1 Introduction

1. Extensive typological work shows that languages differ where number (#) is expressed (Acquaviva 2008, Lowenstamm 2007, Kramer 2014, i.a.):
   - High position is associated with num, low position can be associated with n.

   (1)
   \[ \text{DP} \]\[ \text{numP} \\rightarrow \text{nP} \rightarrow \text{root} \]

2. Dutch is usually taken to have a high expression of # (2b), and we argue Linking Morphemes (L) in Dutch provide evidence for such a low expression of #, (2c).
   - Outside of compounds, # is realized on num,
   - In compounds, # is realized on n in the context of a mystery feature (e.g. [\(\alpha\)])

   (2) a. hond dog
       b. hond-\text{en} dog-PL
       c. hond-s-dol dog-L-crazy

   ‘dog’ ‘dogs’ ‘rabid’

3. The occurrence of L, being n, can be taken a diagnostic of the size of non-head elements.
   - This makes a prediction about the structural configuration of Dutch compounds, based on work on Germanic compounds (Harðarson 2016, 2017, De Belder 2017)

   \[ n \text{ has features in Dutch (\#, } \alpha) \]
   \[ \text{We use L for determining the size of the non-head element and it’s subsequent attachment site.} \]

2 Dutch Ls and n-#

- There are a number properties that distinguish between num-# and n-# (e.g. Acquaviva 2008:11–49, Kramer 2016:534–539).
  - Note that the analysis of n-# relies on a constellation of properties. No single property is sufficient to analyze n-#.

Dutch compounds – a super short intro

- Non-head elements without L can be of any category, (3), whereas non-head elements with L are unambiguously nominal (De Belder 2013,2017).

   (3) a. mee-moeder with-mother
       b. lees-moeder read-mother
       c. drie-luik three-lock

   e.g. ‘a mother who reads a lot’

   (5) but L for any given noun need not be the same as their plural affix, (6)

   \begin{center}
   \begin{tabular}{l|l|l}
   PL & L \hline
   -\text{en} & -\text{en}, -\text{s}, -\text{er} \\
   -\text{s} & -\text{s} \\
   \end{tabular}
   \end{center}

Property #i: Selectional restrictions

- n-# is subject to a greater degree of selectional restrictions than num-#, i.e. n-# is sensitive to both root and derivational environment they appear in (Kramer 2016:534-535).
  - The choice of L usually depends on the non-head element, (5c)-(5d) (Hoekstra 1996, De Belder 2017, a.o.)
(4) a. varken  b. varken-s  c. varken-s-hok  d. varken-s-voer
   pig  'pig'  pig-L-pen  pig-L-food
   (4) a. varken   b. varken-s   c. varken-s-hok  d. varken-s-voer
   pig  'pig'  pig-L-pen  pig-L-food

   cat  'cat'  cat-L-shutter  'cat flap'
   cat  'cat'  cat-L-shutter  'cat flap'

(6) a. dorp  b. dorp-en  c. dorp-s-café
   village  'village'  village-L-pub
   (6) a. dorp  b. dorp-en  c. dorp-s-café
   village  'village'  village-L-pub

(7) a. ei  b. ei-er-en  c. ei-er-koek
   egg  'egg'  egg-L-cookie
   (7) a. ei  b. ei-er-en  c. ei-er-koek
   egg  'egg'  egg-L-cookie

Property #ii: Determinism

- n-# is non-deterministic, whereas, num-# is not (Acquaviva 2008, 33ff).
  - Non-head elements can vary in terms of the selection of L (Krott et al. 2002, 2007), whereas the corresponding nouns cannot.

