account for their similar properties.²⁹

²⁹ Chierchia (1998b), in claiming that mass nouns are lexically marked as plural, captures the differences between mass nouns and plurals by suggesting that the lexical plural marking makes individual
There are, however, a number of problems with the join semi-lattice approach, not the least of which being that the interpretation of the bare plurals in (41), as well as others, does not actually consist of any subset of (well-defined) singulars. Specifically, if Kim ate a portion (potentially of a different size) from a number of apples, although we are justified in saying that she ate apples, the set of elements that she ate does not consist of singular apples, but rather, of apple portions. More devastatingly, we already noted that both zero apples and 0.5 apples do not presuppose the existence of singulars, although they occur with plural marking, and hence are not well-defined sets within the join semi-lattice representation in (45).

An additional set of problems, often pointed out in conjunction with telicity, is associated specifically with the quantification in (42b–c). Although an expression such as more than three narrows somewhat the possible interpretation of plurals (e.g. more than three cuts off the bottom two non-atomic lines in (45)), one would be somewhat hard pressed to suggest that this narrowing down suffices to make the vagueness of the plural interpretation disappear, so as to allow for the appropriate contrast to be drawn between the bare plural apples and more than three apples. Likewise for some, which potentially refers to any of the non-atomic sets in (45), but nevertheless triggers telic interpretation, unlike a bare plural.  

Viewed differently, however, note that although expressions such as more than three circles or some circles do not resolve the vagueness associated with the interpretation of bare plurals, they do have an interpretation which is radically different from that of bare plurals. If Kim drew more than three circles, then there are at least three individual circles such that Kim drew them. The truth conditions of more than three circles could not in fact be computed without assuming individual circles. Likewise, if Kim drew some circles, then there are at least two individual circles such that Kim drew them, and the sentence cannot be true if there is only an assortment of incomplete arcs on the page, a situation which would render (41c) false. In each case, the computation of meaning does appear to presupposing individuals, in a way which the interpretation of bare plurals does not. We submit, then, that individuals cannot be created by the dividing function—that is, by the plural inflection—as the plural inflection can occur without entailing such individuals. Rather, individuals within a plural set emerge as a result of the assignment of range to (e), by a counter. Intuitively,
then, what we are proposing is that a counting function such as *three* picks three individuals from among the divisions introduced by the ⟨e⟩DINV range assignment.

Consider a specific execution of the creation of individuals by the counting function suggested to me by Barry Schein (pers. comm.). According to this execution, a divisional function (which is to say, the assignment of range to ⟨e⟩DINV) involves the superimposition, on a mass denotation, of an infinite set of webs, or reticules (including, potentially, a reticule without any divisions, reticules without complete cells, or reticules which create cells that do not correspond to a canonical singular). The # counting function (which is to say, the assignment of range to ⟨e⟩, by a counter) involves the selection, from among these reticules, of one which matches the properties of the specific #-determiner. For a cardinal such as *three*, it involves the selection of a reticule with three cells, to which a uniform extension, presumably that associated with the conceptual meaning of the relevant N, can be applied. For *zero*, on the other hand, it will involve the selection of a reticule without any (complete) cells. For *more than three*, all reticules which include at least three complete cells will be selected, etc. For 0.5, a reticule will be selected which involves a portion of the mass which does not correspond to a canonical singular. Of special interest is *some*-1 (cf. (40g)), where, I suggest, the # function will be equivalent to that of any unspecified number bigger than one. *Some* could therefore choose any (or all) reticules in which there are at least two cell divisions, thereby giving rise to some unspecified number of individuals, but individuals nevertheless.

Interestingly, in Romance languages, in which bare plurals exist alongside plurals with indefinite (plural) articles, we find the contrast in (46):

     Juana ate apples (*in half an hour/for half an hour)  

b. Juana comió unas manzanas (en media hora/durante media hora).
     Juana ate Art.pl. apples (in half an hour/for half an hour)

