

Overlap and Subregularities in German Noun Plurals

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mfm 22
Manchester
May 30 2014

Prosodic **Homogeneity** – Segmental **Heterogeneity**

Pelz → Pel.ze **Affixation of -ə**

Kind → Kin.der **Affixation of -ɐ**

Held → Hel.den **Affixation of -n**

Recke → Re.cken **Affixation of -n**

Stecken → Ste.cken **∅-Affixation**

$$\left(\sigma_{\text{full}} \cdot \sigma_{\text{weak}} \right)$$

Wiese's Dilemma

(Wiese 2009)

Plural forms are prosodically

homogeneous

Plural forms are segmentally/melodically

heterogeneous

$(\sigma_{\text{full}} \cdot \sigma_{\text{weak}})$

Wunderlich's Dilemma (Wunderlich 1999)

Central parameters of plural formation are **unpredictable**:

- Umlaut (Trohn → Trohne vs. Sohn → Söhne)
- Segmental plural affixes (Mund → Münd-er vs. Bund → Bünd-e)

Specific correlations between these parameters are **predictable**:

- Plural -e always triggers umlaut
(Land → Land-e/Länd-er/*Land-er)
- ə-final stems never show umlaut
(Pate → Pate-n/*Päte-n cf. Laden → Läden)

Basic Analysis

There is only a single segmental [+pl] affix: •

Allomorphy reflects floating material that is part of ...

- ... the [+pl] affix (©)
- ... additional gender+number affixes (p, n)
- ... specific noun roots (p, n)

and surfaces overlapping with [+pl] •

Plural Affixes

•

VPI
|
COR

[+pl] ↔ (c•)

[+pl +fem] ↔ NAS (n)

CPL
|
PHAR

[+pl -fem] ↔ (r)

- Allomorphy

Wind+● → Wind-∅

Rinde+● → Rinde-n

- $+\{\text{n}, \text{p}\}$ -Overlap

Welt $+$ ● $+$ n \rightarrow Welt- n

Feld $+$ ● $+$ p \rightarrow Feld- p

©-Allomorphy

Schau+●©+Ⓝ → Schau-Ⓝ

Sau+●©+Ⓝ → S ä u-Ⓝ

General Theoretical Assumptions (Trommer 2011, 2013)

- **Stratal OT:** (Bermúdez-Otero 2012)
Root-Level Stem-Level, and Word-Level Evaluations feed each other serially. Different levels have potentially different optimality-theoretic constraint rankings
- **Colored Containment:** (van Oostendorp 2006)
Underlying material (i.e. nodes and association lines) is never literally deleted, but retained in the output, and marked as phonetically invisible.
- **Doubling:** (cf. Doubling in Correspondence Theory, McCarthy & Prince 1995)
All markedness constraints are assumed to exist in two versions, one referring only to phonetically visible material, and one to all material in a given structure.

Assumptions on German Vowels and Syllable Nuclei

- **Full Vowels:**

Consistent front vowels: {COR},

consistent back vowels: {DOR},

Variable/umlautable back vowels: { }

(underspecified, with DOR filled in by default)

- **Schwa:**

ə has a VPlace node, but lacks specific place features (DORSAL, CORONAL, PHAR)

- **Syllabic Sonorants:**

In the input to the plural stratum (stem level),

final sonorants head weak syllables without ə-support

(Nadel = [na:][d], Ader = [a:][d_R])

Predicting the Unpredictable: © and Umlaut

- Affixal © associates to underspecified stem vowels due to $c \rightarrow V$
- Association to fully specified back vowels, blocked by $*V_{c,d}$


Constraints

$c \rightarrow V$ Assign * to every COR which is not associated to a full vowel


$*V_{c,d}$ Assign * to every which is associated to COR and DOR

Umlauting ... $\acute{V}C$ Stems

Input: = RA:t+ \textcircled{c} • (Rat 'advice', masc.)

	* $V_{c,d}$	NO SKIP \square	$c \rightarrow V$	DEP c	MAX n	DEP \emptyset
a. Ra:t \emptyset n $_c$			*!			*
b. Ra:t $\textcircled{c}\emptyset$			*!			
 c. R ϵ $_c$:t \emptyset						

Input: = nA:t+ \textcircled{c} • + \textcircled{n} (Naht 'seem', fem.)

