In this note we discuss a couple of Dutch prepositions that systematically combine with a common noun phrase, without any determiner. We explore whether we can analyze these prepositions as having ‘incorporated’ a determiner, semantically speaking, and discuss the consequences of this analysis for the status of bare nominals, the demarcation of syntactic and semantic categories, and the relation between form and meaning.

1 D(eterminer)s and det(erminer)s

In contrast to the increasingly narrow notion of determiner (‘D’) in generative syntax, leaving sometimes only a lonesome article (e.g. Leu 2008), there is a very broad notion of determiner (‘det’) in generalized quantifier theory. Apart from the usual suspects, Keenan & Stavi (1986:253-6) include basically any expression that can combine with a following common noun to form a complete noun phrase, such as:

(1) only the most liberal and the most conservative, all but the two tallest, more than twice as many male as female, neither the tallest nor the strongest

Add the noun students to these and what you get is a full noun phrase.

We know how fruitful it has been for the programme of formal semantics to cast the determiner net so wide. Furthermore, in most cases, more complex dets can be compositionally derived from simpler ones. The adjectival det most liberal (as in most liberal delegates) can be given an interpretation by doing function composition of the interpretation of most and the interpretation of liberal, i.e. most-liberal or \( \lambda X.\text{most(}\text{liberal}(X)\text{)} \). The border between determiners and adjectives is not always clear, as the much debated status of words like many and few shows. That is the lower, right hand border of the category of determiners, but there are also disputes at the upper, left hand border. The word only in the sentence Only dogs bark has been argued not to be a determiner, because it does not satisfy conservativity, but should rather be treated as the kind of focus particle that combines with all sorts of phrases.

2 Per noun

There is another border issue at the ‘left periphery’ of the noun phrase that, as far as we know, has not received much attention. Take the following example (from the British National Corpus):

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The law exempted only one son per family.

The preposition *per* takes a bare nominal here and uses it to express something like ‘for every’ (‘For every family the law exempted only one son’). Although the determiner is structurally missing, it seems to be carried along, semantically speaking, by the preposition *per*, as a kind of portmanteau for ‘for every’, a quantificational preposition, in other words. It suggests that the domain of determiners partly encroaches on the domain of prepositions. We already know that there is formal interaction between prepositions and determiners from contraction patterns like those in French (e.g. *au < a le*) or German (e.g. *zum < zu dem*).

There are two reasons why this semantic phenomenon exemplified by *per* is not so conspicuous. The first reason is that it easily gets lost in the big and confusing problem area of bare nominals in general. Even when considering only prepositional phrases, there are all sorts of cases (like *to school, for president, by train*) that might obstruct our view and it takes some effort to sort out the different types of determinerless PPs. The second reason is that cases like (2) are in fact quite limited in English. They are more common in Dutch (and other ‘continental’ languages). Therefore, to get a better view on the phenomenon of quantificational determiners, we will consider determinerless PPs in Dutch and isolate a relevant subclass.

### 3 Dutch bare PPs

‘Bare PP’ is quite a loose term for a constituent that consists of a preposition followed by a common noun that in other circumstances is accompanied by a determiner, but that can not or need not have one in this construction. Building on Van der Beek (2005) and Baldwin et al. (2006) we can distinguish three major types.² (The terminology is ours.)

1. **PN-based bare PPs**: aan kant (at side, ‘in place’), buiten spel (outside game, ‘offside’), in scène (in scene, ‘faked’), op slot (on lock, ‘locked’), van slag (off stroke, ‘upset’)
2. **N-based bare PPs**: op school (‘at school’), uit bed (‘out of bed’), aan tafel (‘at the table’), naar zolder (‘to the attic’), aan wal (‘ashore’)
3. **P-based bare PPs**: als eenvoudige infanterist (‘as a common infantryman’), per auto (‘by car’), per kilometer (‘per kilometre’), richting centrum (‘towards the centre’), zonder vergunning (‘without a license’)

The first class consists of PN combinations that have a non-compositional semantics and that are not part of a wider pattern. Neither the preposition nor the noun can be varied, so we can treat them as fully fixed idiomatic expressions.