We note that there is no sense in which the quantity of *manzanas*, *apples*, in (46a) could possibly be assumed to be less well defined from that in (46b). The difference between (46a) and (46b), we submit, is in the function of the plural indefinite article. We propose that it is a counter, although with cardinality undetermined, and that as such it performs a similar function to that of *some* or *several*. Syntactically, it assigns range to ⟨e⟩. Semantically, it selects those reticules in which there are at least two cell divisions, thereby giving rise, just like *some*, to an unspecified number of individuals, but individuals nevertheless.
The syntactic generalization which emerges is that whenever \( (e)_a \) is assigned range, telicity may be licensed by the emerging DP, a generalization quite akin to that put forth by Verkuyt as early as 1972, and in much subsequent writing. The question, however, is why it is that the existence of individuals, as formed by the assignment of range to \( (e)_a \) (some apples, for instance), should give rise to telicity, while the absence of individuals (e.g., in apples) should fail to do so. To see what effect the ‘formation of individuals’ may have, it might be worthwhile to consider some of the formal treatments of DPs and telicity, reviewing some of their merits and demerits. Such a review in fact indicates that the claim that apples does not consist of singular apples, but more than three apples does, can resolve a number of rather tenacious problems for explaining the interaction between telicity and DP structure. Consider again the determiners in (42), which give rise (optionally) to telicity, when compared with the absence of telicity with bare plurals in (41). Krifka (1989, 1992, 1998), in attempting to characterize the class of DPs which give rise to a telic interpretation, proposes that such DPs must be quantized. Quantized, in turn, contrasts with cumulative, a property which is attributed to bare plurals and bare mass nouns, and which gives rise to atelicity. The definitions are given in (47):

\begin{align*}
(47) & \quad \text{a. Cumulative (Krifka 1998)} \\
& \forall X \subseteq U \{ \text{CUM}_1(X) \leftrightarrow \exists x, y \{ X(x) \land X(y) \land \neg x = y \} \land \\
& \quad \forall x, y \{ X(x) \land X(y) \rightarrow X(x \oplus y) \} \}
\end{align*}

(X is cumulative iff there exist \( y, x \) with the property \( X \) (and \( x \) distinct from \( y \)) such that for all \( x \) and \( y \), if \( x, y \) have the property \( X \), then \( X \) is a property of the sum of \( x \) and \( y \))

\begin{align*}
(47) & \quad \text{b. Quantized (Krifka 1998)} \\
& \forall X \subseteq U \{ \text{QUA}_1(X) \leftrightarrow \forall x, y \{ X(x) \land X(y) \rightarrow \neg y < x \} \}
\end{align*}

(X is quantized iff for all \( x, y \) with the property \( X, y \) is not a proper part of \( x \))

Bare plurals and bare mass nouns are clearly cumulative in the required sense (apples plus apples gives apples; meat plus meat gives meat), as well as non-quantized, given the fact that it is certainly not the case that all subparts of meat are not meat, or that all subparts of apples are not apples. Likewise, cardinals are clearly quantized, in that no part of three apples is three apples. As often observed, however, some and more than three trigger telicity, although by the definitions in (47) they are cumulative rather than quantized.\(^{34}\)

\(^{34}\) Krifka (1998), in attempting to address these problems, proposes that quantifiers such as more than three and some scope outside the domain of the time-measure phrase in time, thereby giving rise to an interpretation of a fixed amount (and see Schein 2002, for a similar assumption reached from a different perspective). There are, however, a number of problems with this assumption. The reader is referred to
A slightly different approach is put forth in Kiparsky (1998). Kiparsky suggests that the key notion for the emergence of quantity interpretation (boundedness, in his terms; see Volume II, Chapter 5, Section 5.3, for the relevant discussion) involves the notions divisiveness, cumulativity, and diversity, as defined in (48).\footnote{The notion divisible reference, as relevant for the definition of homogeneity and quantity, is distinct from the notion dividing, which is associated with plural marking, as well as with the function of count quantifiers, singulars, and universal distributors. Thus, by assumption, bare plurals are both divided and divisive, but bare mass expressions are divisive, but not divided.}

(48) a. $P$ is divisive iff $\forall x \left[ P(x) \land \neg \text{atom}(X) \rightarrow \exists y \left[ y \subset x \land P(y) \right] \right]$  
(P is divisive if and only if for all $x$ with property $P$, where $x$ is non-atomic, there is a $y$, proper subset of $x$ with the property $P$)

b. $P$ is cumulative iff $\forall x \left[ P(x) \land \neg \text{sup}(x, P) \rightarrow \exists y \left[ y \subset y \land P(y) \right] \right]$  
(P is cumulative if and only if for all $x$ with property $P$, where $x$ is not the maximal element with property $P$, there is a $y$, proper superset of $x$ with the property $P$)

c. $P$ is diverse iff $\forall x \forall y \left[ P(x) \land P(y) \land x \neq y \rightarrow \neg x \subset y \land \neg y \subset x \right]$  
(P is diverse if and only if for all $x$ with the property $P$ and all $y$ with the property $P$, and $x$ distinct from $y$, $x$ is not a proper subset of $y$ and $y$ is not a proper subset of $x$)

(49) A predicate $P$ is unbounded ($-B$) iff it is divisive and cumulative and not diverse.