(8) a. hond-en  b. *hond-s  c. hond-s-dol  d. hond-en-voer
   dog-PL  dog  dog-L-crazy  dog-L-food
   'dogs'  'dog'  'rabid'  'dog food'

Property #iii: Double marking

- Split number systems can have cases of double plural marking, (9)–(10)

(9) a. der xazar  b. di xazeyr-am  c. di xazeyr-am-l-ox
    the pig  'the pig'  the pig-PL-DIM-PL
    [Yiddish (Lowenstamm 2007, 117)]

(10) a. mămhir  b. mămhir-an  c. mămhir-of[f]  d. mămhir-of[f]-an
    'teacher'  'teacher-PL'  'teachers'  'teacher-PL-PL'
    [Amharic (Kramer 2017, 529–530)]

We argue that Dutch -eren plurals are instances of double plural marking.

1. In compounds, only -er appears, (11);
2. The diminutive suffix can intervene between -er and -en, (12)

(11) a. kalf  b. kalv-er-en  c. kalv-er-(*en)-liedfe
    calf  'calf'  calf-PL-PL  calf-L-love
    'calves'  'puppy love'

(12) a. kind  b. kind-er-en  c. kind-er-tje-s
    child  'child'  child-PL-DIM-PL
    'children'  'little children'

- The two number affixes are strictly ordered in double plurals (13), (14).

(13) a. mămhir-an-of[f]
    teacher-PL-PL
    'teachers'
    [Amharic (Kramer 2017, 534)]

(14) a. lied-er-en  b. *lied-en-er
    song-PL-PL  lied-PL-PL
    'songs'  'songs'

- This indicates the two elements are hierarchically ordered as in (15)

(15)

[Diagram]

Property #iv: Derivational contexts

- n-# can occur in derivations, num-# cannot (Kramer 2016:538–539)

(16) a. Zij zong zacht-je-s
    She sang soft-DIM-L
    ‘She was singing quietly’
    [DeBelder 2013:18]

(17) a. Hij gedraagt zich hond-s
    He behaves REFL dog-L
    ‘He behaves like a dog / rude’
    b. Zij is erg stad-s
    she is very city-L
    ‘She is very metropolitan’

1Note that this particular form is possible but not as a real plural.
<table>
<thead>
<tr>
<th>Property</th>
<th>num-#</th>
<th>n-#</th>
<th>Dutch L</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i) Selectional restrictions</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>(ii) Non-deterministic</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>(iii) Multiple # marking</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>(iv) Occurs in derivational contexts</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

Table 1: properties of number

3 Dutch n-#

- Given the properties discussed in the previous section, we argue that Ls express # features on n and an additional feature on n
  - # is in an Agree relation: # on n in uninterpretable and unvalued, # on num is interpretable and valued (drawing on e.g. Kramer 2014)
  - If n does not enter into an agreement relation with num, the number feature receives the value [-SG]
  - The additional feature is a mystery (class markers as in De Belder 2013?)

- We assume that the extended nominal phrase in Dutch contains at least the projections shown in (18).

\[(18)\]

- We argue that by applying a split-# analysis to Dutch by taking Ls as an instantiation of n-#, the various properties of L will follow.

3.1 Deriving Dutch compounds with linking elements

- Consider the derivation of *kattendrollen* ‘cat turds’.


- At this point the number features are unvalued.

\[(19)\]

\[
\begin{array}{c}
\text{Workspace 1} \\
\sqrt{\text{CAT}} \\
\sqrt{\text{TURD}}
\end{array}
\]

- The point at which the two stems are merged, marks the end of the extended projection of the root $\sqrt{\text{CAT}}$ (cf. Hardarson 2016, 2017).
  - # on the non-head element receives the value [-SG]
  - This point does not mark the end of the extended projection of the head, hence it’s # remains unvalued

\[(20)\]

\[
\begin{array}{c}
\text{Workspace 1} \\
\sqrt{\text{CAT}} \\
\sqrt{\text{TURD}}
\end{array}
\]

- num is then merged to the resulting structure in (21). (We set aside the issue of whether this is a result of head raising or lowering)

\[(21)\]

- Following De Belder (2013), we argue that the different linkers are realized in the context of mystery features, that are in a hierarchical relationship.

