

MASS-COUNT DISTINCTIONS IN BARE PPs¹
Bert Le Bruyn, Henriëtte de Swart, Joost Zwarts
Utrecht Institute of Linguistics OTS, Utrecht University
Ms. January 2011

Word count: 11734 words

Abstract

Singular count nouns in Germanic and Romance languages usually require a determiner in regular argument position, but occasionally occur ‘bare’, e.g. in PPs like *at school, in jail, without exception*. This paper investigates countability issues in such bare PPs in the light of recent grammatical theories which claim that count interpretations of nouns require overt, disambiguating functional structure. Such structure is obviously missing in bare PPs. Evidence from productive subclasses of bare PPs reveals that we cannot ignore the mass/count distinction in bare PPs, and cannot reduce all noun interpretations in this environment to a mass use. Subclasses of nouns that are incompatible with a mass interpretation, selectional restrictions induced by prepositions, modification by shape/dimension adjectives, and the ambiguities generated by flexible nouns shows that count interpretations arise in bare PPs in similar ways as in other constructions. We conclude that countability is not an exclusively grammatical feature, and maintain that both mass and count meanings must be visible in the lexical semantics.

1. Mass-count distinctions with bare nominals: background and issues

1.1 Preliminary observations about article use in English and similar languages

Germanic and Romance languages like Dutch, English, Italian, Spanish, etc. generally use full DPs in regular argument position. However, articles or determiners can be optionally left out with plurals or mass nouns.² This leads to the paradigm in (1):

- (1) a. I read a book/the latest book/every book by Chomsky.
b. I read books/the latest books/two books/many books by Chomsky.
c. I read poetry/much poetry by J.C. Bloem.
d. *I read book/latest book by Chomsky.
e. Johnny the termite prefers book over newspaper.

Count nouns such as *book* can appear with an indefinite article (*a*), a definite article (*the*) or a quantifier (*every*) as illustrated in (1a). Plurals can appear with a definite article (*the*), a numeral (*two*), or some other determiner or quantifier (*many*), but they also be bare (i.e. lacking an article, a determiner or a quantifier) as in (1b). Mass nouns display a similar distribution as plurals, cf. (1c), but they do not tolerate numerals, and sometimes use a different form of the quantifier (*many* in 1b, *much* in 1c). Count nouns generally resist the bare form (1d), unless they get a mass interpretation (1e). The paradigm in (1) can be found in many standard grammars of the language. This paper is not concerned with languages such as Mandarin Chinese, Hindi, Hebrew, Russian, etc. in which bare (count) singulars freely occur in regular argument position, but is limited to English-type languages with extensive and

¹ We gratefully acknowledge the Netherlands Organization for Scientific Research for financial support.

² This is not the case in French, cf. de Swart & Zwarts (2009), Le Bruyn (2010) and references therein for discussion of the partitive articles *du, de la, des* in this language. Interestingly, we still find bare PPs and other bare constructions in French, cf. (3) below.

systematic article use along the lines of (1), i.e. basically Germanic and Romance languages. Examples will be taken predominantly from English and Dutch.

There is an ongoing debate in the literature concerning the question whether the mass/count distinction is located in the lexicon or the grammar. If nouns are classified as mass or count in the lexicon, we can take *book* to be a count noun, which leads to a treatment of examples like (1e) in terms of coercion from count to mass meanings. Alternatively, if the mass/count distinction is in the grammar, nouns like *book* are underspecified in the lexicon, and can appear in either count (1a) or mass environments (1e). This debate will be summarized in Section 3 below.

Most discussions of countability issues relate to particular functional structure that indicates a mass/count use, such as determiners, classifiers, etc. We take a radically different approach by focusing on absence of functional structure in bare nominal constructions. There is a range of special configurations in which bare (apparently count) singulars appear in Germanic and Romance languages such as bare predication (*Jones is chairman of the board*), bare coordination (*The medicines will protect mother and child*) or bare noun incorporation (*Terry watched television*) play a crucial role in the argumentation. We refer to de Swart & Zwarts (2009) for an overview of bare constructions in general, and Zwarts (2010) for an exhaustive descriptive overview of bare constructions in Dutch. This paper takes one of these configurations, namely prepositional phrases (PPs) as the empirical domain of our investigation. There are PPs in which the object of the preposition is a bare nominal. We will call these bare PPs.³ Such PPs provide a rich empirical domain for our investigation, because this is a widespread construction in Germanic and Romance languages, which allows for the application of a range of criteria concerning the mass/count distinction even within the bare PP construction itself.

Bare PPs are intriguing, because they leave out the article on the nominal complement, even if the noun looks like it might be a count noun (or is elsewhere used as such). Some English examples are provided in (2):

- (2) after school, at bay, at local level, by car, from hospital, from close range, in bed, in greater detail, on television, on level ground, over dinner, per year, to hell

Article drop in PPs is neither completely free, nor limited to idiomatic constructions, as will become clear in Section 2. In this paper, we argue that the mass-count distinction is operative in bare PPs, which implies that we need to address the status of that distinction in the lexicon-syntax-semantics interface (Section 3). We will argue that a purely grammatical approach fails to account for mass-count distinctions in bare PPs (Section 4), and provide evidence from within the bare PP that both mass and count interpretations can be elicited (Section 5). Empirical support comes from monolingual and multilingual corpus investigations.

2. Lexical, syntactic, semantic and pragmatic features of bare PPs

Bare PPs constructions are prepositional phrases with a nominal complement that is lacking an article, a determiner or a quantifier, and appears without plural marking. Bare PPs occur in languages like English, Dutch, German, French, Spanish, and many other languages that have an obligatory use of a determiner with singular count nouns in regular argument position. Section 1 provided some English examples in (2). In (3), we provide some triplets in English,

³ Bare PPs are also called determinerless PPs or P+N combinations. Strictly speaking it is not the PP that is bare or determinerless, of course, but the noun phrase inside it, but we trust that the short term ‘bare PP’ will not lead to confusion.

Dutch and French, showing that all three languages have bare PPs, but do not always use them in the same way:

- (3) a. by train (En) – per trein (Du) – en train (Fr)
b. at school (En) – op school (Du) – à l'école (Fr)
c. in prison (En) – in de gevangenis (Du) – en prison (Fr)
d. at the office (En) – op kantoor (Du) – au bureau (Fr, au < à le)
e. without a hat (En) – zonder hoed (Du) – sans chapeau (Fr)

(3a) illustrates the bare PP configuration of a preposition combining with a noun that indicates a means of transportation to express the way of travelling in all three languages under consideration. The comparison of (3b), (3c) and (3d) reveals that all three languages use bare PPs consisting of a locative P and a noun indicating some sort of institution, but are subject to different lexical constraints on prepositions and nouns. Articles are underlined, and indicate that all three languages alternate between bare and non-bare PPs. (3e) indicates the configuration of *with/without* type prepositions that Le Bruyn et al. (2010) observe to frequently occur with articleless nouns in Dutch and French. The examples in (3) show that the study of bare PPs is relevant to lexical semantics and lexicography, because of the lexical restrictions involved, and the cross-linguistic variation we find.

The investigation of bare PPs is also relevant to the semantics-pragmatics interface. On the one hand, we typically find enriched, stereotypical meanings in bare PP configurations, as observed by Horn (1993) and Levinson (2000) and studied in detail by Stvan (1998). For examples such as (4), Stvan (1998) argues that the location of the figure (*my husband*) at the ground (*the prison*) is more than a physical location, but comes with associations about activities or role of the person in this location.