Cumulative reference requires in essence that every proper superset of $x$ with the denotation $P$ be within the denotation of $P$. Divisive reference requires in essence the existence of some subset of $x$ with the denotation $P$ to be within the denotation of $P$. In order for a bounded reading to emerge, either divisive reference or cumulative reference must fail (or alternatively, the predicate must be diverse).

The insight of Kiparsky's approach that we will adopt below is to set up conditions for the failure of non-quantity, so to speak, rather than setting up conditions for the failure of quantity. As such, it provides a solution for at least one class of cases which were a problem for Kripka's quantization approach, namely, cases such as at least three apples. Specifically, at least three apples is cumulative, but it is not divisive (i.e. there need not be a proper subset of at least three which is at least three), and hence is correctly predicted to give rise to telicity (or boundedness) (and see Volume II, Chapter 14 for some discussion of...
cases which are divisive, but not cumulative, by Kiparsky's definition). We note, however, that for the bulk of the cases which are problematic for Krifka, the definitions in (48)–(49) do not provide a solution. Specifically, consider the case of some apples, several apples, more than three apples, and similar examples. For Krifka, they were cumulative, and in fact non-quantized, as it is certainly not the case that every proper subset of more than three apples must be distinct from more than three apples. Under Kiparsky's definition they continue to be cumulative, of course, but, arguably, not divisive. However, consider more carefully the possible divisive properties of some apples, several apples and more than three apples. If the set under consideration involves five or more apples, more than three is clearly divisive, as by definition any set which is five or more has a subset—namely, four apples—which is more than three, thereby passing the divisiveness test. Consider, however, a set of four apples. Here, divisiveness fails (thereby making the entire more than three predicate non-divisive, as required), but only if we consider whole apples exclusively. As a set of four whole apples does not have a subset which is more than three whole apples, it is non-divisive; as several and some involve the existence of individual apples, they are not divisive either, as an apple is a subpart of some apples and several apples and is clearly not some apples or several apples. If portions of apples are considered, on the other hand, then a set of four apples or of some apples or of several apples is always divisive under infinite division (but see n. 36 for some relevant discussion of the minimal parts problem).

One could propose at this point that only whole singular apples count, appealing to the denotation of plurals as sets of singulants. Under such an interpretation, some apples, several apples, and more than three apples would become non-divisive and hence bounded, as required, solving the problem. However, the solution here is only apparent. Thus consider apples, under a scenario that includes two apples. If plural refers exclusively to sets of whole singulants, then apples, when referring to two apples, does not have any sub-parts which are apples, and we predict, erroneously, that apples is non-divisive. If, on the other hand, non-whole parts of apples do count, apples will be divisive, correctly, but so will some apples, several apples, and more than three apples, erroneously. It thus appears that even if something like the definitions in (48) could be made to work, there must be a distinction drawn, in principle, between the sort of plurality that is involved in expressions such as some, several or more than three apples, and the sort involved in expressions such as apples. In short, precisely the distinction already suggested must exist, making several, some, and more than three apples, but not apples, true sets of singulants.

To address specifically the cases which are resolved neither by Krifka's account nor by Kiparsky's (1998), suppose we adopt the essence of the defin-
ition of homogeneity proposed in Kiparsky (1996), but abandoned in Kiparsky (1998), which is based on a definition of divisiveness originally proposed in Krifka (1992) (slightly modified):\footnote{Kiparsky, in both his 1996 and 1998 executions, sets aside explicitly the minimal parts problem, i.e. the fact that neither an object nor an event can be subdivided ad infinitum, and that, strictly speaking, an event such as a running is not unbounded because the lifting of the left leg is not running. Likewise, although oxygen atoms are part of water, they are not water. The modification of the definition of divisive in (50), while not presenting a full solution to this issue, faces fewer difficulties, for obvious reasons. While oxygen is a sub-part of water, subtracting water from water will not give rise to free oxygen molecules. Some problems do persist, however, as Philippe Schlenker (pers. comm.) points out, especially within the domain of collective nouns. Thus *monde*, *crowd*, a mass noun, subtracted from *monde* may result in too few individuals to count as *monde*.}