The second class is based on an idiosyncratically delineated class of common locative nouns. The preposition can be varied, e.g. *uit bed* ‘out of bed’, *naar bed* ‘to bed’, *in bed* ‘in bed’, but not the noun (compare *naar zolder* ‘to the attic’ with *naar *(de)* kelder* ‘to the basement’ and *op school* ‘at school’ with *op *(de)* universiteit* ‘at university’). The interpretation has a compositional core, but with a type of pragmatic enrichment that has mainly to do with stereotypical use (see Stvan 1998 for the parallel situation in English and Aguilar-Guevara 2013 for further discussion). These bare nouns alternate with so-called weak definites (Carlson & Sussman 2005), like *the hospital* in *Alex is in the hospital* or *the store* in *Robin went to the store* in English, that do not refer to a uniquely

² Additional work on Dutch bare PPs was done by Paenen (2009) and Van der Klis (2010).
given hospital or store in the context, but that rather describe interaction with a kind of general ‘institute’. Aguilar-Guevara & Zwarts (2011) analyze such definites as referring to kinds. This kind-based analysis can be extended to cases like prison in Alex is in prison or church in Robin went to church that behave in very much the same way, apart from the lack of the article, which is an idiosyncratic property of the noun. The conclusion is then that the bareness of bed in in bed is a property of the noun and not of the preposition.

The third class of bare PPs contains the types that we are interested in. The noun here varies, while the preposition is fixed. About a dozen prepositions in Dutch have the ability to combine with a bare common noun in a more or less productive way. Sometimes the nouns are restricted to a particular semantic class, like means of transportation (per auto ‘by car’, per vliegend tapijt ‘by flying carpet’), clothing items (in bikini ‘wearing a bikini’, in rok ‘wearing a skirt’), or journeys (op kruistocht ‘on a crusade’, op vakantie ‘on a holiday’), or they can’t be modified, like richting centrum lit. direction centre ‘towards the centre’. We set these cases aside because they are not fully productive. In other cases, see (3) and (4), the bare noun seems to function as the predicate of a noun phrase elsewhere in the sentence and the preposition is almost a kind of copula (Emonds 1984):

(3) Ik ben als bedelaar geboren.  (4) Ik ben opgeleid tot monteur.
I am as beggar born  I am trained to mechanic
‘I was born a beggar’  ‘I was trained to be a mechanic’

In such constructions the bareness is closely connected to the general predicative role of the nominal (Stowell 1989) and therefore somewhat independent of the preposition. When we also set these cases aside we are left with the prepositions per ‘per’, zonder ‘without’, met ‘with’, and vol ‘full of’, to which we will now take a closer look.

4 Per, vol, met and zonder

These four prepositions have in common that they must or can take a bare non-predicative noun in a productive way without any sortal or structural restrictions. The following examples show these PPs in a postnominal position:

(5) a. één appel per (*de/*een) mand
one apple per (the/a) basket
‘one apple per basket’

b. de mand vol (*de) appels
the basket full (*the) apples
‘the basket full of apples’

c. een mand met (een) handvat
a basket with (a) handle

(d. een mand zonder (een) handvat
a basket without (a) handle

All of these prepositions are loosely based on a general semantic relation that could be characterized as ‘having’ or ‘being with’. This relation is not only spatial (proximity

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3 The preposition vol ‘full of’ differs from the combination vol met ‘full with’ in never allowing a determiner: vol met de beste muziek lit. full with the best music ‘full of the best music’, but *vol de beste muziek lit. full the best music.
or close contact), but it often seems to bring along richer, functional relations between the
two relata.

However, there are differences between *per* and *vol* on the one hand and *met* and
*zonder* on the other hand. First, as illustrated in (5), for *per* and *vol* determiner omission
is obligatory, while for *met* and *zonder* it is optional. Second, *per* and *vol* impose
restrictions on the number of the noun they combine. *Per* only occurs with singular count
nouns (6a), *vol* only with mass and plural nouns (6b), *met* and *zonder* with all sorts of
nouns (6cd).