- (4) a. My husband is in prison. (≈ as a prisoner)
b. My husband is in the prison
(≈ as a visitor or as the handyman who came to do some repairs)

As a result of the focus on the more abstract institution rather than the concrete location itself, the bare nominal displays weak referentiality features, as observed by Stvan (2009). Weak referentiality indicates that the nominal is less likely to serve as the anchor for an anaphoric pronoun in subsequent discourse. This leads to the contrast in (5):

- (5) a. John is in prison. #It is is brick building.
b. John is in the prison. ✓It is a brick building.

The contrast in (5) has been empirically tested (for Dutch), by Scholten & Aguilar (2010). Weak referentiality is a typical ingredient of bare constructions in English-type languages, as highlighted by de Swart & Zwarts (2009).

The lexical restrictions on bare PPs, combined with their enriched meanings and weakened discourse referentiality features might lead one to think that the examples in (2) and (3) are highly idiomatic, and should be treated in the lexicon. Computational linguists have been working on extracting multi word expressions from large corpora to build extended theories of the lexicon. Baldwin et al. (2003, 2006), Van der Beek (2005), and Dömges et al. (2007) followed by Kiss (2008) and Kiss et al. (2010) have applied these computational methods to bare PP configurations in English, Dutch, and German respectively. After careful investigation, they come to the conclusion that a listing approach is not tenable, because there is too much productivity. As Baldwin et al. (2006) point out, the *by+N*[means of

transportation] construction in English is conventionally used in *by train, by bus, by car, by bike...* but tolerates a creative use as in *by flying carpet*. Dömges et al. (2007) statistically argue that bare PPs are productive. The method they use is inspired by the productivity measure developed by Baayen (2001) and the statistical models in Evert (2004). Informally, a bare PP involving a given preposition X is said to be productive if the likelihood of finding new X+N combinations stabilizes after *n* words at some positive value (significantly) different from 0. This – Dömges et al. (2007) claim – is e.g. what we find for bare PPs with *unter* ('under') when browsing through large German newspaper corpora. The conclusion they draw is that the creative use of bare PPs is too common to be ignored. Accordingly, the starting point of our investigation is that bare PPs need to be accounted for at the interface between lexicon, syntax and semantics.

Lexical constraints on prepositions and nouns are investigated in Le Bruyn et al. (2010). De Swart & Zwarts (2009) drew attention to restricted modification possibilities:

- (6) a. in jail – in county jail - in *(the) new jail
 b. to college – to technical college – to *(the) best college

Only compound-like modifiers that form a fixed combination with the noun are allowed in bare PPs. Examples (3) – (6) taken together show how bare PPs differ from full PPs in different respects.

If bare PPs need to be investigated in the grammar, one issue that arises is the question of countability. Recall that bare plurals and bare mass nouns are fully regular in all kinds of argument position. This includes the nominal complement position of a preposition. So the only 'special' instances of bare PPs in Germanic and Romance languages involve singular count nouns. It is easy to exclude bare plurals on formal grounds, and restrict our investigation to nouns without number marking. However, that leaves us with a large set of prepositions followed by a mass noun, as illustrated in (7) (examples from the British National Corpus):

- (7) a. in water, to music, under pressure, with money, without food.

If bare PPs with singular count nouns are productive, even in a somewhat limited way, then the question arises how we distinguish the 'special' constructions in (2)-(6) from the fully regular PPs in (7). We need to resolve the issue of the mass-count distinction in bare PPs in order to develop the syntax-semantics interface of bare PPs in a comparative perspective. In order to see what the issues are, and how we should address them, we propose to take a step back, and review the debate on countability in the linguistics and philosophical literature more in general. As we will see in Section 3, our take on the mass-count distinction in bare PPs depends to a large degree on whether we take this distinction to be operative in the lexicon or in the grammar.

3. The mass-count distinction: lexicon or grammar?

The classical view locates the mass-count distinction in the lexicon (Pelletier 1975, Link 1983, Bunt 1985, Gillon 1992). There is a lexical distinction between mass and count nouns, which is reflected in the ontology. A particularly influencing view is the one advanced by Link (1983), who maintains that count nouns denote join semi-lattices with minimal parts, and mass nouns involve semi-lattices without minimal parts. There are fairly reliable criteria for classifying nouns as count nouns, for instance the possibility to combine them with an

indefinite article (*a book* vs. *#a sand*). There is also the possibility of plural marking (*pen-pens*) that is not available to mass nouns (*sand* - *#sands*). Count nouns combine with a numeral without the need for a unit of measurement (*two tables*), but mass nouns do not (*#two sands* vs. *two kilos of sand*). Some English determiners are sensitive to the mass/count nature of the noun (*many dollar bills* vs. *much money*, *few successes* vs. *little time*).

Not all languages implement the mass/count distinction in the same way. Doetjes (to appear) offers a thorough cross-linguistic comparison of number marking languages and classifier languages. Since the empirical scope of our paper is restricted to Germanic and Romance languages, we will not be dealing here with classifier languages, but focus on languages with a singular/plural distinction.

From the beginning of the debate, it has been clear that the mass-count distinction needs to be flexible. Many mass nouns have count uses: *wine-a wine*, *coffee-two coffees*, *love-a love*, *thread-a thread*, *stone-a stone*. And similarly, many count nouns have mass uses in the right context: *there is dog/ stone/ chicken on the floor*, *that's quite a bit of table/carpet for the money*, *quite a bit of/a lot of/too much dog/chicken/table/carpet*. Pelletier (1975) proposed the Universal Grinder to model mappings from count interpretations onto mass ones (in particular substance interpretations), see also Pelletier & Schubert (1989). Bunt (1985) added the Universal Sorter and Jackendoff (1991) the Universal Packager to model mappings from mass to count interpretations, in particular conventionalized portions of a substance as in *a coffee*, *a cake* or kind interpretations as in *a beautiful red wine from Napa Valley*). The lexical view is still widely accepted, and gets interesting cross-linguistic applications, as for example the analysis of restrictions on the Universal Grinder in Mandarin Chinese by Doetjes et al. (2009).

Notwithstanding its success, the lexical view also faces problems, for instance when it comes to nouns like *furniture* and *cattle*, which are mass nouns, even though they have individual reference (Pelletier & Schubert 1989, Krifka 1991). Ontologically, plurals and mass nouns have similar semantic properties, such as cumulative reference (Quine 1960, Link 1983). Given that collective mass nouns such as *furniture* have minimal parts just like bare plurals like *chairs*, Chierchia (1998) proposes to treat mass nouns as inherent plurals. As a consequence, there is no ontological distinction between mass and count nouns anymore: both denote join semi-lattices with minimal parts.

Not everyone is convinced that all mass nouns should be treated in a way similar to *furniture* nouns. It has been observed that collective mass nouns behave like count nouns, and not like other mass nouns in comparative constructions (Doetjes 1997, Barner & Snedeker 2005, Bale & Barner 2009):

- | | | | |
|-----|----|-------------------------------------|-------------------------------|
| (8) | a. | Peter ate more chocolates than John | (comparison based on number) |
| | b. | Peter ate more chocolate than John | (comparison based on amounts) |
| | c. | Barbie has more furniture than us | (comparison based on number) |

Both (8a) and (8c) count pieces (of chocolate or furniture), whereas (8b) measures amounts of chocolate. The view that collective mass nouns constitute the exception rather than the rule seems to be emerging from recent work by Nicolas (2002, 2008) and Chierchia (2010).