\begin{align}
(50) \quad & \text{a. } \text{Quantity} \\
& \text{P is } \text{quantity iff } \text{P is not homogeneous} \\
& \text{b. } \text{P is homogeneous iff } \text{P is cumulative and divisive} \\
& \text{i. } \text{P is divisive iff } \forall x \left( P(x) \rightarrow \exists y \left( P(y) \land y < x \right) \right) \land \forall x, y \left[ P(x) \land P(y) \land y < x \rightarrow P(x \cup y) \right] \\
& \text{ii. } \text{P is cumulative iff } \forall x \left( P(x) \land P(y) \rightarrow P(x \cup y) \right) \\
\end{align}

Crucially, within an approach to plurality that views it as a function from singulars, bare plurals are not homogeneous, in that they do not have a divisive reference according to the definition in (50). A singular apple can be obtained from the subtraction of apples (four, for instance) from apples (five), and yet it is not within the denotation of apples. Therefore, divisive reference for apples can only be met if it is assumed that singular atoms are not part of the denotation of (bare) plurals, but are part of the denotation of both more than three apples and some apples, as we are suggesting here.

Suppose, then, that we adopt the definition of homogeneous in (50), with the understanding that bare plurals are divisive, precisely because plurality marking does not denote a set of individuals, but rather, an infinite set of possible mass divisions, including one and none. An important empirical consequence should be noted here, emerging from replacing Krifka's quantization notion with that of quantity. Specifically, a reference emerges as quantity even if cumulative but non-divisive, for example, more than three apples, which is cumulative and non-quantized by Krifka's definition, but cumulative and quantity by the definition in (50), as it is non-divisive (subtracting more than three apples from more than three apples need not give rise to more than three apples). Crucially, the distinction between the definitions rests in the requirement that every subpart of an x that satisfies a quantized P be not P. In contrast, non-divisive reference may emerge even though there may be some parts of P which are P. Thus the fact that
more than three apples when subtracted from more than three apples need not
(but might) give rise to more than three apples suffices to make it a quantity.

I return to the relevance of these definitions within the domain of events in
Volume II, Chapters 3–5. Summarizing their applicability within the nominal
domain, we reiterate that the interpretation of the plural does imply division,
from which the possible existence of discreet portions is derived. However,
the size, nature, and number of these portions remain entirely open ended, as
the division process itself is entirely open ended (and note in this context that
many speakers accept a singular reading for (41a–c)). In comparison, counters
(such as three, every, one) clearly may only operate on uniform sets.57 Although
in principle this means that a counter could count apple-bites, or circle-portions,
provided that they were uniform in some relevant sense, I will assume
that it is precisely at this point that world knowledge takes over in determin-
ing what a canonical portion is for a given denotation, defined as it is on the
basis of the salient properties of the relevant concept. We might note that here,
as elsewhere, world knowledge can be overridden. Thus although the uniform-
ity of the counted set is required by the grammar, what counts as an object of
a particular type in a particular context is subject to much flexibility. Thus, for
instance, if Kim bought three apples, we are much inclined to assume that each
of these apples was a whole one. In turn, if there are three apples in the salad, not
only are we not committed to the shape of these apples, we are not even com-
mitted to the claim that the quantity of apple in the salad, which is equivalent to
three apples, has ever constituted three discrete apples. And finally, if I tell Kim
to throw some three apples away, it is entirely possible that Kim made a noble
effort to eat those apples, bit into each of them in turn, perhaps consumed most
of one but only a little of the others, and now remnants of the three apples are
sitting on the living room table, ready to be thrown away.58

To conclude, the existence of (grammatical) individuals within a plural
denotation, it appears, comes about through the mediation of counters which
merge with (e), and assign range to it. Plurality in English is not a function from
individuals, but rather is a divider. As such, it is a true classifier, taking as its
input stuff, and returning divided stuff. These divisions of stuff may be of vary-

57 Quite trivially, one cannot walk into a room, count every man-made object in sight, and conclude
the counting by saying something like, 'there are 21 chairs, tables, pictures, forks, and books in this room'.
Rather, a counter by definition establishes a homogeneous set to count. Of course, that homogeneous
set may consist of chairs, tables, pictures, forks, and books, but in that case, it would be '21 man-made
objects' that have been counted. A similar point is made in Muromats (1998), who quotes from Freges
(1950), stating that 'we only think of things in terms of number after they have first been reduced to a
common genus'.

