One Classy Number: Linking Morphemes in Dutch and German

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1 Introduction

• West Germanic compounds can consist of elements that look like inflectional suffixes, like plural or case markers, called linkers, (L). These elements, however do not have the same meaning / function as the inflectional suffix.
  – pig must be plural, (1a)
  – pig can be singular or plural, (1b)

(1) a. varken -s
    pig -PL
    ‘pigs’

b. varken -s -hok
    pig -L -pen
    ‘pig pen’

• L has been analyzed as a number of things (typically something special)

• This talk: They are class markers, similar to the corresponding “inflectional affixes” (following De Belder 2013)
  – We thus argue that plural markers are also class markers
  – Different behaviour follows from where the affixes are placed in the structure
  – L sheds light on (i) features in the Germanic DP and (ii) the wide distribution of morphemes such as s.

• We propose that L can be used to diagnose the size of the non-head element
  – They can disambiguate 3-part compounds: [[A-B]-C] vs. [A-[B-C]]

2 West Germanic Compounds and bracketing restrictions

• linking morphemes/phonemes ‘link’ parts of the compound and occur in many Germanic languages

    tid-s-nød    schaap-en-wol    freund-es-kreis
    time-L-shortage    sheep-L-wool    friend-L-circle
    ‘shortage of time’    ‘sheep’s wool’    ‘a circle of friends’

• This element has received a wide variety of analyses: L = phonological, morphological, semantic/conceptual, (not)PL, class marker, case marker, (not)linker (Botha 1968; Augst 1975; Mattens 1984; Becker 1992; Hoekstra 1996; Booij 2001; Krott et al. 2002, 2007; Neijt and Schreuder 2009; Neef 2009; De Belder 2013)

• Generally, the consensus is that there are only tendencies ⇒ we come back to capturing these tendencies in Sec. 5

• Ls’ presence/absence seems to have consequences for meaning, discussed to some extent for North Germanic (see Jónsson 1984; Allan et al. 1995; Joseffson 1997; Joseffson and Platzack 2004; Mellenius 1997, 2003; Bauer 2009, i.a.)
  – For [[A - B] C], there is a strong tendency for a linker to be placed between B and C.
  – Typically the structure has been taken to condition the appearance of L.
– Reversing the causal relationship accounts for various exceptions (see Harðarson 2016, 2017 on Icelandic).

• A similar pattern arises in West-Germanic: the position of L restricts the available range of meanings/structures.

• In the absence of L, (3), or when both non-head elements contain a L, (4), the compounds are ambiguous.

– The choice for L, and the form of it, is dependent on selectional restrictions on the non-head (next section).

(3) a. [riool- water] pomp
   sewer- water- pump
   ✓ pump for sewer water
   b. riool- [water- pomp]
      sewer- water- pump
      ✓ waterpump for the sewer

(4) a. [katt- en- droll-] en- bak
   cat- L- turd- L- bin
   ✓ ‘bin for cat turds’
   b. katt- en- [droll- en- bak]
      cat- L- turd- L- bin
      ✓ ‘bin for turds with cats’

(5) a. ✓ [A B ] C ]
   b. ✓ [A [ B C ]]

• However, if only one element carries a L, this ambiguity is lost (shown for both Dutch and German).

– If the second element carries L, the non-heads form a constituent, [[A - B-L] C].

(6) a. [kleer- kast- ] en- maker
    cloth- cabinet- L- maker
    ✓ maker of cloth cabinets
   b. kleer- [kast- en- maker]
      cloth- cabinet- L- maker
      × Cabinet maker for clothes

(7) a. [Wald- Tier- ] e- Haus
    forest- animal- L- house
    ✓ House for forest animals
   b. Wald- [Tier- e- Haus]
      forest- animal- L- house
      × Animal house in the forest

(8) a. ✓ [[ A B-L ] C ]
   b. ✓ [ A [ B-L C ]]

– If the first element carries L, the head and second non-head must form a constituent, [A-L[B- C]]