(6)  a. *(één persoon)* per stoel/*per stoelen/*per meubilair
    *(one person)* per chair/per chairs/per furniture
    *(one person) per chair*
  b. *(een kamer)* *vol stoel/vol stoelen/vol meubilair
    *(a room) full chair/full chairs/full furniture
    *(a room) full of chairs/furniture*
  c. *(een mand)* met handvat/met gaten/met kant
    *(a basket) with handle/with holes/with lace
  d. *(een mand)* zonder handvat/zonder gaten/zonder kant
    *(a basket) without handle/without holes/without lace

Note that *per* is different from the other prepositions in typically requiring a
numerically specified set over which it can distribute the units denoted by its complement
noun. For example, in *honderd kilometer per uur* ‘a hundred kilometres per hour’ the
quantity denoted by *honderd kilometer* is distributed over the units denoted by *kilometer.*

5  *Per* as a quantificational preposition

As Zimmermann (2002) notes, constructions with *per* parallel distributive
constructions with universal quantifiers:

(7)  a.  drie bewakers *per gevangene*  *(Dutch)*
  b.  three guards *for every* prisoner  *(English)*
  c.  drie Bewacher *je* Gefangenen  *(German)*

The analogy can be brought out nicely if, building on Zimmermann (2002), all three
constructions are analyzed as involving, semantically speaking, a preposition and a
determiner. In (7b) both are analytically expressed, but in (7a) and (7c) there is only one
word expressing the semantic composition. This distributive quantifier immediately
explains why *per* selects only singular count nouns: that is exactly what we see with the
distributive quantifier *each* too.

In order to isolate the lexical specification of *per*, let us start with the logical form in
(8a). In order to account for the universal quantifier taking wide scope over the numeral
we treat the numeral together with the *per* PP as one complex determiner (8b), that can be
derived by taking the *per* PP as a function from determiners to determiners (8c), which
ultimately gives us the rather complex interpretation of *per* given in (8d).

---

4 The morpheme *je* corresponds to the first part of the regular universal determiner *je-der* in
German.
This interpretation clearly shows how universal distributive quantification is packaged together with a general locative relation in one lexical item. It is also interesting to note that *per* only associates with certain determiners:

6. *Vol* as a quantificational preposition

Our analysis of this preposition can only be very rough. We assume that its meaning involves universal quantification over parts of a contained space, given a proper, context-sensitive partition of that space. Filling a space with something means that every part of such a partition of that space is occupied by sums of that something. In the following representations, the universal quantification \( \forall \) takes care of the first condition, the sum operator \( \sigma \) takes care of the second part and it enforces the restriction to cumulative (plural and mass) nouns.

How does this work? The universal quantification in (10a) and (10b) is true for a basket that is full of apples, because for any portion of space \( y \) inside the basket that is not too small, the sum of objects in that portion, given by \( \sigma z. \text{have}(y,z) \), is always a member of the denotations apples and fruit. The reason is, of course, that corresponding to bigger and smaller regions of space these denotations contain both smaller and bigger

\[ \lambda x. \text{basket}(x) \land \forall y. \text{part}(y,x) \rightarrow \text{apples}(\sigma z. \text{have}(y,z)) \]

\[ \lambda x. \text{basket}(x) \land \forall y. \text{part}(y,x) \rightarrow \text{fruit}(\sigma z. \text{have}(y,z)) \]

\[ \lambda x. \text{basket}(x) \land \forall y. \text{part}(y,x) \rightarrow \text{apple}(\sigma z. \text{have}(y,z)) \]

\[ \lambda N. \lambda M. \lambda x. M(x) \land \forall y. \text{part}(y,x) \rightarrow N(\sigma z. \text{have}(y,z)) \]
splits of objects to fill those regions. However, the universal quantification in (10c) is always falsified, because there will always be a portion of space \( y \) in the basket that does not contain a single apple (but more apples, or an apple part, or no apple at all). Intuitively, the denotation apple is ruled out because its quantized structure does not allow the smaller and bigger regions of space to be filled.

