On the distribution of pre-determiner universal quantifiers in Dutch*

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1. Introduction

This paper studies the distribution of universal quantifiers that occur to the left of the determiner in Dutch, henceforth pre-determiner universal quantifiers or PUQs. An example is given in (1).

(1) al de chocolade
all the chocolate
'all the chocolate'

Zwarts (1992) observes that such PUQs come in two types in Dutch, viz. *al* 'all' and *heel* 'whole'.[1] They are in complementary distribution: the first one, *al* 'all', occurs with definite mass nouns (2a) and definite plural DPs (2b), the second one, *heel* 'whole', is restricted to definite singulars (2c).

(2) a. {al / *heel} de chocolade
all/whole the chocolate
'all the chocolate'
b. {al / *heel} de regio's
all / whole the regions
'all the regions'
c. {*al / heel} de regio
all /whole the region
'all the region

Al 'all' is not specified for number. If it were specified for singular it would not be able to co-occur with plurals. If it were specified for plural, it would not be compatible with mass readings, which are unspeficied for number[2]. As far als *heel* 'whole' is

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1 There are many uses associated with the Dutch word *heel* 'whole' (cf. for example Den Dikken 2002). In this paper I will only be concerned with the use of *heel* in pre-determiner position.

2 Although DPs that are mass readings trigger singular agreement in the clause, I assume an absence of number marking in their nominal inflection (cf. Borer 2005).

concerned, Zwarts (1992) concludes from these data that *heel* 'whole' is marked for singular, as it only co-occurs with singulars. At first sight, the distribution of *al* 'all' and *heel* 'whole' seems to be simple. On the one hand, singular NPs select *heel* 'whole', which is marked for the feature [singular], while on the other plurals and DPs that have a mass readings select *al* 'all' as an elsewhere option.

I propose, however, that the distribution of *heel* is more complex. I will show that it is licensed by an inflectional head in the DPs countability domain. More specifically, Dutch *heel* 'whole' is licensed by a functional head that is responsible for a specific count reading, viz. unit readings.

This paper is structured as follows. In the next section I present the data. In section 3 I outline the analysis. In section 4 I propose a semantics for the PUQs *heel* 'whole' and section 5 concludes.

2. The Data: *Heel* and Countability

The examples in (2) already suggest that the occurrence of the PUQ *heel* is related to countability. It is disallowed with mass readings and plurals DPs, whereas it is grammatical with singular DPs. In this section I explore its compatibility with various mass and count readings in Dutch in more detail.

Dutch has a mass reading (3) and two types of count readings, viz. the kind reading (4) and the unit reading (5). These readings are semantically distinct from one another.

(3) chocolade
chocolate
'chocolate'

(4) chocolade-s
chocolate-PL
'several kinds of chocolate'

(5) chocola-tje-s
chocolate-DIM-PL
'portions of chocolate'

(3) shows a Dutch mass reading. (4) is a Dutch kind reading. Kind readings can be paraphrased as 'a kind of' and the concepts they refer to have no stretch in space. For example, it is odd to ask about their size, as is shown in (6).

(6) # Hoe groot zijn die chocolades?
how big are these chocolate-PL
'How big are these kinds of chocolate'

As can be seen from the plural marking in (4), kind readings are marked for number. (5) is an example of a unit reading. Unit readings can be paraphrased as 'a unit/individual/portion of' and the concepts they refer to have a stretch in space and

are thus measurable. Consequently, it is fine to ask about the size of units, as is shown in (7).

(7) Hoe groot zijn die chocola-tje-s?
how big are these chocolate-PL-DIM
'How big are these pieces of chocolate?'

In what follows, I show that these three readings are not only semantically distinct, but that they also differ with respect to their morphology. Moreover, they also differ in compatibility with the PUQ *heel* 'whole'.

2.1 Mass Readings

Dutch mass readings (8) do not allow for plural marking (9).

(8) chocolade
chocolate
'chocolate'

(9) * chocolade-s
chocolate-PL
(disallowed under a mass reading)

Further, Dutch mass readings cannot be turned into a diminutive (10).