(9) a. [boer- en- kleer-] kast
    farmer- L- cloth- cabinet
    × cabinet for farmer’s clothes
   b. boer- en- [kleer- kast ]
      farmer- L- cloth- cabinet
      ✓ cloth cabinet for farmers

(10) a. [See- n- Wald-] Tier
     sea- L- forest- animal
     × Animal in a sea forest
   b. See- n- [Wald- Tier ]
      sea- L- forest- animal
      ✓ Forest animal close to a lake

(11) a. ×[[ A-L B ] C ]
   b. ✓ [ A-L [ B C ]]

• L’s presence/absence has consequences for the structure of the compound:

– Elements carrying L must be structurally peripheral to elements without L.

– Elements without L cannot be structurally peripheral to elements with L.
3 Analysis part I: Compounding structure

- This follows from approaches to compounding such as Harðarson (2016); De Belder (2017).
  - Compounding is layered (roots, stem level, inflectional level).
  - At each layer, elements of the matching syntactic size are merged.

- Roots can merge with roots, stems with stems, etc.
- Stems cannot directly merge with roots.

- In case of no-L or both-L, the sizes of the non-heads match (roots ([√X] or higher level [l √X l] )

- L-elements are bigger than elements without: A in (10-11) is smaller than B-L and cannot be attached higher

- A reason to think that we are dealing with roots vs stems, is that kleer cannot stand by itself. It needs to have additional morphemes to be pronounced.

(23) a. * kleer
cloth
Intended ‘Singular piece of clothing’
b. kleer -en
cloth -PL
‘Clothes’
Aside: Note that the theory being developed here does not exclude null elements corresponding to L. However, we expect the presence of such elements to have consequences for semantics and phonology.

- As L has consequences for the size of the element it attaches to, Ls are part of the extended projection of the relevant root.

### 4 But what is the head?

- Answer: Derivational class marker (following ideas by De Belder 2013)

- Several properties distinguish between ‘inflectional’ and ‘derivational’ (see, Lieber 1980; Acquaviva 2008; Kramer 2016)
  
  - This relies on a constellation of properties; No single property is sufficient to analyze a morpheme as derivational
  
  - We contrast the L with uses of the plural marker and other uses of the morphemes.

- Clear generalizations arise, despite variation (especially in German choice of linker)

<table>
<thead>
<tr>
<th>Properties</th>
<th>‘inflectional’</th>
<th>‘derivational’</th>
<th>PL(ural)</th>
<th>L(inker)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i) Double marking</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>(ii) Selectional restrictions</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>(iii) non-PL interpretation</td>
<td>–</td>
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<td>✓</td>
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<tr>
<td>(iv) Non-determinacy</td>
<td>✓</td>
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<tr>
<td>(v) Idiosyncratic meaning</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>(vi) Derivational contexts</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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</tbody>
</table>

#### (i) Double marking

- In Dutch, the suffix -er shows a distinction between L and PL (Hoekstra 1996).

  (24) a. **ei** -er -koek  
  egg -L -cook  
  ‘egg cookie’

  b. **kind** -er -boek  
  child -L -book  
  ‘book for children’

  c. **kalv** -er -liefde  
  calf -L -love  
  ‘puppy love’

- This marker can show up with PL markers outside of compounds, even with other morphemes intervening.

  (25) a. **kind** -er -en  
  child -L -PL  
  ‘children’

  b. **kind** -er -tje -s  
  child -L -DIM -PL  
  ‘Little children’

  c. **kalv** -er -en  
  calf -L -PL  
  ‘calves’

  d. **kalv** -er -tje -s  
  calf -L -DIM -PL  
  ‘Little calves’

- This suggest that L are structurally lower than PL markers.

- But why are most L homophonous to PL markers, even though they have the same uses and distribution as the non-PL -er?