58 Likewise, a three-year-old's three drawn circles will almost certainly refer to objects which are vastly
distinct from three circles drawn by a geometry student. The former, note, not only need not be perfectly
round, but may not even be complete.
ing size, and may or may not correspond to canonical divisions, as observed in
the world or as represented in our conceptual system. Telicity, then, as illustrat-
ed by the contrasts between (41) and (42), emerges in the context of a counter
and is absent in its absence. 39

And what of mass nouns? The very same explanation is available for the
contrasts in (43)–(44). Note that an account which is based on the inherent
vagueness of quantities associated with meat or sand in (43) fails directly when
the equally inherent vagueness of quantities such as more than enough and too
much are considered, as in (44). Even if we grant that quantities associated with
enough or much are well defined in a given context, how much is more than
enough? How much is too much?

Viewed differently, however, much as well as too much are quantity expres-
sions, merging with (e), and assigning range to it. As in the case of more than
three, the interpretation of too much must start from the computation of much, a
well-defined quantity (in a particular context), just as the interpretation of more
than enough or not enough must take as its starting point the well-defined quan-
tity (in a particular context) enough. It is precisely the existence of this well-
defined quantity, whether a singularity or a fixed mass, which is characterizable
in our system by the #P projection and the (e) open value, and it is this property,
we argue, which is relevant for the emergence of a telic interpretation.40,41

39 H. Filip (pers. comm.) notes the following problem for the view of plurals as divisions, rather than
sets of singulars:

(i) Jane built houses in a month.

Under the iterative interpretation of (i), Jane built multiple houses, each of which took a month to
build, thereby suggesting that houses does denote a set of individuals. I will not attempt a direct solu-
tion to this issue now, but two executions of such a solution do present themselves in principle. First, it
is eminently plausible that, in line with commonly made assumptions, an abstract distributive with the
properties of each may be present in the structure, assigning range to some values within the DP head-
ed by houses (specifically, (e)), giving rise to its distributive reading. While this assumption is relatively
unproblematic, we nevertheless note that singulars, as analysed here, need to have a single range assigner
assigning range to (e), and to (e)open, but in (i), (e)open is assigned range, by assumption, by the 'plural'
marking, raising the possibility that the system may need to be enriched here in some way. We note in this
context that e.g. (ii) is vague, with the number of donkeys owned by farmers, individually or collectively,
undetermined, and consistent with either a single one or a plurality of donkeys, a reading that is entirely
consistent with the analysis made here:

(ii) When farmers own donkeys, they treat them like pets.

Another possibility suggests itself concerning the iterative reading of (i) – possibly, the distributive
reading of houses emerges here as a result of the plurality marking the events of house buildings, rather
than of houses, as such, and is hence not necessarily damaging to the account of plurals, when associated
with nominals, as divisions, rather than sets of singulars.

40 An unresolved issue does remain, however, concerning mass expressions quantified by some, or a
quantity of, which, by the definitions given thus far, remain homogeneous. For a recent relevant discus-
sion, see Zacchi and White (2000), where it is assumed that existential closure could resolve the issue
here, providing we assume that bare plurals are kinds (and hence not subject to existential closure). An
We will return in Chapters 5 and 6 to additional aspects of #P, noting here, as an interim result, that the properties which bare mass nouns and bare plurals share follow from the absence of (overt) range assignment to \( \langle e \rangle \). Such an absence is prima facie compatible with two structural executions. One leaves \( \langle e \rangle \), without a range assigner (or, possibly, a DP-external range assigner) while the other fails to posit a #P altogether in the relevant structures. These alternatives are illustrated in (51) and (52), respectively:

\[
\begin{align*}
(51) & \quad a. \quad [\text{DP} \langle e \rangle_\text{A} \langle \text{NP} \langle \text{div} \rangle \langle e \rangle \langle \text{NP} \langle \text{cat} \rangle \rangle \langle \text{NP} \langle \text{cat} \rangle \rangle] \\
   & \quad b. \quad [\text{NP} \langle e \rangle_\text{A} \langle \text{NP} \langle \text{cat} \rangle \rangle]
\end{align*}
\]

\[
\begin{align*}
(52) & \quad a. \quad [\text{NP} \langle e \rangle_\text{A} \langle \text{NP} \langle \text{cat} \rangle \rangle] \\
   & \quad b. \quad [\text{NP} \langle e \rangle_\text{A} \langle \text{NP} \langle \text{cat} \rangle \rangle]
\end{align*}
\]