- Although linking elements are always homophonous to plural markers, they are not necessarily interpreted as plural, (22a) (Booij 2001, Krott et al. 2002, De Belder 2013 a.o.)
### Table 2: Feature Hierarchy

<table>
<thead>
<tr>
<th>Feature</th>
<th>-s ((-\text{SG}))</th>
<th>-en ((-\text{SG}))</th>
<th>-er</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\alpha$</td>
<td>+</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>$\beta$</td>
<td></td>
<td></td>
<td>+</td>
</tr>
</tbody>
</table>

- In (22a), the turd was not laid by multiple cats
- In (22b), the pen may be intended for one pig or multiple pigs

(22)   
\[
\text{a. katt-en-drol} \quad \text{cat-L-turd} \\
\text{b. varken-s-hok} \quad \text{pig-L-pen}
\]

'cat turd'  
'pig’s pen'

- We assume the affixes spell out \([-\text{SG}]\), to capture the fact that they are not plural, but at the same time can be interpreted as plurals (a.o. Sauerland 2008)
- At the point of Vocabulary Insertion the following rules apply to the roots.

(23) \(\sqrt{\text{CAT}} \rightarrow /\text{kAt}/\)

(24) \(\sqrt{\text{TURD}} \rightarrow /\text{drol}/\)

- For \(n, [-\text{SG}]\), we assume the following VI-rules:

(25)   
\[
\text{a. } n, \rightarrow /\alpha\} / [\beta] \\
\text{b. } n, u[#:--\text{SG}] \rightarrow /\alpha(n)/ / [\alpha] \\
\text{c. } n, u[#:--\text{SG}] \rightarrow /s/
\]

- The ‘double plural’ marking is special in that -er only spells out mystery feature
- For \(\text{num, [PL]}\) we need (at least) the following VI-rules:

(26)   
\[
\text{a. } \text{num, i[#:--\text{PL}]} \rightarrow /\alpha(n)/ / [\alpha]_n \\
\text{b. } \text{num, i[#:--\text{PL}]} \rightarrow /s/
\]

- Under these rules, the non-head element will be realized as /\text{kat}/-/\alpha(n)/ and \(\text{num}\) is realized as /\alpha(n)/.
- Under the rules in (25), the double plural marker on turd is ruled out.
- Does not contain the feature \([\beta]\)
- \# feature on \(n\) is valued as PL.

2The choice of the \(\text{num}-\text{pl}\) is largely prosodically defined (van der Hulst 1984, Booij 1998, a.o.). However, there are exceptions. Nothing hinges on the representation via contextual allomorphy rules or not.

(27)   
\[
\text{a. drol-0-en} \quad \text{turd-0-PL} \\
\text{b. *drol-s-en} \quad \text{turd-L-PL} \\
\text{c. *drol-en-en} \quad \text{turd-L-PL}
\]

- In the context of \(\text{num, [+SG]}\), the feature [\(\alpha\)] undergoes obliteration (Calabrese 2011)
- Bleeds the VI rules in (25)

### 4 Presence/Absence of L

- It has been argued that compounding takes place at different layers and the size of the element determines the layer at which it can be attached (Harðarson 2016, 2017, De Belder 2017), i.e. only elements of the same size can be compounded.
- Icelandic three part compounds are ambiguous wrt. left or right branching: (28), (29).

(28)   
\[
\text{a. karl#hest#vagn} \quad \text{man#horse#wagon} \\
\text{b. WAGON} \quad \text{HORSE} \quad \text{stem} \quad \text{MAN} \quad \text{stem}
\]

'a horse carriage for men'  
'carriage drawn by male horses'

(29)   
\[
\text{a. karl-a#hest-a#vagn} \quad \text{men-GEN#horse-GEN#wagon} \\
\text{b. WAGON} \quad \text{HORSE} \quad \text{infl} \quad \text{MAN} \quad \text{infl}
\]

'a horse carriage for men'  
'carriage drawn by male horses'

- However, when the two elements do not match, the compounds loose their ambiguity.
- If an uninflected element linearly follows an inflected element, only a right branching structure is possible, (30).
• When the uninflected element linearly precedes the inflected element, only a left branching structure is possible, (31).