#### (ii) Selectional Restrictions

- Derivational elements tend to be pickier than inflectional elements
  
  - Generally, the choice of L is dependent on the non-head (compare c-d examples)
  
  - Choice of L can match the choice of PL, (26, 27)

  - L can differ from PL, (28), but s-PL cannot take en-L. (Mattens 1984; Hoekstra 1996; De Belder 2013):
(26) a. varken  
  pig  
  'pig'  
  b. varken-s  
  pig-PL  
  'pigs'  
  c. varken-s-hok  
  pig-L-pen  
  'pig's pen'  
  d. varken-s-voer  
  pig-L-food  
  'pig food'

(27) a. kat  
  cat  
  'cat'  
  b. katt-en  
  cat-PL  
  'cats'  
  c. katt-en-luik  
  cat-L-shutter  
  'cat flap'  
  d. katt-en-droll-en  
  cat-L-turd-PL  
  'cat turd'

(28) a. dorp  
  village  
  'village'  
  b. dorp-en  
  village-PL  
  'villages'  
  c. dorp-s-café  
  village-L-pub  
  'village pub'  
  d. dorp-s-plein  
  village-L-square  
  'village square'

(29) a. ei  
  egg  
  'egg'  
  b. ei-er-en  
  egg-PL  
  'eggs'  
  c. ei-er-koek  
  egg-L-cookie  
  'egg cake'  
  d. ei-er-lepel  
  egg-L-spoon  
  'spoon for eggs'

- A summary of both morpheme systems:
  - Dutch has two PL, and the en-PL nouns are pickier when it comes to the choice of L.
  - For German there is more variation due to additional interactions with case. However, a similar generalization is possible (based on August 1975, Gruber 1976)

- There is a subset relation for both Dutch and German PL and L, (30)

  - In case of German, genitive singular serves as an additional context for the appearance of these markers

(30) a. Dutch: (-er) > -en > -s  

| PL  |  
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| -en | -en, -s, -er  
| -s  | -s  |

b. German: -er > -e > -en > Ø > -s  

<table>
<thead>
<tr>
<th>GEN.SG</th>
<th>PL</th>
<th>L</th>
</tr>
</thead>
</table>
| -(e)-s | -er  
| -(e)-s | -e  
| -(e)-s | -en  
| -(e)-s | -s  
| -(en)-Ø | -e  
| -s  | -Ø  
| -s  | Ø  
| -s  | -s  

(iii) Non-plural interpretation

- A reason to think that L and PL are related is that the L does interact with possible number interpretations.
- Plural interpretation is possible with L, but not obligatory (26-27) (Mattens 1984; Booij 2001; Neijt and Schreuder 2009).
- Typically the presence of PL coincides with a plural interpretation, although it is not always so (Sauerland et al. 2005).

(31) Je mag je kinderen meenemen  
  you can your children bring  
  ‘You can bring your (one or more) children’

- PL/L hence appear similar, both can co-occur with plural interpretation, and both can occur without it.

(iv) Non-determinacy

- Derivational elements are generally non-deterministic, whereas inflectional elements are usually deterministic.
- A noun typically only occurs with a particular plural suffix, whereas L may vary. (Becker 1992 Krott et al. 2002, 2007)
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(32) a. hond- en  
    dog- PL  
    ‘dogs’

b. *hond- s  
    dog- PL  
    ‘dogs’

c. hond- en- voer  
    dog- L- food  
    ‘dog food’

d. hond- s- dol  
    dog- L- crazy  
    ‘rabid’

(33) a. Kind- er- Ø  
    child- PL- NOM  
    ‘children’

b. Kind- er- n  
    child- PL- DAT  
    ‘children’

c. Kind- er- computer  
    child- L- computer  
    ‘child’s computer’

d. Kind- s- computer  
    child- L- computer  
    ‘silly/child’s computer’

(v) Idiosyncratic meaning

- The meaning of inflectional material is generally more transparent than derivational material.

- The PL only adds a plural interpretation to the base, whereas different L can induce an idiosyncratic interpretation of the non-head, cf. (32a) vs. (32d) and (33c) vs. (33d).