The flexibility of many nouns to appear with both mass and count interpretations and the problems raised by the lexical approach lead Borer (2005) and Bale & Barner (2009) to locate the mass-count distinction in the grammar. Every lexical item starts as a root, underspecified for its syntactic category. When a root appears in a nominal environment, it is labelled as an expression of category N. The default interpretation of expressions of category N is mass. The count interpretation is derived as the result of embedding the noun in syntactic structures which induce such interpretations. Borer proposes a so-called 'divider' which

occupies a syntactic slot above the N projection. Bale & Barner formulate their analysis in terms of a singular count functional head [n,c] which attaches to the root.

There is a clear condition for success of the grammatical line: in all cases in which a count interpretation is needed, syntax must project distinct and unambiguous functional structure above the noun, because countability must be created in the syntax. Borer (2005: 132) maintains that this is the right outcome for structures like *sun worshipper* or *in prison*. She argues that *sun worshipper* can be used in a situation with two suns, referring (in an undespecified way) to people that worship one or two suns. Her argumentation focuses mostly on the compounding cases (which we ignore here). The main question we want to address here is how to assess the mass/count features of nouns in another class of configurations lacking the disambiguating functional structure that clearly leads to a count interpretation, e.g. bare PPs such as *at school*, *by bus*, *without exception*. This environment functions as our testcase for the grammatical view.

Section 4 takes a stepwise approach to address this problem. First, we show that attempts to explain away the problem fail. Second, we show that a default mass interpretation fails. Third, we propose to focus on productive classes of bare PPs, and present corpus data from English and Dutch that help to focus on so-called P-based bare PPs. Section 4 paves the way for section 5 in which we take bare count singulars seriously, and investigate their lexical, syntactic and semantic properties.

4. Bare PPs and countability: testing the grammatical view

4.1 No syntax, no problem

The hypothesis we start from is the one proposed by Borer (2005: 132): we suppose that bare PPs are not environments in which syntax is at work, i.e. in which there is functional structure. They may be part of the lexicon or they may be treated as idioms, as long as the mass/count distinction is not operative in this configuration. This view is clearly the default option for anyone working on this problem. And there is a clear advantage to keeping bare PPs outside of syntactic theory: we do not need to worry about the mass-count distinction, which is inert in the absence of visible functional structure.

One piece of evidence we can present in favour of this hypothesis is the mostly conventionalized use of bare PP use in English, as illustrated in some of the examples of (2). Bare PPs like *at school*, *in jail*, *on disk* are subject to lexical constraints on both the preposition and the noun (cf. Stvan 1998 for a detailed investigation). However, as already pointed out in Section 1, bare PPs are indeed not fully productive, but they are not completely idiomatic either. The empirical evidence Baldwin et al. (2003, 2006) (for English) and Dömges et al. (2007), Kiss (2008), Kiss et al. (2010) (for German) advance in favour of productivity required us to address bare PPs in the grammar in the first place. The argument extends here to the mass/count distinction. In sum, we know that the creative use of bare PPs is tolerated by the grammar in English and German, so we cannot list all the possible combinations, and thereby ignore the mass/count distinction in this configuration.

We can strengthen this result by looking at *with/without* prepositions, which frequently take determinerless nominal complements in languages like Dutch, German, French, etc. (cf. Le Bruyn et al. 2010). Given the lower frequency of *without*, it proves easier to find examples with *without* than with *with*, so that is what we do in (9) (the examples in 9a are from the British National Corpus, those in 9b from a free google search restricted to the Dutch .nl domain):

- (9) a. without exception, without delay, without restriction. [English]

- b. zonder hoed ('without hat'), zonder streepje ('without stripe-DIM'), zonder logo ('without logo'), zonder toets op kennisfeitjes ('without test for knowledge facts'), een leven zonder baan ('a life without job'). [Dutch]

The range of nouns that occur bare in *with/without* PPs is quite varied, to the point that the choice of the noun appears to be entirely free. There is no enriched meaning either (cf. 4a). The Dutch example *een leven zonder baan* seems to be simply equivalent to the English *a life without a job*, indicating that bare *with/without* PP yield something approximating existential closure of the variable corresponding to the bare noun.

Interestingly, while *with/without* bare PPs basically get an existential interpretation, and alternate with PPs with an indefinite singular nominal complement, most other bare PPs are close in meaning to PPs with an overt definite article. In (4) above, we already saw that English *in jail* alternates with Dutch *in de gevangenis*, and Dutch *op kantoor* alternates with English *at the office*. Where the Americans say *in hospital*, the British prefer *in the hospital*. Because of the close similarities in meaning between these configurations, Carlson (2006) suggests a semantic analysis in terms of incorporation that should apply to both definite and bare complements of prepositions. Whatever the attraction of such an analysis, note that with full DPs, the mass/count nature of the nominal structure is never underspecified because of the overt syntactic structure the noun is embedded in. According to Borer (2005), definite DPs have enough functional structure to make countability visible. If we assume that the mass/count distinction is operative in *in the hospital* but not in *in hospital*, we would have to postulate radically different semantic structures for these two varieties of English, which runs counter to the identical semantic properties that these expressions have. Similarly, Dutch *een leven zonder baan* and English *life without a job* become semantically incommensurable. As a result, it becomes difficult to establish a good comparison between the two structures with/without an article, and carefully map out the semantic similarities and differences.

The conclusion we reach is that we cannot explain the problem away, but have to address the mass/count distinction in bare PP configurations.

4.2 A default mass interpretation

On the basis of the argumentation in section 4.1, we take it for granted that bare PPs are environments in which syntax is at work. At that point, we can no longer dismiss countability issues. But in the absence of overt and disambiguating function structure, we could hypothesize that the bare nominal complement gets a default mass interpretation. This would be a very attractive position to defend. The first advantage is that we maintain the regular grammar of English (Dutch, Spanish, etc.), where unmarked bare nominals are admitted in regular argument position with a mass interpretation: *I drank water, I ate soup, I bought furniture, ...* Unfortunately, that argument does not extend to French, for this language blocks bare nominals in argument position altogether (cf. footnote 2).

The second advantage is that we maintain a connection to Stvan's (1998) analysis, who argues that *at school* is perfectly regular, for *school* occurs in regular argument position, as illustrated in (10a) below. Note, however, that this criterion is difficult to apply to more creative bare PPs uses such as *by flying carpet*, because we have difficulty admitting such nouns in regular argument position, as shown in (10b). Note further that in languages other than English, even constructions like (10a) are difficult. In Dutch for instance, only the noun *school* is felicitous in regular argument position (10c), but no other noun is, (10d). However, *op school* ('at school') and *op kantoor* ('at office') are quite similar as bare PPs (lexical restrictions, enriched meaning, weak referentiality, etc.) (cf. Le Bruyn et al. 2010).

- (10) a. School was boring today, I hate school!
 b. ??I hate flying carpet!
 c. Ik haat school, school is saai!
 I hate school, school is boring!
 d. ??Ik haat kantoor!
 I hate office!