Interestingly, the range of the universal quantifier in a structure \( M \ vol N \) is not \( N \), but \( M \), in a sense. There is no universal quantification over apples or fruit in (10), but over basket parts. There might be a similarity here with the focus particle only, which also has universal quantification over the expression that is not its direct argument:

\[
\begin{align*}
(11) & \quad a. \ M \text{ is } [\ vol N ] = \text{‘all of } M \text{ is } N' \\
& \quad b. \ [\ only N ] M = \text{‘all } M \text{ is/are } N'
\end{align*}
\]

Related to this is the observation that the complement of vol is not the ground, as with most prepositions, but the figure (Talmy 2000:333), that is, the object that is moving:

\[
\begin{align*}
(12) & \quad a. \ \text{Smoke (F) slowly filled the room (G).} \\
& \quad b. \ \text{The room (G) slowly filled with smoke (F).}
\end{align*}
\]

So, although vol carries along a universal quantifier, its restriction is not the nominal that follows it but the nominal that precedes it, but it is still the ground of the spatial relation and not the figure. The cumulative reference property of vol is not a direct selectional restriction, but it follows indirectly.

7 *Met* and *zonder* as quantificational prepositions

The English prepositions with and without occur less frequently in corpora without an article than their counterparts in French (avec, sans), German (mit, ohne), and Dutch (met, zonder). These are not marginal prepositions, but they have a high frequency and many different senses (see, for example, Kiss et al. 2010 for German ohne).

One possibility is to analyze the bare use of *met* and *zonder* as involving an incorporated existential determiner (with an additional negation for *zonder*):

\[
\begin{align*}
(13) & \quad a. \ (een) \ \text{mand met handvat} \\
& \quad \lambda x. \text{basket}(x) \land \exists y. \text{handle}(y) \land \text{have}(x,y) \\
& \quad a'. \ \text{met: } \lambda N. \lambda M. \lambda x. M(x) \land \exists y. N(y) \land \text{have}(x,y) \\
& \quad b. \ (een) \ \text{mand zonder handvat} \\
& \quad \lambda x. \text{basket}(x) \land \neg \exists y. \text{handle}(y) \land \text{have}(x,y) \\
& \quad b'. \ \text{met: } \lambda N. \lambda M. \lambda x. M(x) \land \neg \exists y. N(y) \land \text{have}(x,y)
\end{align*}
\]

This immediately accounts for the lack of the determiner and the indefinite existential force that the bare nominal has. However, the disadvantage is that we need two entries for *met* and *zonder*, a normal version and quantificational version, with the existential determiner incorporated.

Other possibilities include postulating a zero existential determiner, a type shift in the spirit of Chierchia (1998) or trying to extend the analyses Partee and Landman have proposed for existential have in a number of joint and individual papers (see Partee 1999 and Landman 2004). We leave the exact analysis for future research, while concluding
that it is at least possible to treat *met* and *zonder* as quantificational prepositions in a straightforward way.

### 8 The level of bareness

In addition to their determiner, bare nominals across many different constructions and languages are often argued to lack also their number specification, i.e. they are essentially mass nouns. For some authors this is connected to the strong theoretical claim that number specifications come from the syntax and that nouns come from the lexicon with an unspecified mass denotation (e.g. Borer 2005, Bale and Barner 2009). It is only when an article like *a* or plural morphology is added to a noun that it gets countability and number. The prediction is then that a noun without either determiners or number marking has a mass denotation. The lexicalist alternative to this constructionalist view is of course that noun roots come out of the lexicon with a clear identity (although there might be shifts between mass and count). Bare PPs form an interesting testing ground for these views.