(30) a. karl-#hest#vagn
    men-GEN#horse#wagon

  a. karl-#hest-#vagn
    man#horse-GEN#wagon

  b. *  

  MAN_{inf}  HORSE_{stem}  WAGON  MAN_{inf}  HORSE_{stem}

  ‘a horse carriage for men’  ‘carriage drawn by male horses’

• Under Harðarson (2016, 2017), these bracketing restrictions were argued to stem from compound elements being required to match the level at which they are merged.

• In the structure such as (32):
  – Categorized stems, i.e. elements of category \( n \), must merge at the stem level, i.e. to a head of the category \( n \).
  – Inflected elements, i.e. elements of category \( num \), must merge at the inflectional level, i.e. with a head of the category \( num \).3

(32)  

  num  num

  √ROOT  n

3This node was labelled as \( \varphi \) in Harðarson (2016, 2017).

• Harðarson (2016, 2017) and De Belder (2017) predict the same type of distinction between compounding at the stem level and compounding at the root level.

  – When a categorized stem linearly precedes an uncategorized root, only a right branching structure will be possible, (33), corresponding to (30).
  – When an uncategorized root linearly precedes a categorized stem, only a left branching structure will be possible, (34), corresponding to (31).

(33)  

  N-√ROOT-HEAD  (34)  √ROOT-N-HEAD

  a. *  

  N  √ROOT

  HEAD

  b. *

  √ROOT  N

  HEAD

  – The left branching structure in (33) is ruled out since it would require a root to merge at the stem level, i.e. to an element of the category \( n \).
  – The left branching structure in (34) is expected since a categorized stem contains sufficient structure to host an uncategorized root as a modifier.
  – The right branching structure in (33) is possible since the root can attach to the head of the compound at the root level, whereas the stem is attached following the initial compound merging with \( n \).
  – The right branching structure in (34) is ruled out since it would require the root to attach to an element of the category \( n \).

• Since we argue that L is a realization of \( n \), its presence or absence should indicate the size of the elements.

  – The presence of L indicates that the element is of category \( n \).
  – The absence of L can be taken as the absence of \( n \).

• This predicts:

  – When an element with L linearly precedes an element without L, only a right branching structure is possible, (35).
  – When an element without L linearly precedes an element with L, only a left branching structure is possible, (36).
\( L > \sqrt{\text{ROOT}} \)

\( \sqrt{\text{ROOT}} > L \)

These predictions are borne out.
- The root kleer- ‘cloth’ never surfaces in singular form outside of compounds (37);
- In compounds kleer-, cannot take a linker, (38);
- When an element with a L linearly follows kleer-, left branching structure is unavailable, (39b), whereas right branching structure is possible, (39a);
- When kleer- linearly precedes an element with L, right branching structure is unavailable, (40b), whereas left branching structure is possible, (40a);

\( L > \sqrt{\text{ROOT}} \)

\( \sqrt{\text{ROOT}} > L \)

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- When kleer- linearly precedes an element with L, right branching structure is unavailable, (40b), whereas left branching structure is possible, (40a);

5 Conclusions

- The properties of L is consistent with the properties of \( n-\# \)
  - Associated with nominal stems
  - Appears in derivational context
  - Greater selectional restrictions
  - Non-determinism
- -eren plurals provide evidence that Dutch has a split-number system
  - -er and -en are separable
  - DIM can intervene between the two
  - Only -er occurs on non-head elements in compounds
- Taking L to be a realization of n makes predictions wrt. bracketing restrictions based on the presence or absence of L on non-head elements
  - In a three element compound:
    * When an element with L follows an element without, only left-branching structure is possible
    * When an element with L precedes an element without, only right-branching structure is possible
  - These predictions are borne out
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