All in all, it may be difficult to get syntactic support for the mass status of the noun in bare PPs from the occurrence of the bare noun in regular argument position, so we should rather look for other types of evidence. The question arises what criteria to use to assess the mass/count nature of bare nominals in PPs like *at school*, *in jail*, *on album*, *by flying carpet*. One possible answer is to use criteria about plural morphology in comparative constructions, or compatibility of the noun with the indefinite article and with cardinals. This is the approach adopted by Kiss (2008) and Kiss et al. (2010). But this is a tricky issue, actually, because tests with countability, distributivity or comparison cannot take place within the bare PP construction, so we have to take the noun out of its bare PP context. But what does it mean to know that *by flying carpet* is perfectly acceptable but not configurations like *??much flying carpet* or *??There was a lot of flying carpet in the air*? We therefore prefer to seek evidence for the mass-count distinction within the bare PP from sources other than functional projections such as would have been contributed by plural morphology and articles in normal argument positions.

One piece of evidence we might contribute here is that the nominal in bare PPs is number neutral:

- (11) a. John and Mary are both in jail/at school/in hospital.
 b. Bill spent ten years in jail.
 b'. Bill spent ten years in a jail.

We can use the singular (unmarked) noun in (11a) even if we know that John and Mary are in different jails, schools, hospitals. Also (11b) can be used when Bill spent his detention in different jails, but this seems a less natural interpretation for (11b'). Number neutrality is a characteristic feature of bare nouns, and also arises in bare predication, bare noun incorporation, etc., see de Swart & Zwarts (2009) and references therein. Now under Chierchia's (1998) analysis, the number neutral interpretation of *jail* in *in jail* is indistinguishable from a plural denotation, so this could support the hypothesis of a default mass interpretation.

The question that remains to be answered is whether number neutrality is really the same as a plural or mass denotation. Under Chierchia's (1998) analysis it is, but Rullmann and You (2006) develop a slightly different ontology to account for the number neutrality of Mandarin bare nouns, and they explicitly refrain from associating number neutrality to a mass denotation. Until the ontological debate has been settled, it remains unclear whether number neutrality can be used as evidence in favour of a default mass interpretation of the nominal complement in bare PPs, so we will ignore it here.

At this point, we seem to be stuck. Section 4.1 showed that we cannot take the mass/count distinction to be inert in bare PPs. Section 4.2 showed that a default mass interpretation is not a viable option either. However, the data in this section show that we cannot assess the mass/count features of bare PP configurations like *at school* or *by flying carpet*, because there is not enough room to manipulate the construction and apply relevant criteria within the bare PP itself. The solution we propose is to investigate more productive bare PPs such as those in (9). It will prove insightful to take a comparative approach, and

include data from languages other than English. Section 4.3 uses corpus data from English and Dutch to show how we can focus on more productive classes of bare PPs. Section 5 develops a range of criteria to assess mass/count distinctions in so-called P-based bare PPs.

4.3 Data from monolingual English and Dutch corpora

English has a rich set of what Le Bruyn et al. (2010) call N-based bare PPs. We see that nouns like *school* occur bare with a range of prepositions (*in school, at school, to school, from school ..*). N-based bare PPs are then configurations in which the noun drives the bareness of the PP. Le Bruyn et al. (2010) distinguish these N-based bare PPs from what they call P-based bare PPs. In P-based bare PPs it is the preposition that seems to license the bare noun. They use corpus data to support the distinction. Baldwin et al. (2003,2006) make a similar distinction.

Le Bruyn et al. (2010) develop a relatively straightforward method to extract bare PPs from a monolingual corpus. They use tagged corpora, which permits them to extract the full set of occurrences of the form of a preposition P_i . They then calculate the number of occurrences of $P_i + N$ configurations in the corpus, and calculate the relative frequency of $P_i + N$ with respect to the total number of occurrences of P_i . The data are never a perfect comparison of bare to full PPs, because the percentage is calculated on the entire set of occurrences of the preposition, and prepositions also occur in other configurations, e.g. *without coming to a decision*. However, it gives a fair indication of the productivity of bare PPs.

They apply this method to English, Dutch, French and Spanish corpora to develop a classification of bare PPs in a comparative perspective. Here, we reproduce their results for English and Dutch, which is based on the work by Paenen (2009) and Van der Klis (2010), respectively. The English corpus investigated is the Brown Corpus from (1961). It is a tagged corpus consisting of 1 014 312 words. Table 1 spells out the number of occurrences per preposition, the number of bare PP occurrences, and the percentage of bare PPs on the total set of occurrences of the preposition in decreasing order.

Preposition	# occurrences	# occurrences + BN	% occurrences + BN
Per	370	323	87.30%
Without	574	139	24.22%
Concerning	62	13	20.97%
Of	35 023	6 722	19.19%
Under	686	115	16.76%
For	8 843	1 398	15.81%
In	20 724	3 175	15.32%
Into	1 778	237	13.33%
After	698	93	13.32%
Between	725	93	12.83%
Before	406	52	12.81%
With	7 260	851	11.72%
Including	166	19	11.45%
By	5 220	583	11.17%

Table 1: English preposition data (abridged), from van der Klis (2010)

From the table we can extract several prepositions that easily combine with bare nominal complements, the type that Le Bruyn et al. (2010) label P-based bare PPs. In English, these are the ones introduced by *per*, *under* and *without*:

- (12) a. *per* UNIT: per cent, per day, per pound, per mile, per acre, per head, per person, per patient, per student, ...
 b. *under* ACTION: under arrest, under attack, under battle, under siege, under debate, ...
 c. without analysis, without captain, without argument, without song, ...

English *per* is restricted to nouns that can be interpreted as a unit of quantification (12a), and this seems quite broad, as long as the noun provides the domain of quantification (e.g. *per patient* ‘for every patient’). The preposition *under* typically selects nouns that refer to an action applied to the external argument of the PP (12b). There are no obvious lexical restrictions on the bare nominal complement of *without*.

The corpus is not tagged for mass/count, so the examples in (12) have been manually selected as likely count nouns on the basis of the criteria developed in Kiss (2008) and Kiss et al. (2010). These criteria involve the use of plural morphology in comparison constructions and the use of an indefinite article in definitions. As argued in Section 4.2, these criteria are not decisive, for they are not based on criteria within the bare PP, so the status of examples like (12) in our investigation is as bare PPs involving potential count nouns (or count noun uses).

The Dutch corpus investigated by Paenen (2009) is the Eindhovencorpus (VU version). It is a tagged corpus containing 720 000 words. Table 2 provides the number of occurrences per preposition, the number of bare PP occurrences, and the percentage of bare PPs on the total set of occurrences of the preposition in decreasing order.

Preposition	translation	# occurrences	# occurrences + BN	% occurrences + BN
Per	Per	317	273	86.12
Zonder	Without	352	145	41.19
Onder	Under	1 151	285	24.76
Tot	Until, to	2 339	491	20.99
Buiten	Outside	151	30	19.87
Naar	To	2 665	308	11.56
Tussen	Between	668	75	11.23
Op	On	6 861	757	11.03
Met	With	6 761	728	10.77
In	In	15 500	1 512	9.75
Na	After	790	73	9.24
Bij	At, near	2 911	258	8.86

Table 2: Dutch preposition data (abridged), based on Paenen (2009)

From the table we can extract the prepositions that easily combine with bare nominal complements. In Dutch, these include PPs introduced by *per* (‘per’), *zonder* (‘without’), *onder* (‘under’) and *tot* (‘to/until’):

- (13) a. *per* MEANS: per brief (‘by letter’), per ballon (‘by balloon’), per auto (‘by car’), ...
 b. *per* UNIT: per productief manuur (‘per productive man-hour’), per regio (‘per region’), per kilometer (‘per kilometre’), ...
 c. *zonder* hoed (‘without hat’), *zonder* resultaat (‘without result’), *zonder* raam (‘without window’), *zonder* directe aansluiting (‘without direct connection’), ...