(10) * chocola-tje
chocolate-DIM
(disallowed under a mass reading)

Finally, as was already noted in section 1, Dutch DPs with mass readings cannot be combined with the PUQ *heel* 'whole' (11).

(11) * heel de chocolade
whole the chocolate

Summarizing, Dutch mass readings do not allow for number marking, diminutives or the PUQ *heel* 'whole'.

2.2 Kind Readings

Dutch kind readings (12) allow for plural marking (13).

(12) een chocolade
a chocolate
'a kind of chocolate'

(13) chocolade-s
chocolate-PL
'several kinds of chocolate'

They cannot not, however, be combined with the diminutive suffix (14).

(14) * een chocola-tje
a chocolate-DIM
(disallowed under a kind reading)

Thirdly, *heel* 'whole' cannot modify a DP with a kind reading, not even when the DP is singular and definite (15)[3].

(15) *? Op deze workshop over de Granny Smith verwelkomen we
on this workshop on the Granny Smith welcome we
professor Janssen die **heel** **die** **appel** analyseerde.
professor Johnsson that whole that apple analyzed.
Intended: 'For this workshop on the Granny Smith we welcome professor Johnsson who has analyzed this kind of apple from a to z.'

In (15), the DP 'that apple' does not refer to individual instances of apples, but to a kind of apple, viz. the Granny Smith. Used in this sense, the DP *die appel* 'that apple' does not allow for the PUQ *heel* 'whole'.

Summarizing, Dutch DPs with kind readings do allow for number marking, but they disallow diminutives and the PUQ *heel* 'whole'.

2.3 Unit Readings

Dutch unit readings (16) allow for plural marking (17).

(16) een chocolaatje
a chocolate-DIM
'a piece of chocolate'

(17) chocolaatjes
chocolate-DIM-PL
'pieces of chocolate'

As can be seen in (16-17), they also allow for diminutives. Furthermore, singular definite unit readings can be combined with the PUQ *heel* 'whole' (18).

(18) heel het chocolaatje
whole the chocolate-DIM
'the whole chocolate'

[3] Cf. section 1 in which it is pointed out that PUQs only occur in definite DPs.

Dutch unit readings thus allow for number marking, diminutives and the PUQ *heel* 'whole'.

2.4 Summary

The data I discussed above are summarized in the following table.

(19)

	NUMBER	DIMINUTIVE	*HEEL*
MASS	*	*	*
KIND	√	*	*
UNIT	√	√	√

The grid shows that mass readings do not allow for any nominal inflection or for the use of the PUQ *heel* 'whole'. Number marking is allowed for kind readings, but diminutives and *heel* are not. Finally, unit readings allow for diminutives, *heel*, and number marking.

The data in (19) suggest that the occurrence of *heel* 'whole' is related to the possibility of using the diminutive. *Heel* 'whole' is thus not only marked for singularity (Zwarts 1992). In the next section, I account for the relation between *heel* 'whole' and the diminutive by examining the role of the diminutive in the DP's nominal inflection.

3. Analysis

In order to account for the distribution of *heel* 'whole', I first present an analysis for the Dutch mass reading, kind reading and unit reading. I follow Borer (2005) in the assumption that the mass reading is the default and that functional material can be added to the structure in order to derive count readings.

3.1 Mass readings

Borer (2005) assumes that nouns are unmarked in the lexicon for mass or count. When they are inserted in an unspecified structure, i.e. in a structure which lacks functional heads between the NP and the NumP, the default reading is the mass reading. The Dutch example in (20) thus has the structure in (21).

(20) de chocolade
the chocolate
'the chocolate'

(21) $[_{DP}\ [_{D'}$ de $[_{NP}\ [_{N'}$ chocolade]]]]

The structure of the mass reading in (21) lacks nominal inflection. This accounts for the observation (cf. section 2.1) that the mass reading does not allow for plural or diminutive marking.

3.2 Kind readings

Recall that kind readings show number marking. Borer (2005) proposes that number marking is the overt realization of the feature [Div], the dividing feature. This feature indicates that stuff gets divided into countable concepts. It is realized syntactically as the head Div°. Because of the presence of number marking in kind readings, I assume the presence of the [Div] feature for this reading. The structure of the kind reading in (22) is then as represented in (23).