	* $V_{c,d}$	NO SKIP \square	$c \rightarrow V$	DEP c	MAX n	DEP \emptyset
a. na:t \emptyset n $_{c,n}$			*!			*
b. na:t $\textcircled{c}\emptyset$ \textcircled{n}			*!		*	
 c. n ϵ $_c$:t \emptyset \textcircled{n}					*	
d. n ϵ $_c$:t \emptyset n $_{c,n}$				*!		*

Generalizations I: Umlaut and Feminine Nouns

Generalizations:


- Feminine Nouns take plural -n (Frau → Frauen) or umlaut (Braut → Bräute)
- Plural-n and umlaut are in complementary distribution (Frau → *Fräuen)

Derivation:


- this follows from the availability of a single underlying c and unavailability of epenthetic COR by DEP c
- $c \rightarrow V \gg \text{MAX } n$ predicts preference for umlaut, and otherwise realization as a nasal

Non-umlauting ... $\acute{V}C$ Stems

Input: = $ma_d:t + \textcircled{c} \bullet$ (Maat 'stewart', masc.)

	$*V_{c,d}$	NO SKIP \square	$c \rightarrow V$	DEP c	MAX n	DEP \emptyset
a. $ma_d:t\emptyset n_c$			*			*!
 b. $ma_d:t\textcircled{c}\emptyset$			*			
c. $m\epsilon_{c,d}:t\emptyset$	*!					


Input: = $za_d:t + \textcircled{c} \bullet + \textcircled{n}$ (Saat 'seed', fem.)

	$*V_{c,d}$	NO SKIP \square	$c \rightarrow V$	DEP c	MAX n	DEP \emptyset
 a. $za_d:t\emptyset n_{c,n}$			*			*
b. $za_d:t\textcircled{c}\textcircled{n}$			*		*!	
c. $z\epsilon_{c,d}:t\emptyset n_{c,n}$	*!					*

Exceptional [-fem] plurals in -n

- A small number of ... $\acute{V}C$ take plural -n even though they are masculine (Mast \rightarrow Mast-en)
- Analysis:** These nouns bear a floating \textcircled{n} feature
- Evidence:** Most of these nouns show **n** also in singular forms: Mast (Nom.sg.) vs. Mast-en (Gen./Dat./Acc.sg.), but Gast (Nom./Dat./Acc.sg.), Gast-s (Gen.sg.)

Input: = $ma_dst\textcircled{n} + \textcircled{c}$ (Mast 'pole', masc.)

	$*V_{c,d}$	NO SKIP \square	$c \rightarrow V$	DEP c	MAX n	DEP \emptyset
 a. $ma_dst\textcircled{n}_{c,n}$			*			*
b. $ma_dst\textcircled{n}\textcircled{c}\emptyset$			*		*!	
c. $m\mathcal{E}_{c,d}st\emptyset n_{c,n}$	*!					*

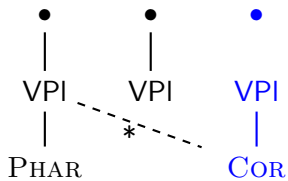
Generalizations II: Umlaut and ə-final nouns

Generalizations:

- Nouns lexically ending in $...ə$ never umlaut
(Pate \rightarrow *Päte/*Päte-n/*Päte-r)
- Nouns lexically ending in $...ə$ always suffix -n
(Pate \rightarrow Pa.te-n)

Derivation:

- NoSKIP $_{\square}$ Assign * to every triple of VPlace nodes (N_1, N_2, N_3) such that:
- $N_1 \prec N_2 \prec N_3$
 - N_1 and N_3 are associated to the PLC-node P
 - N_2 is not associated to P

Violating NOSKIP_□

Pa

te

[+pl]

Non-umlauting ... \acute{V} ... ə Stems

Input: = pA:tə + \textcircled{c} • (Pate 'godfather', masc.)

	*V _{c,d}	NO SKIP _□	c → V	DEP c	MAX n	DEP ə
☞ a. pa:tə _{n_c}			*			
b. (pa:tə \textcircled{c} ə)			*			
c. pɛ _c :tə		*!				

Input: = rA:tə + \textcircled{c} • + \textcircled{n} (Rate 'rate', fem.)