- d. *onder* ACTION: onder behandelng ('under treatment'), onder dekking ('under cover/protection'), onder druk ('under pressure'), ...
- e. de benoeming tot burgemeester ('the appointment as mayor'), zichzelf tot idioot maken ('to make oneself into an idiot'), tot badplaats opschroeven ('to upgrade to a seaside resort')

Dutch *per* has a broader set of uses than its English counterpart, in part because it uses *per* with nouns indicating means of transportation, while English uses *by* in that configuration. There are no obvious lexical restrictions on the nominal complement of *zonder* ('without'). Dutch *onder* seems to be like English *under*, in selecting action nouns in an important subset of its uses. The bare use of *tot* that is illustrated in (13e) is predicative: the bare nominal is a predicate applied to an NP elsewhere in the sentence.

Section 4.2 ended with the conclusion that we cannot ignore the mass/count distinction in bare PPs, and a default mass interpretation is not a viable option. However, we also found that N-based bare PPs do not allow us to investigate this properly within the bare PP itself. The main reason to present the data from the monolingual corpus investigations in this section is to show that there is a subset of bare PPs, the P-based bare PPs, that display more productivity than examples like *at school, in jail*. Section 5 will use these P-based bare PPs to manipulate features inside the PP to test countability of the nominal complement.

5. Mass/count use in bare PPs: empirical evidence from inside the PP

The investigation in this paper is driven by the question how we determine whether the nouns in bare PPs are count or mass (or are used as count or mass). Evidence coming from the behaviour of the nouns under consideration in other constructions is insufficient, because many nouns can shift from mass to count or from count to mass. Therefore, we focus here on evidence from within the bare PP to argue that the mass/count distinction is operative here. We offer four kinds of evidence in sections 5.1 through 5.4, coming from restrictions on noun interpretations, selection restrictions on the nominal complement introduced by the preposition, modifiers indicating count use, and the interpretation of flexible nouns. This section will lead to the conclusion that the grammatical approach gets a long way towards explaining the data, but ultimately fails. This leaves us with the lexical approach as a more attractive option. A comparative approach of Dutch and English bare PPs based on data from multilingual corpora will provide indirect, but independent evidence in support of this view (section 5.5).

5.1 Bare PPs tolerate nouns that are incompatible with a mass interpretation

Dutch diminutives constitute a class of nouns that are incompatible with a mass interpretation. If we add the suffix *-je* or *-tje* to a noun that otherwise allows both mass and count interpretations, the result is restricted to the count interpretation only, as illustrated in (14), based on the general paradigm in (1):

- (14) a. Ik heb steen/een steen
I have rock/a rock
- b. Ik heb een steentje/*steentje,
'I have a rock-DIM/*rock-DIM.

This observation leads to the following hypothesis about diminutives in bare PPs. If nouns in bare PP constructions are restricted to mass interpretations, diminutives should be blocked from bare PPs. Clearly, this is not the case. Diminutives are very frequent, and a free google search yields the following examples among many others:

- (15) a. Daarnaast zijn er ontelbare inhammen en baaitjes die per bootje bereikbaar zijn
[transportation *per*]
In addition there are innumerable creeks and bays that are reachable by
boat-DIM
<http://www.paxosinfo.com/nl/paxos%20eilandjes.htm>
- b. U heeft €10 per boekje betaald. [quantificational *per*]
You paid €10 a book-DIM.
<http://www.steun.nl/index.php?page=veelgestelde-vragen>
- c. Als ik moet kiezen staat het witte jasje het mooist, maar het liefst zie ik de jurk
zonder jasje, zoals ze het nu droeg.
If I have to choose, the white jacket-DIM looks best, but I prefer to see the dress
without jacket-DIM, the way she was wearing it now.
<http://troonopvolgers.web-log.nl/troonopvolgers/2008/06/deense-familie.html>

Diminutives constitute very strong evidence that count noun uses are at least possible in bare PP configurations, so bare PPs are not restricted to mass interpretations. However, diminutives are not a knockdown argument against a grammatical approach. According to Borer (2005: 92, footnote 6), the diminutive introduces a divider, so the suffix *-je* or *-tje* licences a special syntactic position above N. Under that approach, the bare PPs in (15) include disambiguating functional structure that supports a count interpretation of the nominal complement.

Note however that such an approach cannot handle the similarities in meaning between *per boot/per bootje* ('per boat/per boat-DIM'), *per boek/per boekje* ('per book/per book-DIM') or *zonder jas/zonder jasje* ('without jacket/without jacket-DIM'). We would have to assume that the internal structure of the two variants of the bare PP is fundamentally different. The PP *per bootje* 'by boat-DIM' would then contain a semantically interpreted component (in addition to the diminutive), which is lacking in the PP *per boot* 'by boat'. Given that both refer to the same type of object, this outcome is counterintuitive, which weakens the grammatical line.

Other noun classes than diminutives cannot necessarily be handled so easily. Borer's theory is built on the assumption that all nouns are born underspecified for mass/count. Doetjes (to appear) maintains that count nouns that refer to abstract objects such as *aspect* or *characteristic* typically resist mass use, because they cannot be ground to a substance. Unfortunately, such nouns are rarely found in bare PP environments. According to Doetjes, measure nouns such as *mile* and *kilometre* do not tolerate a mass use either. Interestingly, measure nouns easily occur in the *per* + UNIT construction in both English and Dutch, as illustrated in (12a) and (13b). Note that they do not require the diminutive suffix in Dutch, so there is no disambiguating functional structure to support a count interpretation.

We can draw three conclusions from these observations. First, Dutch diminutives offer a convincing argument in favour of the availability of a count interpretation in bare PPs. Second, the similarity in interpretation between bare PPs with nouns with and without the diminutive suffix suggests that there is more to this than grammar. Third and finally, measure nouns (that are non-diminutive and that are independently argued to resist mass interpretations) felicitously appear in bare PP configurations. All in all, both the lexicon and

morphology provide empirical evidence in favour of the availability of count interpretations in bare PPs.

5.2 Mass/count restrictions induced by the preposition

If mass/count distinctions are operative in bare PPs, as the data in Section 5.1 indicate, we would expect prepositions to impose restrictions on the interpretation of the nominal complement based on this distinction. In this section, we show that there are in fact prepositions in bare PPs that can select for either mass or count interpretations of the noun, whereas others are neutral.

The first piece of evidence comes from prepositions that take count nouns (or count noun uses) only. As we already saw, English and Dutch *per* have a quantificational use where the noun following *per* indicates the unit that the quantifier ranges over, and is always interpreted as count (16a, 17a). The quantificational use of *per* allows mass nouns, but only if they have shifted to a count meaning (16b, c 17b, c). In line with this, it also excludes substance nouns that are not easily shifted into kinds or portions (16d, 17d). No examples of these constructions were found in a free google search, and it would require unnaturally heavy contextual pressure to construct them in creative language use.