(22) de chocolade-s
the chocolate-PL
'the different kinds of chocolate'

(23) $[_{DP}\ [_{D'}$ de $[_{DivP}\ [_{Div'}$ chocolade-s $[_{NP}\ [_{N'}$ ~~chocolade~~]]]]]]

In (23) the noun raises to the Div° head where it gets marked for the [Div] feature, which is overtly realized as number marking.

3.3 Unit readings

According to Borer (2005) the only feature that brings about count readings is the [Div] feature. In section 2.3, however, I have shown that Dutch unit readings have two morphemes in their nominal inflection, viz. number marking, which realizes the [Div] feature and the diminutive suffix. Borer's analysis cannot account for the presence of this additional morpheme. I therefore assume an additional head that hosts an extra feature, which I call [Size]. It is responsible for assigning the notion of measurability to the concept the noun refers to. In Dutch it is realized as the diminutive. Unit readings are thus the result of the interplay between two features, [Div] and [Size]. The [Size] feature indicates that the concept the noun refers to is measurable, the [Div] feature indicates that the concept is countable. Unit readings (24) are then structured as in (25).

(24) de chocola-tje-s
the chocolate-DIM-PL
'the pieces of chocolate'

(25) $[_{DP}\ [_{D'}$ de $[_{DivP}\ [_{Div'}$ chocola-tje-s $[_{SizeP}\ [_{Size'}$ ~~chocola–tje~~ $[_{NP}\ [_{N'}$ ~~chocola~~]]]]]]]]

In (25) the noun first raises to the Size° head, where it gets the [Size] feature, realized as the diminutive. It raises further to the Divº head, where it gets the [Div] feature, which is realized as number marking.

3.4 *Heel* and unit readings

If we now compare the features of the various mass and count readings with the distribution of the PUQ *heel*, it becomes immediately clear which feature determines the presence of *heel*. An overview is given in the table in (26).

(26)

	NUMBER	DIMINUTIVE	*HEEL*
MASS {∅}	*	*	*
KIND {Div}	√	*	*
UNIT {Div, Size}	√	√	√

The table shows that only unit readings are marked for the feature [Size] and that only those same readings allow for the presence of the PUQ *heel* 'whole'. It further shows that the readings which lack the feature [Size] disallow *heel* 'whole'. It thus appears that when the feature [Size] is present, the use of *heel* 'whole' is licit. I therefore conclude that the PUQ *heel* 'whole' is specified for the feature [Size].

3.5 The other features of *heel*

The PUQ *heel* 'whole' is marked for more features than only [Size]. If it were only marked for [Size], it would be able to co-occur with all possible unit readings. This is not the case. As was noted in the introduction, it only co-occurs with singular and definite DPs, not with DPs with plural unit readings (definite and indefinite) (27) or singular indefinite unit readings (28).

(27) * heel (de) chocola-tje-s
whole the chocolate-DIM-PL

(28) * heel een chocola-tje
whole a chocolate-DIM-PL

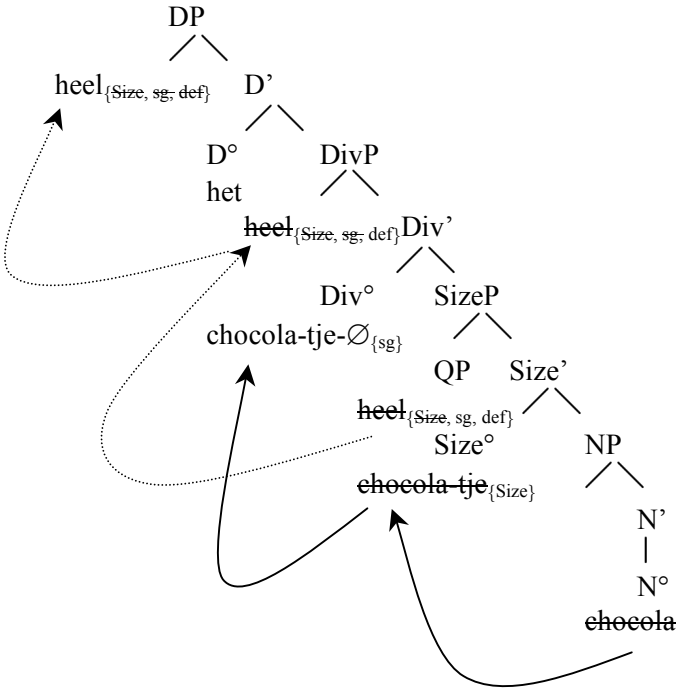
I therefore assume that *heel* 'whole' is not only marked for [Size], but also for the feature singular, i.e. [sg] and the feature definite, i.e. [def].