I return to this issue in Chapter 6, Section 6.1, where I will conclude that the structures in (51) must be rejected for bare (weak) plurals and mass nouns. While the structures do exist, their interpretation involves the assignment of range to \( \langle e \rangle \), by an adverb of quantification or a generic operator. and the subsequent emergence of a quantity expression. As bare plurals and bare mass expressions are, as argued, not quantity expressions, I will suggest that the structures in (52) should be favored for them. It thus emerges that the structure assigned to non-quantity expressions is structurally less complex than the structure assigned to quantity expressions, just as the structure associated with mass is structurally less complex than the structure associated with count.\(^{42}\)

adaptation of the Zucchi and White (2001) proposal to the system suggested here might be possible if we assume that the existential operator in question asserts the existence of a relevant quantity reticule for cases such as some meat, but the existence of meat without any quantity specification for the bare mass meat. This adaptation is not attempted here and the issue is set aside, in the hope that a further refinement of a reticule-based system could account for the relevant cases.

\(^{41}\) If the suggestion that telicity is related to the existence of well-defined apportioning is true, then many existing characterizations of telicity must be re-worked. Note, specifically, that accounts in which a measured argument portions out the event, defining its telos with respect to the culmination of the object, are prima facie problematic. While it is perfectly coherent to suggest that eating three apples culminates with the end of the third apple, when does the eating of more than three apples culminate? More seriously, when does the eating of unus manzanas culminate? We note that what is involved here cannot be a specified quantity (contra Verkuyl 1973, 1992), nor can the account rest on any characterization which is linked to degrees of vagueness, as in the quantization approach put forth by Kriika (1992). While descriptions in terms of (non-)homogeneity may be more successful, we note that lack of homogeneity, as in the case of e.g. more than three apples and unus manzanas does not require a specific quantity, nor, within the event domain, I will argue, is culmination in any sense necessarily identified with the telos. I will discuss extensively in Chapters 3–8 of Volume II the fact that telic predicates, just like quantity DPs, need only give rise to well-defined, measurable sub-events. Co-finality, often associated with telicity, and the logical equivalent of specified quantity, is thus only a special case of such quantity, rather than a necessary condition on its existence.

\(^{42}\) In Volume II I will argue for the existence of semantically empty functional shells which must be phonologically licensed (for instance, a semantically empty shell of \( \lambda \text{NP} \), could project if its specifier is a
Before moving on to the remaining issues, we note that in a language such as English (or for that matter, any language which has determiners in the functional lexicon capable of assigning range to $\langle e \rangle$), the strict correlation between the presence of an overt determiner and the emergence of a non-homogeneous reading provides independent evidence not only for the specific execution proposed here, but also for a system in which realized syntactic structures largely underlie semantic interpretation.

The reader will have no doubt noted by now that a number of important issues remain open. At a first approximation, these issues include the following:

(53) A list of open issues:
   i. How is null $\langle e \rangle$ licensed (cf. (27)–(28) and similar structures)?
   ii. Is there a $\langle e \rangle$ in (54a–c) (or put differently, is the material in the parentheses in (55a–c) there or not there)? And if there is an $\langle e \rangle$, how is it assigned range?
   iii. How does a singular reading emerge in (55a) (potentially with the structure in (55a)) in the absence of $\langle e \rangle$?
   iv. If $a$ is a singular marker, why does it trigger indefiniteness, or, put differently, why is (56a), ostensibly with the structure in (56b), grammatical, but (57a), ostensibly with the structure in (57b), ungrammatical?
   v. And what of inter-language variation? What of languages that do mark singulars, either alongside plurals, or without marking plurals? What configurations do we predict there?

(54) 
   a. the cat  
   b. the cats  
   c. the salt

(55) 
   a. [DP the $\langle e \rangle$ ( [ap $\langle e \rangle$ ] ) [$_{\text{CL}\max} \langle e \rangle$$_{\text{DIV}}$ [np cat]]] 
   b. [DP the $\langle e \rangle$ ( [ap $\langle e \rangle$ ] ) [$_{\text{CL}\max} \text{cat}.$ (div) $\langle e \rangle$$_{\text{DIV}}$ [np cat]]] 
   c. [DP the $\langle e \rangle$ ( [ap $\langle e \rangle$ ] ) [np salt]]

(56) 
   a. the cats  
   b. [DP the $\langle e \rangle$ ( [ap $\langle e \rangle$ ] ) [$_{\text{CL}\max} \text{cat}.$ (div) $\langle e \rangle$$_{\text{DIV}}$ [np cat]]]