- (16) a. per mile/per patient/per acre/per word. [quantificational *per*]
 b. The fact that Blue Moon is considered a foreign beer in European countries actually raises the price per beer making a larger profit for Coors as a whole
 [count use of mass noun: portion]
[http://en.wikipedia.org/wiki/Blue_Moon_\(beer\)](http://en.wikipedia.org/wiki/Blue_Moon_(beer))
 c. The general rule of thumb for determining how much wine to pour per person is: 2 ounces of wine per glass, per wine for each tasting
 [count use of mass noun: kind]
<http://wine.about.com/od/holidayswithwine/ht/Winetastingpart.htm>
 d. ??per gold, ??per coal, ??per mourning, ...
- (17) a. per week/per student/per boekje [quantificational *per*]
 per week/per student/per book-DIM
 b. Per liefde schaf ik een nieuw parfum aan. [count use of mass noun]
 For each love I buy a new perfume
 c. De karper heeft in de winter zeer korte aasperioden, wat per water wel weer kan verschillen [count use of mass noun]
 In winter, carp has very short feeding periods, which can in fact differ per water.
 d. ??per zand ('per sand'), ??per steenkool ('per coal'), ??per verdriet ('per sadness'), ??per genot ('per pleasure')

The data in (16) and (17) can easily be accounted for under a lexical approach. The preposition *per* in Dutch and English simply requires common nouns with a singular count denotation. For the grammatical approach this is less straightforward. As far as we can see, one way to account for these restrictions under the grammatical approach is to assume that the preposition itself introduces the disambiguating functional structure that imposes the count interpretation. In Borer's theory, the quantificational use of *per* could be taken to license a divider above N. In Bale & Barner's approach, *per* can be taken to license a [+c] functional head as part of the meaning of the preposition.

While *per* selects count nouns, Dutch has a counterpart of this in the preposition *vol* ('full of'), which takes mass noun uses only, as illustrated in (18):

- (18) a. De kar ligt vol modder/zand/steen/touw/olie/water/groente.
The cart is full of mud/sand/stone/string/oil/water/vegetables.⁴
b. de mond vol appel ('the mouth full of apple'), een bak vol kip ('a bowl full of chicken'), een handje vol hond ('a small handful of dog'), ..
c. vol ??auto/??kers/ ??koe (no obvious mass interpretation)
full of ??car/ ??cherry/ ??cow
d. vol *touwjtje/ *appeltje/... (diminutives always count)⁵
full of *string-DIM/*apple-DIM

The complement of *vol* is typically a mass noun, as in (18a). (Plurals are also possible, but we will ignore those here.) (18b) shows that count nouns can only be used if they are shifted to mass. If such a shift is not possible, as in (18c), then the combination is ungrammatical, as is the use of diminutives (18d). The grammatical approach would have to assume that *vol* blocks a divider or a count functional head, in similar ways as the determiners *much* and *little* do in English. The lexical approach would simply assume *vol* to select mass denotations on the basis of its quantificational meaning.

Most other prepositions take both mass and count uses, as illustrated in (19) and (20) for English and Dutch *with/without*:

- (19) a. without restriction/without exception/without delay (most likely count)
b. without water/without gold/without pleasure (most likely mass)
(20) a. met/zonder open dak/ tuin/ hoed/ fles (most likely count)
with/without open roof/garden/hat/ bottle
b. met/zonder zand/ wijn/ water/ snoep/ plezier (most likely mass)
with/without sand/ wine/water/ candy/ pleasure

Whichever way we account for Dutch diminutives, and the selectional restrictions of quantificational *per* and Dutch *vol* under the grammatical approach, the data in Sections 5.1 and 5.2 provide strong evidence that both count and mass interpretations are available for a range of bare PPs, and may be driven either by properties of the noun or selection restrictions of the preposition. This result inevitably leads to the conclusion that the mass/count distinction is not invisible in bare PPs, but is operative here in similar ways as it is in many other syntactic configurations.

⁴ Unlike English *vegetables*, Dutch *groente*, like German *Gemüse*, is a mass noun.

⁵ Only in very special contexts can diminutive nouns be coerced to get a mass interpretation. Jenny Doetjes (p.c.) suggests the example of the count noun *gebakje* (a kind of individual cake usually reserved for special occasions), derived from the mass noun *gebak* (cake). Substance readings of *gebakje* are possible in contexts where we need to refer to the stuff associated with that special kind of individual cake, as in (i):

- (i) We hebben een foto van mijn dochter op haar eerste verjaardag met haar mond vol gebakje
We have a picture of my daughter on her first birthday with her mouth full of cake-DIM.
(ii) (subscript under a photo): een toetje vol toetje
een toet-je vol toe-tje
a face-DIM full of dessert-DIM

Example (i) offers a lot of contextual pressure to combine *gebakje* with *vol*, but even so, not all speakers tolerate this creative use, although some do. Example (ii) is an attested internet example, a word play with the homonyms *toet-je* ('a small face' from *toet* 'face') and *toe-tje* ('a small dessert' from *toe* 'afterwards'). The word play might facilitate the creative use of the bare PP here.

5.3 Restrictions on the interpretation of modifiers

The arguments offered in Sections 5.1 and 5.2 could potentially be dealt with in a syntactic way, even if that would presumably imply missing certain generalizations. The argument developed in this section is a purely semantic one, and one that cannot be repaired in the syntax. The argument is based on two generalizations that have long been floating around in the literature, but that were phrased most clearly by Bale & Barner (2009):

- (21) Generalization 1: no term that can be used in count syntax can also be used in mass syntax to denote individuals.
Generalization 2: mass nouns that support comparison based on number do not allow count uses.

Generalization 1 is illustrated in (22), generalization 2 in (23):

- (22) a. Esme has more ropes than Seymour. (comparison based on number)
b. Esme has more rope than Seymour. (comparison based on amount)
(23) a. Esme has more furniture than Seymour. (comparison based on number)
b. *Esme has three/some furnitures.

The nouns we are considering as potential count nouns in bare PPs are typically not *furniture* type nouns, but bona fide individual referring nouns like *hat*, *patient* or *car* or flexible nouns like *rope*. So in comparison constructions, they require plural morphology to refer to individuals (cf. 22a). Accordingly, they cannot be used to refer to individuals in mass syntax (generalization 1). On the assumption that the noun in bare PPs has individual reference (singular or number neutral, i.e. one or more), we can then hypothesize that the bare PP construction must involve their count use, not their mass use.

Now the claim about individual reference of the noun in bare PPs is non-trivial. Following insights by Espinal & McNally (2010) about bare nominals in Spanish and Catalan, and Aguilar & Zwarts' (2010) proposals about weak definites, we suspect that N-based bare PPs such as *in jail*, *at school*, *in hospital* involve reference to abstract objects (presumably kinds). Restrictions on modification as illustrated in (6) above support these claims. The nominal complement remains bare if the modifier introduces a subtype of the kind (*county jail*, *technical college*). However, any modifier referring to a concrete object requires an overt article (*the new jail*, *the best college*). We conclude that N-based bare PPs cannot be used to apply Bale & Barner's generalizations within the bare PP, because these nouns might not have individual reference in the first place, because they fall in a different semantic category.