3.6 Summary

In the previous sections, I have shown that the PUQ *heel* 'whole' is marked for the features [Size], [sg] and [def]. I therefore propose the structure in (30) for the DP in (29).

(29) heel het chocola-tje
whole the chocolate-DIM
'the whole piece of chocolate'

(30)



In (30) the noun *chocola(de)*[4] 'chocolate' first raises to the Size° head where it gets the [Size] feature, realized as the diminutive. It then raises further to the Div° head, where it gets the [Div] feature, which is realized as number marking.[5]

The PUQ *heel* 'whole' merges in the specifier of the Size° head, where it checks its feature [Size]. It raises further to the specifier of the Div° head in order to check its [sg] feature. It then raises to its surface position, the specifier of the DP to check its feature [def].

4. The semantics of *heel* 'whole'

4.1 Background: The semantics of completeness

The PUQ *heel* 'whole' adds the notion of completeness to the DP, just like the etymologically related *whole* does in English. For example, it is odd to combine DPs modified by *whole* with adverbs like *partly* (31).

(31) # I ate the whole cookie partly.

The same is true for the Dutch PUQ *heel* 'whole', as shown in (32).

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[4] The last syllable of the Dutch noun *chocolade* 'chocolate' can be optionally dropped.

[5] I present singular marking as a null morpheme. Nothing hinges on this choice and I believe that other approaches on singular marking, such as the proposal that is it realized by the determiner (Borer 2005), would work equally well.

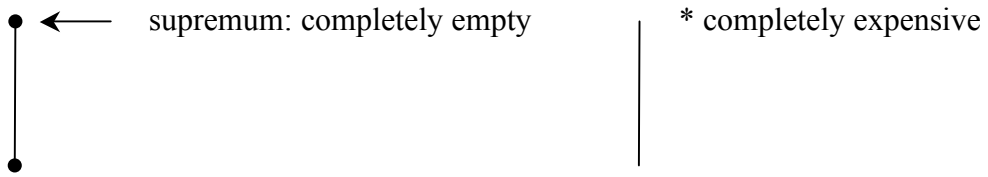
(32) # Ik heb heel het koekje deels opgegeten.
I have whole the cookie partly eaten

The notion of completeness has been studied before in semantics, mainly in the realm of adjectives. It has been noted that absolute adjectives allow for modifiers that express completeness, whereas relative adjectives do not (Kennedy & McNally 2005, Kennedy 2007, Winter & Rotstein 2004). This is illustrated in (33)-(34).

(33) completely empty
(34) * completely expensive

Adjectives like *empty* and *pure* allow for modifiers which express completeness, whereas adjectives like *expensive* and *tall* do not. The former are called absolute adjectives, the latter relative adjectives. These facts follow from the fact that absolute adjectives express a closed scale, whereas relative adjectives express an open scale. In both cases, the scales refer to an ordered set of degrees. The closed scales of absolute adjectives have a supremum, i.e. a highest degree, whereas the open scales of relative adjectives do not. A modifier of completeness refers to the supremum of a scale. Not surprisingly then, only adjectives that refer to a scale with a supremum allow for modifiers of completeness (Kennedy & McNally 2005, Kennedy 2007). This is illustrated in (35).

(35) *Empty* *Expensive*



(35) shows that an absolute adjective such as *empty* refers to a closed scale. This closed scale has a supremum, which can be referred to by means of modifiers that express completeness. Relative adjectives such as *expensive* on the other hand, refer to an open scale. These do not have a supremum, and hence such adjectives do not allow for modifiers that refer to that supremum.

4.2 The semantics of *heel* and unit readings

Given that the PUQ *heel* 'whole' expresses completeness, it also refers to the supremum of a closed scale. This part of the analysis is developed in this section.