(vi) Derivational contexts

- Inflectional elements do not participate in changing parts of speech, derivational elements can

- L can appear in different derivational contexts: adverbs, nouns/verbs (Augst 1975; Dressler et al. 2001; De Belder 2013)

- Importantly, the usage of the morphemes en/s, etc. is wide-spread and the PL are only a subset of the usage.

(34) a. gind-/s-er  
    there-/L/L  
    ‘over there’

b. help-en  
    help-n/v  
    ‘the help/to help’

c. Zij is erg stad-s  
    she is very city-L  
    ‘She is very metropolitan’

(35) a. leid-er  
    sad-L  
    ‘unfortunately’

b. sprach- en  ~ Sprach- e  
    speak- INF  
    ‘to speak’

    speech- N  
    ‘language’

4.1 Generalization

- Clear generalizations arise, despite a lot of variation (especially in German choice of linker)

- We expect that the tendencies observed in the distribution of L are due to their derivational status

- L and PL are linked, but rather than making L special, we take the corresponding PL to also be the same class markers interacting with the number system

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5 Proposal, part II: Class and Number

- Both L and PL are class markers. (cf. De Belder 2013)
- Class markers can interact with other features in the extended projection
  - This gives the appearance of a hybrid between derivational and inflectional morphology.

- We assume that n carries a class feature and these features are in a subset relationship (following De Belder 2013)
  - Thus α is contained in β, and so forth.
  - The root selects for a n of a particular class.
  - This captures the fact that there are mismatches between L and PL only in one direction.

<table>
<thead>
<tr>
<th>Feature</th>
<th>-s</th>
<th>-en</th>
<th>-er</th>
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<tr>
<td></td>
<td>+</td>
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<td>α</td>
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<td>β</td>
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Table 1: Dutch class features

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<thead>
<tr>
<th>Feature</th>
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Table 2: German class features

- To achieve the distinction between derivational and inflectional morphology within a single component of grammar, we assume a relative difference in height with respect to the root.
- The DP in Dutch and German is layered and includes at least the structure in (36), (Abney 1987; Ritter 1991 and others).
  - Features related to number interpretation are situated in Num.
  - Class feature is copied onto Num.

(36) DP

```
D  NumP
    Num [±SG α] nP
        Num [α] √ROOT
```

(37) The structure of varkens ‘pigs’

```
Num n
    Num [−SG ]
    √PIG n
```

(38) The structure of honden ‘dogs’

```
Num n
    Num [−SG α]
    √DOG n [α]
```

(39) The structure of eieren ‘eggs’

```
Num n
    Num [−SG β[α]]
    √EGG n [β[α]]
```

- We assume that the spell-out of these structures involves the following VI rules and Impoverishment rules.
  - Rules are ordered in terms of specificity (The subset principle, Kiparsky cf. 1973; Halle and Marantz cf. 1993).
(40) Partial list of Dutch VI rules
a. \[\sqrt{\text{PIG}} \rightarrow /v\text{uik}\text{\textalpha}/\]
   pig- n PL
b. \[\sqrt{\text{DOG}} \rightarrow /\text{hond}/\]
dog- n- PL
c. \[\sqrt{\text{EGG}} \rightarrow /\text{ai}/\]
d. \[\beta \rightarrow /\text{o}/\]
e. \[\alpha \rightarrow /\text{o}/\]
f. \[\text{[+NOMINAL]} \rightarrow /s/\]

(41) Partial list of Dutch Impoverishment rules
a. \[\beta \rightarrow /0/ [\text{Num}_{-}]\]
b. \[\alpha \rightarrow /0/ [+\text{SG}]\]

(42) Spell-out of (37)
/v\text{uik}\text{\textalpha}/- pig-
/s/ - n PL

(43) Spell-out of (38)
/h\text{ond}/- dog-
/-/ - n - PL

(44) Spell-out of (39)
/\text{ai}/- egg-
/-/ - n - PL

(45) a. /v\text{uik}\text{\textalpha}/ - s /
   pig- PL
b. /h\text{ond}/ - /\text{o}/
dog- PL
c. /\text{ai}/ - /\text{o}/ - /\text{o}/
egg- n- PL