We are better off looking at P-based bare PPs. Our argumentation is based on modification by adjectives that specify the shape or dimension of the object. As we see in (24), the nominal complement of *without* and *zonder* supports such modification:

- (24) a. without flat iron, without square background, without rectangular cavity, without small hole, ...
b. zonder hoog dak ('without raised roof'), zonder klein groen kruisje ('without small green cross-DIM'), zonder kleine telescoop ('without small telescope'), zonder grote kast ('without large cabinet'), zonder vierkante gesp ('without square clasp'), zonder ronde knop ('without round knob'), .. [Dutch]

Modified nouns in bare PPs introduced by *with/without* are abundant in Dutch, whereas they are somewhat more restricted in English. Nevertheless, the point is easy to make: adjectives of size and shape are unambiguously pointing towards count nouns (cf. Bunt 1985, Cheng & Sybesma 1998). In Borer's terms, shape/dimensional adjectives exclusively operate on count nouns because they bear on individualized, atomic entities. So the presence of the adjectives in (24) shows that the bare PPs involve individual reference, and thereby unambiguously signal a count use of the bare nominal complement. Note that it seems unlikely that shape/dimensional adjectives can licence the functional structure of a divider or a count head, the way a preposition like *per* might be taken to do (cf. section 5.2 above). Rather, this is a semantic selection restriction that cannot be pushed into the grammar.

Now, for productive (P-based) bare PPs, we do want a unified semantics for constructions like *riem zonder gesp* ('belt without clasp') and *riem zonder vierkante gesp* ('belt without square clasp'). After all, they can both be used to refer to the same object. If the two expressions can be used to refer to the same object, generalization 1 states that it is impossible to take *gesp* as mass in *zonder gesp*, because the same noun gets a count use in *zonder vierkante gesp*. Under Bale & Barner's generalizations then, even the optional appearance of shape/dimension adjectives makes it impossible to maintain an exclusively mass interpretation for the same noun without the modifying adjective in the same bare PP configuration.

This result will be strengthened in Section 5.4, where the interpretation of bare PPs is scrutinized in the context of the noun that the bare PP is modifying.

5.4 Flexible nouns: mass/count alternations in bare PPs

The literature indicates that some nouns are more flexible than others in allowing mass-count alternations. For nouns that are very flexible (*rope, string, stone,...*), Bale & Barner (2009) emphasize the usefulness of comparison by number (count use, 22a, cf. also 8a) and comparison by amount (mass use, 22b, cf. also 8b). We predict then that the count use of such flexible nouns appears with Dutch diminutives and in quantificational *per* constructions, whereas the mass interpretation is selected with the Dutch preposition *vol*. These predictions are borne out in (25):

- (25) a. Two diameter values per stone are measured, corresponding to the maximal diameter and the sieving diameter. (quantificational *per*: count use)
<http://adsabs.harvard.edu/abs/1996SPIE.2785..129R>
- b. Help de levens van moeders en kinderen te redden - bouw met ons mee en adopteer een steen! De kosten per steen bedragen €5 en iedere steen telt! Help to save the lives of mothers and children – help us construct (a mother and child house) by adopting a stone. Expenses per stone are €5 and every stone matters! (quantificational *per*: count use)
<http://community.millenniumakkoorden.nl/blog>
- c. Voor de bouw zijn 2500 wagens vol steen uit het Colosseum gehaald. 2500 carts full of stone were taken from the Colosseum to construct (the church). (mass use)
http://www.reisweb.nl/reisverhalen/reisverhaal.php?reisverhaal_id=47428

The examples in (25) confirm that the interpretation of nouns like *stone* is flexible, and adapts to its environment. However, not all prepositions impose selectional constraints on their nominal complement. The grammatical approach predicts that, in the absence of selection restrictions or other disambiguating functional structure, bare PP configurations with flexible

nouns like *string*, *rock*, *chocolate* get a default mass (substance) interpretation, rather than a count (object) interpretation. The lexical approach predicts that both the count (object) and mass (substance) interpretation are available in such a context.

In order to test this hypothesis, we need to look for examples of *stone*, *string*, *chocolate* type nouns in bare PPs headed by *with/without*, because these prepositions allow both mass and count noun uses, as shown in Section 5.2. Corpus data indicate that *with/without* bare PPs allow both count and mass readings of flexible nouns, depending on the larger context. In examples like (26) and (27), we easily detect ambiguities of the type in (22):

- (26) a. With the comfortable Wellness tampon without string you can visit the sauna, wellness centre, thermae or spa discretely and nothing to worry about.
<http://www.tamponwellness.com/en/> (count use: object)
- b. What a brilliant invention string is/was! Where would we be without it?
 No cloth without string, so no sails for boats and ships, so no discovery and travel. (mass use: substance)
<http://www.punterchat.co.uk/forum/archive/index.php?t-18802.html>
- (27) a. Het is een graf zonder steen. [Dutch] (count use: object)
 It is a grave without (head)stone
<http://www.sleyster.nl/docs/heerdenieuwebegraafplaats.htm>
- b. Levendsteen mag enkel in gerijpt water aangebracht worden, dus kies je ervoor om zelf je zeewater samen te stellen dan moet je bak in ieder geval eerst draaien op enkel water zonder steen! (mass use: substance)
 Live rock should only be introduced after the tank has been set up, so if you choose to create your own sea water, than your aquarium should first run on just water without stone.
<http://zwanebloem.com/grootscherm/zoutaquarium.htm>

As far as we can see, the count and mass readings found in (26) and (27) provide the decisive argument against the hypothesis that nouns in bare PP construction have a default mass interpretation. Both mass and count readings are possible when the preposition has no particular selective preference.

Where does this lead us to? Sections 5.1 and 5.2 showed that the mass-count distinction is operative in bare PP configurations, but also suggest that syntax might still play a role in this. However, in section 5.3, shape/dimensional adjectives show that individual count reference is straightforwardly possible in bare PPs. This conclusion carries over to the non-modified counterparts, because nouns with and without modifying adjectives are semantically related. In this section, flexible nouns were used to show that the mass/count distinction is found in bare PPs even in the absence of plural morphology, diminutive inflections, articles, modifiers or any other kind of overt material disambiguating between the two readings of flexible nouns. Ultimately then, the semantic arguments provided by modification in section 5.3 and flexible nouns in section 5.4 shows that the grammatical approach fails. Section 5.5 compares instances of English and Dutch bare PPs introduced by *without* extracted from multilingual corpora as indirect support in favour of this conclusion.

5.5 Comparative evidence: without in English and Dutch

In Sections 4.1, 5.1 and 5.3, we pointed to similarities between PPs with and without overt material signalling countability (*in hospital* – *in the hospital*, *without restriction* – *without a restriction*) to emphasize that we need to develop a unified account of these constructions. So

far, the evidence we provided was based on constructed examples. This section pushes the argument a bit further by setting up a more systematic investigation of the alternation between bare and full PPs across languages extracted from multilingual corpora, as based on Van der Klis (2010).