The Dutch bare PPs that we have discussed challenge the constructionalist view and support the lexicalist view. The first observation is that we find diminutives in bare PPs, which in Dutch are always count:

(14) a. tien euro per boekje
    ten euro per book-DIM
    ‘ten euro per booklet’

b. een jurk met/zonder jasje
    a dress with/without jacket-DIM
    ‘a dress with/without a jacket’

However, for the constructionalists it is possible to view the diminutive suffix as part of the syntax of number (De Belder 2008). To the extent that that is a feasible option, this argument loses its force.

The second observation is that *per* and *vol* select for nouns with particular number properties. *Per* takes singular count nouns, *vol* takes the complementary class. If we use a noun that does not fit, then this makes the familiar shifts to the opposite class (grinding or sorting):

(15) a. de prijs per bier
    the price per beer
    ‘the price for every glass/kind of beer’

b. een bord vol kip
    a plate full chicken
    ‘a plate full of chicken’

It is not clear how such selections are possible in a constructionalist framework if the noun is a completely unspecified. The only possibility would be to assume that there can be number syntax in prepositions. In other words, *per* does not only incorporate a universal quantifier, but also a singular count specification.

The third observation is that we find mass/count ambiguities with *met* and *zonder* without any overt marking:

(16) a. een graf zonder steen
    a grave without stone
    ‘a grave without (a) stone’

b. een fles met glas
    a bottle with glass
    ‘a bottle with (a) glass’
Where does the ambiguity come from if there is no overt marking? From the lexicon, says the lexicalist view. The constructionalist view seems to have no way to account for this ambiguity.

The final observation concerns adjectives that only occur with count nouns and that we also find in bare PPs:

\[(17) \]
\[
\begin{align*}
a &. \quad \text{een riem zonder vierkante gesp} \\
& \quad \text{a belt without square clasp} \\
& \quad \text{‘a belt without a square clasp’} \\
b &. \quad \text{de paaltjes met ronde knop} \\
& \quad \text{the poles with round knob} \\
& \quad \text{‘the posts with a round knob’}
\end{align*}
\]

It is not clear how the distribution of such adjectives can be determined if all nouns are essentially mass.

So we conclude that bare PPs also provide motivation for a view that locates the mass/count distinction primarily in the lexicon.

Conclusion

Having taken a closer look at four bare PPs in Dutch, we can conclude that there is clear evidence that one preposition \((\text{per})\) is at the same time functioning as a universal determiner. Another preposition \((\text{vol})\) also has universal quantificational force, but the noun that this quantifier ranges over is not its object, but its subject, in a sense. The situation with \(\text{met}\) and \(\text{zonder}\) does not unequivocally point to an incorporated quantifier, although this is a possible analysis.

The phenomena that we have discussed indicate that categories might not always be nicely separated, not paradigmatically, but also not syntagmatically. The item \(\text{per}\) is both a preposition and a determiner, and the same can be said perhaps of German \(\text{je}\) and English \(\text{a}\) \((\text{an apple a day})\), which, given their combinatorial possibilities, cannot be just determiners. Seen from another angle this means that syntactic and semantic elements do not line up in a one to one fashion as some models would like it.

There are many interesting questions that remain after a short paper like this. We have suggested that the prepositions discussed here are all based on a general ‘have’ relation. If that is true, then the question is why this would be so, and how it relates to the fact that also in bare object constructions in other languages this ‘have’ relation has been found to be important (Espinal & McNally 2011). One also wonders whether there might not be a system, like the square of oppositions, underlying these prepositions, given the way universal and existential quantification, and negation figure. Another question concerns the historical development and cross-linguistic distribution of bareness in this domain. Given that English \(\text{with}\) and \(\text{without}\) seem different from their continental counterparts, one wonders what drives the omission of the article. In the case of \(\text{per}\), it might be a remnant from the determinerless Latin source, but this cannot be the case for \(\text{zonder}, \text{ohne}\) and \(\text{sans}\), which are quite different items.

In other words, quantificational prepositions constitute a domain where the semantics of quantification and the syntax of prepositions interact in an unusual, but interesting way, raising questions about synchronic and diachronic aspects of the mapping between meaning and form in this domain.
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