

# Locality Conditions on Umlaut Restrict German Schwa Epenthesis

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# Claims

## **Neef (1997):**

The interaction of umlaut and ə-epenthesis in German 2sg/3sg verb forms is governed by a paradigmatic distinctivity constraint

## **This talk:**

The interaction of umlaut and ə-epenthesis in German 2sg/3sg verb forms is governed by concatenation + phonology

## ə-Epenthesis in German Verbs

	‘to send’	‘to glue’	‘to lend’	‘to rule’
<b>Infinitive</b>	ʃɪk-n	pap-n	mi:t-n	walt-n
<b>2sg</b>	ʃɪk-st	pap-st	mi:t-ə-st	walt-ə-st
<b>3sg</b>	ʃɪk-t	pap-t	mi:t-ə-t	walt-ə-t

⇒ between [t] and [-t/-st] ə is inserted

# Umlaut and ə-Blocking in German Verbs

	'to put'	'to carry'	'to weed'	'to counsel'	'to hold'
<b>Infinitive</b>	le:g-n	tra:g-n	jɛ:t-n	ra:t-n	gɛlt-n
<b>2sg</b>	le:k-st	trɛ:k-st	jɛ:tə-st	<b>RE:t-st</b>	<b>gilt-st</b>
<b>3sg</b>	le:k-t	trɛ:k-t	jɛ:tə-t	<b>RE:t</b>	<b>gilt</b>
					(Raising)

⇒ Umlaut blocks ə-epenthesis

# Structure of the Talk

The Analysis of Neef (1997)

Theoretical Background Assumptions

A Phonological Analysis of ə-Blocking

# The Analysis of Neef (1997)

## Neef's (1997) Word-Design

- ▶ Word forms don't consist of morphemes
- ▶ Word forms have stems and bases
- ▶ Word forms are well-formed,  
if they satisfy all design conditions of a given language
- ▶ Design conditions are language-specific & inviolable

## Neef (1997): Design Conditions for the 3sg

**Design Condition 1:** 3sg must end in [t]

**Design Condition 2:** 3sg must differ phonologically from its base

## Neef (1997) on Umlaut and Ablaut


Umlaut and ablaut are due to

arbitrary selection of stem allomorphs

which can not be altered by design conditions


## 3sg-Forms not ending in [t]

**Base:** [knak] (Stem)

	-t	Base $\neq$ Form
 knakt	✓	✓
knak	★	★

(not umlauting)

**Base:** [bak] (Stem)

	-t	Base $\neq$ Form
 bεkt	✓	✓
bεk	★	✓

(umlauting)

## 3sg-Forms ending in [t]

**Base:** [jɛ:t] (Stem)

	<b>-t</b>	<b>Base ≠ output</b>
☞ jɛ:tət	✓	✓
jɛ:t	✓	★

(not umlauting)


**Base:** [Ra:t] (Stem)

	<b>-t</b>	<b>Base ≠ output</b>
Rɛ:tət	✓	✓
☞ Rɛ:t	✓	✓

(umlauting)

# Umlauting 3sg-Forms with Final [t]

**Base:** [Ra:t] (Stem)

	<b>-t</b>	<b>Base <math>\neq</math> output</b>
 Rɛ:tət	✓	✓
 Rɛ:t	✓	✓

**Problem:** What excludes [Rɛ:tət]?

“The Schwa is . . . a kind of last resort, which steps in, if there are no other means to satisfy a structural requirement.”  
(Neef, 1997:165)

## The Problem with 2sg

**Base:** [Ra:t] (Stem)

	<b>-st</b>	<b>Base <math>\neq</math> output</b>
Rɛ:təst	✓	✓
☞ Rɛ:tst	✓	✓

**Base:** [jɛ:t] (Stem)

	<b>-st</b>	<b>Base <math>\neq</math> output</b>
jɛ:təst	✓	✓
☞ jɛ:tst	✓	✓

### Problem:

If schwa is last-resort, it should be blocked by an affix which makes the 2sg distinct from the stem

## The Problem with 2sg: Neef's Solution

“The consequence . . . is that the design of the [2sg] depends from the design of the [3sg], hence that the base of the [2sg] is the [3sg] and not the verb stem. . . .

In principle the form of the [2sg] is identical to the [3sg] apart from the fact that it must end on [st] instead on [t]”  
(Neef, 1997:173-174)

2sg [jɛtəst] is better than [jɛtət]  
because it is closer to the 3sg base [jɛtət]  
Hence the schwa in [jɛtəst] is not epenthetic,  
but already part of the base.