Recall that the PUQ *heel* 'whole' only co-occurs with unit readings (cf. sections 2.3 & 3.3). The main syntactic characteristic of unit readings is the presence of the Size° head. I will assume that it is the Size° head that provides the semantics of the closed scale, the supremum of which can be referred to by means of the PUQ *heel* 'whole'.

Let us assume a closed scale that is defined as an interval of real numbers. This scale refers to the degree of completeness of the unit. The bottom of that scale refers to the individual, smallest parts, its middle refers to sets of parts and its top refers to the complete set of all parts of the unit (36). For example, if we are talking about an apple, the bottom of the scale refers to the smallest discernible pieces of the apple, the middle would to half an apple and the top to the whole apple.

(36)  the complete apple

The Size° head introduces units by referring to a measure function that points at a certain number on the closed scale, which is an interval of real numbers. In other words, the Size° head asserts that the concept the noun refers to consists of a certain number of parts, hence it is measurable in space or even time[6]. The Size° head is then defined as follows (37).

(37) $\lambda X \lambda n \lambda x[m_Q(x) = n \wedge X(x)]$
with
$m_Q \rightarrow [0,1]$

(42) states that the concept the noun refers to has a certain value on the closed scale.

The Dutch diminutive, which realizes the Size° head, thus not only expresses smallness, but also a closed scale. Its semantics is given in (38).

(38) $[|\ \text{DIM}\ |] = \lambda X \lambda n \lambda x[m_Q(x) = n \wedge X(x) \wedge \text{small}(x) > d_s]$
with
$m_Q \rightarrow [0,1]$

In (38) the first part of the formula states that the diminutive expresses a closed scale, the third part says that the degree of smallness is higher than the average degree of smallness in the context [7](cf. Kennedy 1999 on d_s, i.e. the standard degree).

The PUQ *heel* 'whole' in the specifier of Size° points at the supremum on that scale.[8] *Heel* 'whole' can be defined as follows (39)[9].

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[6] The mereological part of a unit can be spatial, such as a crumble, or temporal, such as a second.

[7] The degree of smallness becomes higher if the object becomes smaller.

[8] In the absence of *heel* the default value is a small interval at the top of the scale. In other words, if one is talking about a cookie, the default interpretation will be that one is talking about a (nearly) complete cookie (cf. Kennedy 2007).