(57) 
   a. *the a cat  
   b. [DP the $\langle e \rangle$ ( [ap * $\langle e \rangle$ ] ) [$_{\text{CL}\max} \text{a}$ $\langle e \rangle$$_{\text{DIV}}$ [np cat]]]

case position). Following the same rationale, a semantically inert CL$^\text{max}$ node or a semantically inert #P, not headed by $\langle e \rangle$$_{\text{DIV}}$ or $\langle e \rangle$, respectively, might occur in non-quantity and in mass nominals if phonologically licensed. A potential phonological licenser for such semantically inert CL$^\text{max}$ or #P could be an AP in its specifier, should it turn out that APs are generated in specifiers, and that the specifier positions of #P or CL$^\text{max}$ may host an AP. I leave issues concerning the attachment of adjectives (and adverbs) aside in this work (but see Chapter 3 at n. 10 as well as Chapter 8, Section 8.3, for some relevant comments).
Before we turn to these important questions, we digress briefly to consider independent evidence from the domain of word formation for the non-singular, unmarked nature of noun stems in English.\footnote{As this book was going to production, A. Fassi Fehri (pers. comm.) brought to my attention the following paradigm in Standard Arabic:}

\begin{itemize}
  \item[(i)] a. samak 'fish, mass only
  \item[(b)] samaka 'fish, singular only
  \item[(c)] asmak 'fish, pl., multiple individual fish, multiple fish-types
  \item[(d)] samakaat 'fish, pl., multiple individual fish, *multiple fish-types
\end{itemize}

Standard Arabic allows for two kinds of morphologically distinct plurals—so-called broken plurals, in which a consonantal root is pluralized through the use of a vocalic affixal melody, as in the case of samak-iasmak, and the so-called grammatical plural, in which a suffix is utilized, as illustrated by (id). As (i) shows, however, the interpretation of these pluralizing morphological strategies is not identical, and specifically, while the broken plural has the range of interpretations associated with English (or Hebrew) plural marking, the grammatical plural only allows a set-of-individuals reading. Intriguingly, grammatical plurals and broken plurals also part ways when it comes to telicity. Broken plurals, again like English plurals, disallow a telic interpretation. On the other hand, grammatical plurals do allow a telic interpretation.

Given the parallel between the behaviour of broken plurals in Standard Arabic and English plural marking, it is plausible that broken plurals are classifiers. We note specifically that the exclusive mass reading associated with the stem in (ia), and the need for a special marking to give rise to a singular reading, as in (ib), are in actuality exactly what the system here would predict (and see Chapter 7, Section 7.1, for more discussion of singular marking). However, the absence of a type-reading for grammatical plurals when combined with the telic reading available for (ib) raises the interesting possibility that grammatical plurals in Standard Arabic are the grammatical equivalents of Spanish *unas, as illustrated in (46). In other words, they assign range to (\(\epsilon\))\(_m\) possibly as well as to (\(\phi\))\(_{TP}^m\), in effect giving rise to the reading 'a number of'.

If this analysis is on the right track, it provides additional evidence for the overall architecture put forth here. It further suggests that 'plurality' (as typically construed) may not be a unified notion and may consist of two different grammatical objects with diverse semantic, syntactic, and, at times, morphological properties—one interacting with (\(\phi\))\(_{TP}^m\) the other with (\(\epsilon\))\(_m\). Regrettably, however, we must set aside this issue now. For an insightful discussion of this topic, see Fassi Fehri (2003).
The other contexts are those of derivational morphology (e.g. brother-hood, friend-ly), and of compounding. Although within this latter domain Ware restricts himself to modificational contexts, such as snowman, or hand washing, a more thorough consideration of compounds in English reveals that in all contexts the attribution of a ±count property to a stem is extremely problematic.