## Why these data are important

- ▶ They seem to show that a phonological process (ə-epenthesis) is directly sensitive to intra-word distinctness
- ▶ This could only be captured in an architecture of morphophonology which is inherently paradigmatic

and where phonological constraints have detailed access to morphological information in the form of constraint indexation or cophonologies

# OT-Approaches Invoking Morphological Distinctivity

- ▶ **Antifaithfulness** (Alderete, 2001):  
Paradigmatically related stems must differ according to a specified phonological parameter
  
- ▶ (Paradigmatic) **REALIZE MORPHEME** (Kurusu, 2001):  
Paradigmatically related words must differ according to some phonological parameter

(potentially problematic)

# Theoretical Background Assumptions

# Background

- ▶ Umlaut is a defective segment **U** which can occur in all positions which are open to full segments
- ▶ In 2sg/3sg forms U is a sub-exponent of verb agreement restricted to a specific lexical class of verbs
- ▶ Umlaut spreads to stems due to phonological licensing constraints

# Technical Implementation

- ▶ **Morphology:**

Distributed Morphology

(Halle & Marantz, 1993; Müller, 2006; Trommer, 2007)

- ▶ **Phonology:**

Autosegmental Phonology +

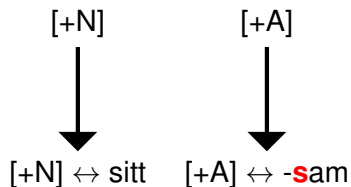
the Colored Containment version of Optimality Theory

(van Oostendorp, 2004; Hermans & van Oostendorp, 2008)

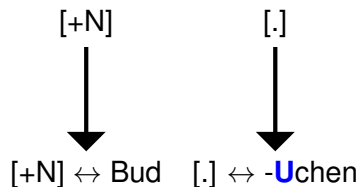
## (Defective) Segments can occur as

- ▶ parts of exponents
- ▶ exponents
- ▶ subexponents

# (Defective) Segments as parts of exponents

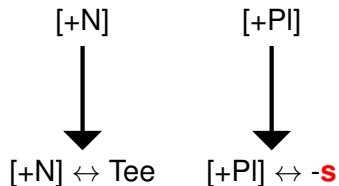


sitt**s**am

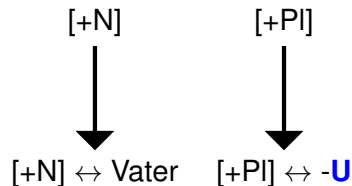


B**ü**dchen

# (Defective) Segments as exponents (Trommer, 2007)

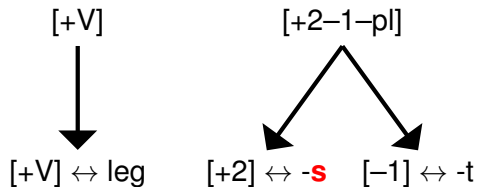


Tee**s**



Vä**U**ter

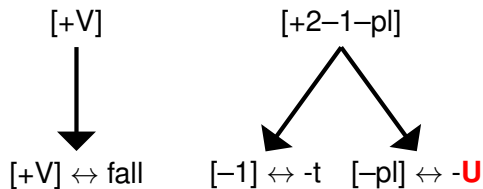
# Segments as subexponents (Müller, 2006; Trommer, 2007)



leg**s**t

# (Defective) Segments as subexponents

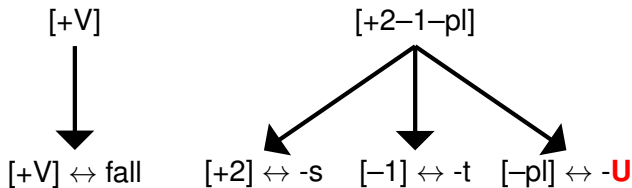
(Müller, 2006; Trommer, 2007)



fällt

# (Defective) Segments as subexponents

(Müller, 2006; Trommer, 2007)



fällst

# Discontinuous Exponence in German (Müller, 2006; Trommer, 2007)

	sg		pl	
1	[+1 -2 -pl]	-e	[+1 -2 +pl]	-n
2	[-1 +2 -pl]	-s-t	[-1 +2 +pl]	-t
3	[-1 -2 -pl]	-t	[-1 -2 +pl]	-n

[-2+pl] : -n

[+2] : -s / [\_\_\_\_ -pl]

[-1] : -t

[-pl] : **U** / [\_\_\_\_ -1] **Class<sub>U</sub>**

[-2] : -e

# Limburgian Diminutive Umlaut (Hermans & van Oostendorp, 2008)

## Regular Umlaut

	<b>Diminutive</b>
v[u:]s 'fist'	v[y:]s-ke
b[o:]k 'book'	b[ø:]k-ske
m[a]n 'man'	m[æ]n-ke

## Blocking by Intervening Vowel

	<b>Diminutive</b>
j[u:]d[a]s 'rotter'	—
[o:]m[a] 'grandma'	—
c[a:]mer[a] 'camera'	—