	*V _{c,d}	NO SKIP _□	c → V	DEP c	MAX n	DEP ə
☞ a. ra:tə _{n_{c,n}}			*			
b. ra:tə \textcircled{c} ə \textcircled{n}			*		*!	
c. Rɛ _c :təə \textcircled{n}		*!				
d. Rɛ _c :tə _{n_{c,n}}		*!		*	*	

Umlauting ... Ç Stems (R)

Input: = fA:t_R+ç• (Vater 'father', masc.)


	*V _{c,d}	NO SKIP _□	c → V	DEP c	MAX n	*CC] _σ
a. fε _c :tɛn _c				*!		
b. fa:tɛç•			*!			
☞ c. fε _c :tɛ•						

Input: = mUt_R+ç•+n (Mutter 'mother', fem.)


	*V _{c,d}	NO SKIP _□	c → V	DEP c	MAX n	*CC] _σ
a. mY _c tɛn _{c,n}				*!		
b. mʊtɛç•n			*!			
c. mY _c tɛ•n					*	

Non-umlauting ... Ç Stems (!)

Input: = $ta_d:d| + \textcircled{c} \bullet$ (Tadel 'reproach', masc.)

	$*V_{c,d}$	NO SKIP \square	$c \rightarrow V$	DEP c	MAX n	$*CC]_{\sigma}$
a. $ta_d:d n_c$			*			*!
 b. $ta_d:d \textcircled{c} \bullet$			*			
c. $t\varepsilon_{c,d}:d \bullet$	*!					


Input: = $na_d:| + \textcircled{c} \bullet + \textcircled{n}$ (Nadel 'needle', fem.)

	$*V_{c,d}$	NO SKIP \square	$c \rightarrow V$	DEP c	MAX n	$*CC]_{\sigma}$
 a. $na_d:d n_{c,n}$			*			*
b. $na_d:d \textcircled{c} \bullet \textcircled{n}$			*		*!	
c. $n\varepsilon_{c,d}:d n_{c,n}$	*!					*

R-Vocalization

$*\{DOR, COR, PHAR\}_{\sigma_w}$: Assign * to every non-coronal C which is final in a weak syllable

Input: [a:][d_R] (Ader 'vein', fem.)

	$*\{D, C, P\}_{\sigma_w}$	IDENT v
a. [a:][d _R]	*!	
b. [a:][d _ə][R _ə]		*!
c. [a:d][R _ə]		*!*
 d. [a:][d _ə]		

Generalizations III: Umlaut and -er

Generalization:


- Non-feminine Nouns that take plural -er always umlaut (Mann → Männ-er, Buch → Bücher, Gott → Gött-er)

Derivation:

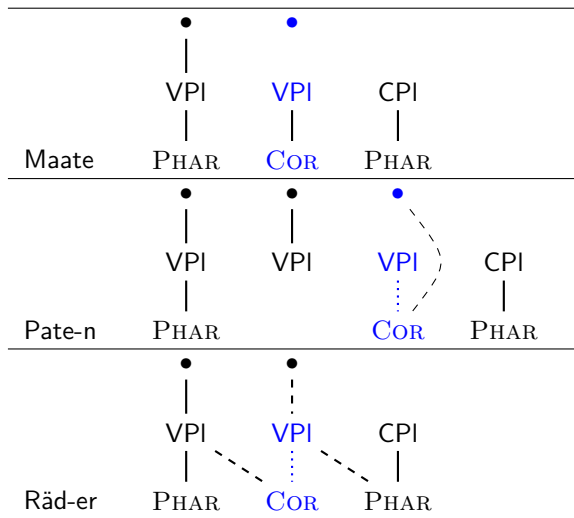
- Plural-er is formed by merging affixal **P** with **•**
- This requires the VPlace node of the [+pl] affix which is only free if preassociated **C** has shifted to the stem vowel to produce umlaut

ɐ-Plural

Input: = man + \textcircled{c} + \textcircled{p} (Mann 'man', masc.)

	$*V_{c,d}$	NOSKIP_{\square}	$c \rightarrow V$	$\text{DEP } c$	$\text{MAX } n$	$*\text{CC}]_{\sigma}$
a. $m\varepsilon_c n\varepsilon_n$				*!		
b. $man\varepsilon_p$			*!			
 c. $m\varepsilon_c n\varepsilon_p$						

Phar-Affixation ([+pl -fem])



Phar cannot integrate into ...