The starting point of the comparison of English and Dutch bare PPs resides in the observation made in Section 5.2 that *with/without* type prepositions are neutral with respect to the mass/count distinction, and are compatible with both interpretations. We suspect that there are no particular lexical constraints on the nouns that occur in the nominal complement of bare *with/without* PPs, but at the same time, languages vary in their use of bare nominals after *with/without*. Intuitively, we feel that bare nominal complements are used more freely in Dutch than in English. We propose to exploit that variation to test two possible hypotheses concerning the interpretation of nominals in bare PPs:

- (29) Hypothesis (i): if nominals in bare PPs occur in their mass use, we should find alternations/ translation relations that reflect this, such as mass nouns without count counterparts, or adverbial/adjectival constructions that support a mass interpretation. Hypothesis (ii): if nominals in bare PPs also occur in their count use, we should find alternations/translation relations that reflect this, such as nominals with an indefinite article.

Hypothesis (i) is in line with the grammatical approach, whereas Hypothesis (ii) is in line with a lexical mass/count distinction. The strategy we follow uses the parallel Europarl (Koehn 2005). This corpus consists of meetings of the European Parliament, which can be aligned in pairs of languages. We used the last quarter of the 2000 proceedings, which is just over 1 million words in size in both English and Dutch.

The corpus is not tagged, so we cannot use the method developed in Section 4.3 above. Instead, we searched for all occurrences of *without* in English. We manually filtered out the uses in which *without* is the head of a relative clause or is otherwise not followed by a noun phrase. Of the remaining occurrences of *without* followed by a noun phrase, we then selected the set of potential singular count nouns, according to the same criteria we used in Section 4.3. We categorized all examples as bare or preceded by a definite or indefinite determiner. Each of these hits was matched with the Dutch translation from the corpus. We categorized the results into one of the three categories of *zonder* + NP, namely bare, definite, indefinite. We added a ‘residue’ category into which we put the translations which do not consist of *zonder* + NP. We repeated the entire procedure for Dutch *zonder*, to complete the picture from the other direction.

In total, we are looking at 181 items, so we emphasize that this constitutes a small scale pilot project. In (30) we give examples where an article appears in the translation of a bare PP. (31) illustrates two cases where the translation of a bare PP is non-nominal.

- (30) a. Het gaat om het recht om zonder beperking toegang te krijgen tot documenten
‘It concerns the right of access to documents without restriction.’
Dutch → English, bare → bare
- b. (...) landen zonder vetorecht zijn eerder deelstaten dan zelfstandige naties.
‘(...) countries without the right of veto resemble constituent states more than independent nations.’
Dutch → English, bare → definite
- c. En dat is wat ik bedoel als ik zeg dat we te maken hebben met een rechtsorde zonder beleid.
‘This is what I mean when I talk about a law without a policy.’

- Dutch → English, bare → indefinite
- d. It has to be done, without hesitation and without delay, and on a massive scale.
 ‘Dit is wat wij zonder enige aarzeling en zonder enig uitstel moeten doen, en wel op massale schaal.’
 English → Dutch, bare → indefinite
- (31) a. zonder aarzeling ⇒ resolutely | without doubt ⇒ ongetwijfeld
 Dutch → English | English → Dutch, bare → residue
- b. Wij zijn tot de slotsom gekomen dat het de voorkeur verdient dat wij ten aanzien van dit verslag overgaan tot stemming zonder debat.
 ‘We have agreed that it would be better to proceed to the vote without debating the report.’
 Dutch → English, bare → residue

We found almost all combinations of categories exemplified in the corpus. The frequency results are shown in Table 3, where rows indicate the different forms of the English original, and columns provide the category of the Dutch translation:

↓ English\Dutch →	# bare	# indef	#def	#residue	#total
# bare forms	16	3	0	46	65
# indefinites	10	17	1	24	52
# definites	3	1	6	2	12
# residue	32	14	6	-	52
# total	61	35	13	72	181

Table 3: frequency table for En *without* to Du *zonder* translations on 1 million words Europarl, from van der Klis (2010)

In so far as the prepositions are translated by a construction with a nominal complement, the table reveals that, under normal circumstances, bare forms are translated with bare forms, indefinites with indefinites, and definites with definites. But there are some interesting deviations from this rule. When translating English *without* + indefinite NP to Dutch (2nd row), we see that 10 out of 52 hits (19.2%) are translated with a bare noun. The other way around, an English bare form to a Dutch indefinite, we see that this is only 3 out of 65 (4.6%). An ANOVA test reveals that this difference is statistically significant, so English is more likely to use a “stronger” discourse referential expression (indefinite or definite), rather than a weakly referential bare noun. This is in line with our intuition that English makes less liberal use of bare nominal complements with *with/without* prepositions than Dutch. The fact that there is a sizable number of translation correspondences between *without/zonder* + bareNP and *without/zonder* + indefNP indicates that translators feel that the count use of the noun was possible in the bare construction in one of the two languages. These data then provide support in favour of Hypothesis (ii) in (29).

There is a substantial set of residual translations. A large sample of these is taken up by the type of adverbs illustrated in (31a) or gerunds as in (31b). These translations seem to support the weak discourse referentiality of bare nominals in bare PP constructions (cf. Section 2 above). However, the residual translations do not clearly argue in favour of or against a mass interpretation of the bare noun. This implies that the residual translations do not help to decide between hypotheses (i) and (ii) in (29).

We conclude that Table 3 provides tentative and indirect evidence in favour of hypothesis (ii). The dataset is a bit small, so more indepth research is needed to finetune the interpretation of residual translations and strengthen these results. At least our preliminary

investigations into multilingual corpora suggest that this is a fruitful way to extend the monolingual corpus research presented in Section 4.3.

6. Conclusion

The debate between lexicalist and grammatical analyses of the mass/count distinction usually does not bear on constructions in which the noun occurs bare, i.e. constructions without the presence of disambiguating functional structure. In this paper, we argue that the investigation of productive subclasses of bare PPs in languages like English and Dutch reveals that we can use this construction to put the grammatical view to the test. We focus on empirical evidence within the bare PP, and show that interpretations exist that are unambiguously count or mass. We conclude from this that the lexicon has an important role to play in deciding countability issues. However, this does not mean that grammar does not matter. It is still the case that the grammatical context (especially determination and quantification) plays a role in determining the interpretation of a noun as mass or count. How are we to reconcile the two lines of thought?

The solution might come from a recent proposal made by Pelletier (2010). In his view, nouns do not have a syntactic mass/count feature at the lexical level, so they are syntactically neither mass nor count. However, this does not mean that nouns get a default mass interpretation. Rather, lexical items are semantically *both* mass and count, that is, all possible meanings are part of the lexical semantics of the item. This includes meanings corresponding to count use such as object meanings, standard servings or kind reference as well as meanings corresponding to mass use such as material meaning, substances, etc. Putting a noun in a syntactically +count environment removes the mass denotations from the denotation. Putting a noun in a syntactically +mass context removes all count interpretations from the denotation.

Pelletier's work offers an interesting perspective on bare PPs. For Borer or Bale and Barner, a lexical root that has been classified as +n(oun), but not classified as count through the presence of count functional syntax is treated as mass. This leads to the prediction that all nouns in bare PP configurations get a default mass interpretation. However, the bare PP data presented in this paper do not support this analysis. Under Pelletier's analysis, on the other hand, both mass and count interpretations of the bare nominal are available in bare PP configurations. This immediately accounts for the flexible noun interpretations we put forward in Section 5.4 as a decisive argument against the grammatical line. It also explains the other data in a natural way. We conclude therefore that bare PPs support a view of the mass/count distinction that involves both lexicon and grammar.

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