As is well known, aside from a few exceptions, the non-head noun in N–N compounds in English may not occur with a plural morpheme, regardless of the actual interpretation of the resulting compound. Thus in (59a) an interpretation whereby flea is singular is incompatible with the meaning of infestation, and in (59b) the salient interpretation favours more than one shelter:44

(59) a. flea infested
    b. shelter burning

(60) a. *fleas infested
    b. *shelters burning

It is clear, then, that the bare stems in (59)–(60) are not singular in any grammatically meaningful way, or a plural interpretation would be excluded. Note further that they are neither referential nor specific. There are no particular fleas such that they are responsible for the infestation, or particular shelters such that they have been burned, nor is the existence of such fleas and shelters asserted by (59)–(60). The most plausible account for the behaviour of the non-head nouns in (59), then, is that they function, word-internally, as predicates of sort. Devoid of the syntactic structure which maps predicates onto objects (DP), as well as of quantity (#P) and division (Cl_{max}), they bring to bear on the structure nothing but their conceptual content. Thus their occurrence in this context with this reading supports our claim that bare nouns in English are not specified as singular. Note further that when world knowledge supports both mass and count interpretation, both are compatible with the same stem, thereby supporting our claim that noun stems in English are unspecified as either mass or count:

(61) a. stone throwing (count)
    a'. stone carving (mass)
    b. dog grooming (count)
    b'. dog eating (mass)

44 The impossibility of (60a–b) could not be attributed to a restriction against morphologically complex non-heads in compounds. Non-heads in compounds can be morphologically complex, and be compounds themselves, as (i) illustrates. What is specifically barred is a (regular) plural marker:

(i) a. software retrieval
    b. condition C-effect
    c. transportation design
    d. feeding device
c. meat eating (mass)
c'. meat selection (count)

Some apparent counter-examples are given in (62). Here, it seems, sun has a specific singular interpretation. As for home, it clearly has a singular, unique interpretation:45

(62) a. sun worshipper
b. home owner

It turns out, however, that in (62a–b) as well, the singular, specific readings can be overridden. Consider first (62a), where a singular specific reading is no doubt due to the existence of a single sun in our solar system. Suppose, however, we reside on a binary system with a blue sun and a red sun. Our planet also has a moon or two rotating around it. Now the population at large is religiously very diverse. Some people worship the blue sun, others worship the red sun, and some worship both. Yet others worship the moons or some subset of them. In this context, it would be quite appropriate for me to refer to an assembly of ten people as sun worshippers (and not moon worshippers), if some worship the red sun, others worship the blue sun, and yet others worship both. In the latter case, sun clearly refers to more than one sun, indicating that sun need not be singular for any given worshipper. More interesting, however, is the fact that the term ‘sun worshippers’ is appropriate although the object of worship is not the same for all individuals thus described. Clearly, then, in this context sun is neither specific nor singular or plural. It could be interpreted as specific, in a particular context (one world, one sun), but need not be; it could be interpreted as plural, but need not be; and finally, it could be interpreted as singular but not specific. And most importantly, it could mean all these at the same time. Needless to say, should both our suns go supernova next year, those of us who survive might very well continue to be sun worshippers, although neither sun exists any longer.

Home, being an inherently anaphoric expression with a conceptually associated expectation of uniqueness, is harder to construe as non-specific or non-singular. Note, however, that (63a) is good even if I owned three distinct homes in the past fifteen years, or if I owned more than one at any given point (say, one in Los Angeles and the other in London) and that (63b) is not a contradiction, and neither is (63c).

(63) a. I have been a home owner since 1985.
b. a multiple-home owner
c. I hope to become a home owner when I grow older.

45 I am grateful to Barbara Partee (pers. comm.) for pointing out these examples to me.
From the perspective of the system proposed here, these results are expected. If bare nouns are devoid of any count or reference properties, those being properties of some functional structure, it follows that the only guideline for the interpretation of non-head nouns without such structure is world knowledge, which, characteristically, can be overridden.

Although, of course, much of what is outlined here has been observed before, lexicalist approaches to the specification of mass–count or the singular–plural distinction are rarely perturbed by it. And yet, any coherent theory of the lexicon would have to assume that while stems enter word formation stripped of all relevant syntactic and lexico–semantic properties, including mass–count, those very same stems bring into the syntax rich semantic and syntactic specification which underlies syntactic structures and interpretation. If indeed one is to capitalize on lexical properties and lexical listing, some systematic treatment of the radically different behaviour of the very same listemes in syntactic vs. morphological contexts is certainly called for. Any such description might very well involve such a substantial formal enrichment of the content of lexical entries so as to make it extremely unattractive. We note that no such enrichment is necessary within the system proposed here.46

46 As a potential additional problem for the account of mass nouns as inherent plurals, note that stems such as lice and mice cannot be coerced into a mass interpretation, as (i) shows:

(i) a. *There is lice in my soup.
    b. *Too much mice around here.

At least superficially, such forms are excellent candidates for lexically specified plurality, yet their behaviour crucially differs from that of mass nouns.