- C-final stems since it ...
 - ▶ ... is illicit in weak σ -final coda (Nadel \rightarrow Nadel-n/*Nade-r/*Nadel-r)
 - ▶ ... cannot associate across another C (Spaten $\ast \rightarrow$ Spat[\varnothing]n)
- ... \emptyset -final stems with plural -n (Pate \rightarrow Pate-n/*Pate-r)
for the very same reasons
- ... non-umlauting stems since the [+pl] VPlc node
is occupied by COR (Maat \rightarrow Maat-e/*Maat-er)

Constraints Governing P-Association

- NoSKIP
 CPL: A PLC node dominated by a CPlace node might not associate across another CPlace node
- $*C_{\{Lab,Dor,Phar\}}]_{\sigma_w}$ Final Cs in reduced syllables must be coronal
- $*_{COR}PLC_{PHAR}$ A segment cannot be specified phonetically for COR and PHAR
- PARSE COR COR must be dominated phonetically by a place class node (CPlace or VPlace)

Deriving the Plural Template

- **Uniformity of Exponence:**

There is only one segmental plural affix

- **Emergence of the Unmarked:**

Plural exponents are phonologically deficient,
hence minimally protected by faithfulness constraints

- **Prosodic Conservatism:**

IDENT ν blocks additional syllables ($*\sigma_w\sigma_w$)

IDENT ν

IDENT ν : Assign * to every output segment which is a syllable nucleus underlyingly, but not in the output

Input: [na:][d!] (Nadel 'needle', fem.)

	IDENT ν
a. [na:][d!]	
b. [na:][d!n]	
c. [na:][d \emptyset l]	*!
d. [na:d][l \emptyset]	*!
e. [na:[d \emptyset][l \emptyset]	*!

Deriving the Plural Template

- $\dots \acute{V} \dots \emptyset$ nouns take plural -n:
 Suppe \rightarrow Suppe-n, Recke \rightarrow Re.cken
 $(\sigma_s.\sigma w) \rightarrow (\sigma_s.\sigma w)$
- $\dots \acute{V} C$ nouns take plural -\(\emptyset\), -\(\emptyset\), or -\(\emptyset\)-n
 Pelz \rightarrow Pel.ze, Huhn \rightarrow Hühn-er, Frau \rightarrow Frau-en
 $(\sigma_s) \rightarrow (\sigma_s.\sigma w)$
- Nouns ending in $\dots \emptyset C$ take plural -\(\emptyset\)-n or -n:
 Stecken \rightarrow Ste.cken, Hobel \rightarrow Ho.bel, Ader \rightarrow Ader-n
 $(\sigma_s.\sigma w) \rightarrow (\sigma_s.\sigma w)$

Consequences

- Floating affixes do not necessarily surface on stems (cf. 'Strict Base Mutation', Alderete 1999)
- There might be much more floatig affixes than we thought
- There might be much more multiple exponence than we thought – but of a standard type (less specific inside of more specific, Inkelas and Caballero 2013)
- Floating affixes may derive similar results as schema-based analyses (Köpcke 1988) or cumulative rules (Albright and Hayes 2003)

References

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Major Generalizations on Suffixation

- Nouns ending in $\dots\text{ə}$ take plural -n (Recke → Re.cken)
- (Non-feminine Nouns ending in $\dots\acute{V}C^*$ take plural -ʰ)
- Nouns ending in $\dots\acute{V}C^*$ take plural -ə (Pelz → Pel.ze)
- Nouns ending in $\dots\text{ə}R$ take plural -∅
(Stecken → Ste.cken, Hobel → Ho.bel, Koffer → Ko.ffer)

Major Generalizations on Plural Umlaut

- Feminine Nouns take plural -n (Frau → Frauen) or umlaut (Braut → Bräu.te)
- Plural-n and umlaut are in complementary distribution (Frau → *Fräu.en)
- Nouns lexically ending in ...ə never umlaut (Pate → *Pä.te-n)
- ɐ-Plural implies umlaut (Rad → Rä.der/*Rader)
- (Otherwise plural umlaut is unpredictable: Sohn → Söhn-e vs. Trohn → Trohn-e)