(46) The structure of Kindes ‘children(GEN.SG)’

(47) The structure of Kinder ‘children(DAT.PL)’

(48) Partial list of VI rules for German
a. \[\sqrt{\text{KIND}} \rightarrow /k\text{Ind}/\]
b. \[\delta \rightarrow /0/\]
c. \[\gamma \rightarrow /\text{\textalpha}/\]
d. \[\text{[DAT]} \rightarrow /n/ - /[-\text{SG}]\]
e. \[\text{[GEN]} \rightarrow /s/ - /[+\text{SG}]\]
f. \[\text{Num} \rightarrow /0/\]

(49) Partial list of Impoverishment rules for German
a. \[\delta \rightarrow /0/ [\text{[+SG,+OBLIQUE]}]\]
b. \[\beta \rightarrow /0/ [\text{[+SG,-OBLIQUE]}]\]

(50) Spell-out of (46)
/k\text{Ind}/ - /\text{\textalpha}/ - /s/ -
child- n GEN.SG

(51) Spell-out of (47)
/k\text{Ind}/ - /\text{\textalpha}/ - /n/
dog- n- DAT.PL

• Haplology applies to phonologically identical linearly adjacent morphemes, yielding (45).¹

• Although the mechanism is the same, German differs in two ways:
  – Distinct forms for the high and low morphemes.
  – An interaction with case in addition to number.

• Illustrated through the derivation of the genitive singular and dative plural forms of Kind ‘child’.
  – Genitive and dative are distinguished from nominative and accusative by [±OBLIQUE] (Smith et al. 2018 a.o.).

¹Haplology that is sensitive to different stages of the derivation (Yip 1988) has been independently motivated for Dutch (Bennis 1980; Odijk 1993; Neeleman and van de Koot 2005; Don 2015).
5.1 Putting the pieces together

- Mismatches between L and PL markers occur when the structure conditions deletion of a class feature.

- Consider, *kattendrollen* ‘cat turd’, discussed in section 4 above, repeated in (52).
  - The structure based on the proposal is shown in (53) and the relevant VI rules in (54).

(52) katt-en-droll-en
cat-L-turd-PL
‘cat turd’

(53)

- VI yields (55a), and haplology yields (55b).

(55) a. /kat/-/an/-/drɔl/-/an/-/an/
   b. /kat/-/an/-/drɔl/-/an/

- In cases of mismatches between L and PL, the structure can serve as contexts for deleting a class feature, as in (56).
  - The root √DOG selects for a n carrying the class marker [α], (56a).
  - When modifying the, e.g., stem dol-, [α] is deleted and n is realized as -s, (56b).
  - In other contexts, no deletion is applied and n is spelled out as -en, (56c).

(56) a. hond-en
dog-PL
‘dogs’
   b. hond-s-dol
dog-L-crazy
‘rabid’
   c. hond-en-voer
dog-L-food
‘dog food’

- The same mechanism is at work in German compounds. The difference lies in additional feature content.

(57) Kind- er- spiel- e- n
child- L- play- L- DAT.PL
‘child’s play (DAT.PL)’

(58) The output of spell-out of (59)
/kнд/-/u/-/fpiл/-/an/

\[ \sqrt{\text{CHILD}} \quad n \quad \sqrt{\text{GAME}} \quad n \]

\[ [\delta [\gamma [\beta [\alpha]]]] \quad [\gamma [\beta [\alpha]]] \]
6 Conclusion
Looking at a single morpheme reveals...
1. Restrictions on compound structure, especially three part compounds
   - L disambiguates compound structure, indicating restrictions on heads and non-heads
2. How features in the DP interact
   - The variation with L is a result of an interplay of different features across different contexts.
   - This allows for explaining their homophony with PL as well as various other affixes.

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