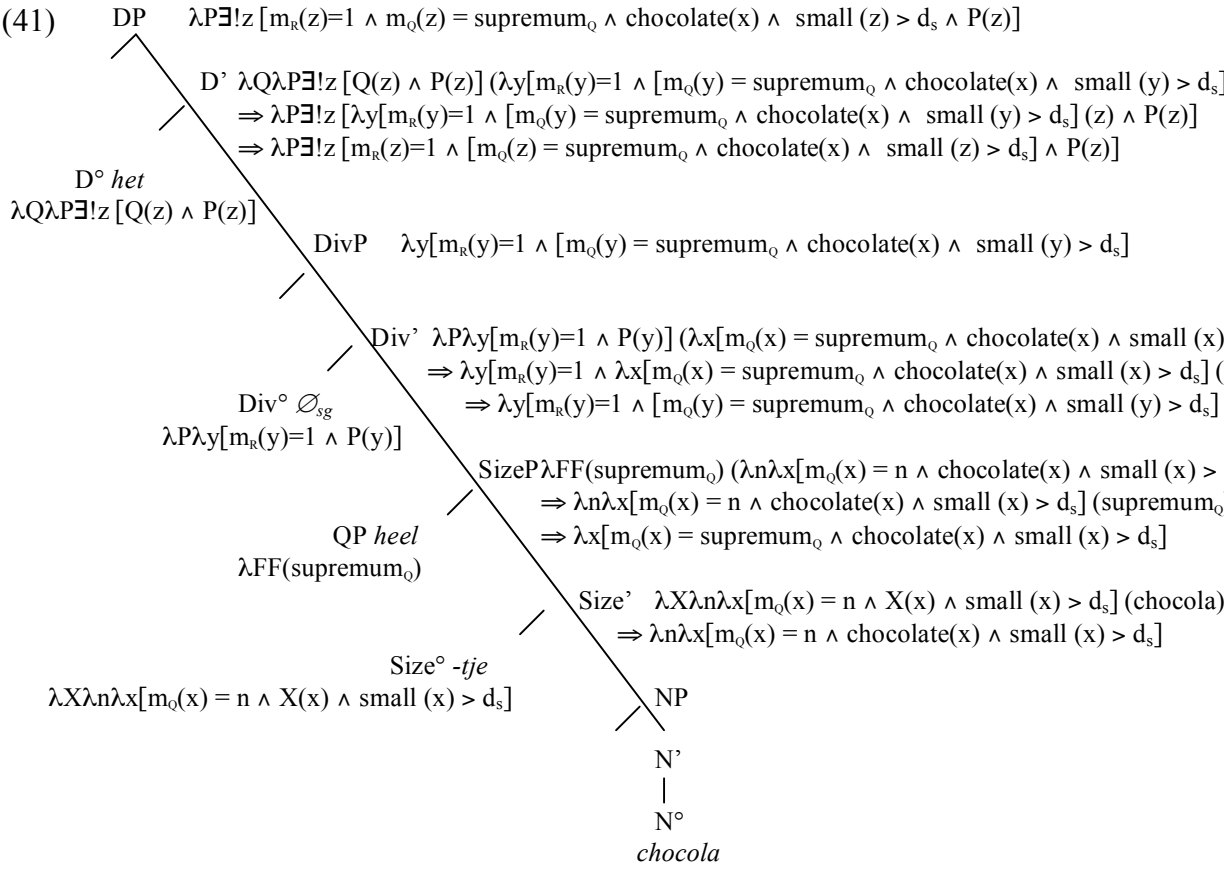
[9] Note that (39) is the same as $[|\ \text{heel}\ |] = \lambda FF(1)$

(39) [| heel |] = λFF(supremum$_Q$)

Heel 'whole' thus takes the function that Size' delivers as its argument. In this way it fills in a value on the scale Size delivers. We now have all the ingredients to understand the semantics of the PUQ *heel* 'whole' and its interaction with the unit reading. The derivation of the DP in (40) is given in (41).[10]

(40) heel het chocolaatje
whole the chocolate-DIM
'the whole chocolate'

(41)



In (41) the noun *chocola* 'chocolate' gets inserted from the lexicon as a noun that is unmarked for mass or count properties. It raises to the Size° head, where the measure function assigns a certain number of parts to the noun's denotation. This derives the property of measurability of unit readings; it asserts that the unit has a certain number of parts. The quantifier in the specifier of the Size° head, i.e. *heel* 'whole', specifies this number, by pointing at the supremum of the closed scale, i.e. at the total sum of all parts[11]. This derives the notion of completeness. In this way, both the unit reading

[10] For the semantic representation of the singular and the determiner, I follow traditional assumptions (cf. Krifka 1995 for the semantic representation of number marking). Note that the measure function in Div° is of a completely different nature than the one in Size°. The one in Div° refers to an open scale and the value 1 in Div° thus simply refers to singular, not to a supremum of any kind.

[11] In the absence of heel, as in *het chocolaatje* 'the chocolate', I assume a default value, which is a small interval at the top of the closed scale (cf. Kennedy 2007).

and the notion of completeness are derived by the structure. The noun then further raises to the Div° head and the DP head, where it acquires singularity and definiteness.

5. Conclusion

In this paper I have discussed the distribution of pre-determiner universal quantifiers in Dutch. I showed that the pre-determiner universal quantifier *heel* 'whole' interacts with the noun's functional heads that are responsible for countability. More specifically, it is licensed by the Size° head, which also derives unit readings. In this way, I accounted for the fact that the *heel* 'whole' is restricted to unit readings. It is further specified for singularity and definiteness.

From a semantic point of view, I defined the Size° head as a measure function that refers to a scale, which I defined as an interval of real numbers. This scale refers to the completeness of the unit. The universal quantifier *heel* 'whole' interacts with this scale; it points at the supremum. By asserting that there is a set of parts, one assures that the unit is measurable in time or space. By pointing at the supremum, one asserts that it is complete.

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