# The Representation of Umlaut

 (Hermans & van Oostendorp, 2008)**U**

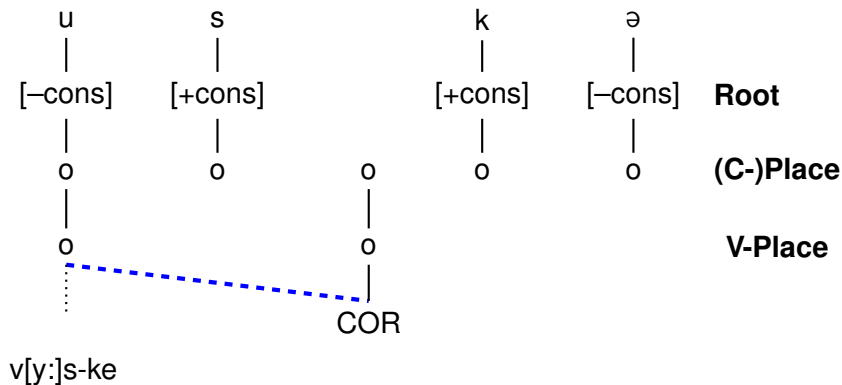
=

o  
|  
o  
|  
COR

**Root****(C-)Place****V-Place**

# Successful Umlaut

(Hermans & van Oostendorp, 2008)






# Constraints (Hermans & van Oostendorp, 2008)

- ▶ **LIC-COR**: A coronal feature must be licensed by association to a stem vowel
- ▶ **(HEAD=HEAD)**: The head of a harmonic span should be the head of a foot.)
- ▶ **BIN-SPAN**: A feature span is (maximally) binary
- ▶ **\*∅**: Avoid the ∅-parse

# Blocked Umlaut (Hermans & van Oostendorp, 2008)

**Input:** j[u:]d[a]s-kUə

	LIC-COR	BIN-SPAN	*Ø
a. j[y:]d[ɛ]s-kUə		*!	
b. j[u:]d[a]s-kUə	*!		
c. j[u:]d[a]s-kUə	*!		
 d. Ø			*

# Evidence for the Phonological Analysis (Hermans & van Oostendorp, 2008)

- ▶ Phonological intervention cannot be captured as paradigmatic distinctness
- ▶ Intervention even applies if fronting would be vacuous:

z[e:]br[a]	'zebra'	*z[e:]br[E]-ke	*z[e:]br[a]-ke
T[i:]n[a]	girl's name	*T[i:]n[ɛ]-ke	*T[i:]n[a]-ke
t[y]b[a]	'tuba'	*t[y]b[ɛ]-ke	*t[y]b[a]-ke
t[y]m[ɔ]r	'tumor'	*t[y]m[œ]r-ke	*t[y]m[ɔ]r-ke

# A Phonological Analysis of ə-Blocking


## ə-Insertion before [-t]

- ▶  $[V \ t \ t]_{\sigma}$  is phonetically interpreted as  $[V \ t]_{\sigma}$
- ▶  $[V \ t \ t]_{\sigma}$  is possible (*rä[tt]*), but marked (*\*wa[tt]*)
- ▶ **\*TT**: No adjacent coronal stops
- ▶ Repair by ə-insertion

similar to the standard treatment of ambisyllabic/geminate consonants

## ə-Insertion before [-t]

**Input:** mi:t-t


	*TT	DEP V
a. mi:tt	*!	
 b. mi:t-ə-t		*

## ə-Insertion before [-s-t]

- ▶  $[V \ t \ s]_{\sigma}$  is harmonically bounded by  $[V \ \widehat{t}s]_{\sigma}$  (*des Ra[\widehat{t}s]*) due to **SONORITY SEQUENCING**
- ▶  $[\widehat{t}st]$  is possible (*rä[\widehat{t}st]*), but marked by \*TT (*\*wa[\widehat{t}st]*)
- ▶ ə-insertion between [s] and [t] is excluded ((*du*) \**watset*)
- ▶ **CONTIGUITY**<sub>SUBEXPONENTS</sub>: No insertion between subexponents of the same head


## ə-Insertion before [-s-t]

**Input:** mi:t-s-t

	*TT	SON-SEQ	CONTIG <sub>SUBEX</sub>	DEP V
a. mi:t-s-t		*!		
b. mi:t- <sup>^</sup> s-t	*!			
c. mi:t-s-ə-t			*!	
 d. mi:t-ə-s-t				*

# Umlaut and Blocking of ə-Insertion

**Input:** Ra:t-t-U

	LIC-COR	BIN-SPAN	*Ø	*TT	DEP V
a. Ra:t-ə-t-U	*!				*
b. Rɛ:t-ət-U		*!			*
c. Ø			*!		
 d. Rɛ:t-t-U				*	

**Input:** Ra:t-s-t-U

	LIC-COR	BIN-SPAN	*Ø	*TT	DEP V
a. Ra:t-ə-s-t-U	*!				*
b. Rɛ:t-ət-s-t-U		*!			*
c. Ø			*!		
 d. Rɛ:t-s-t-U				*	

# Umlaut and ə-Deletion in Diminutives


Rose	Röse-chen	*Röse-chen
Bude	Büde-chen	*Büde-chen
Dame	Däme-chen	*Däme-chen
Monat	*Mönat-chen	*Mönat-chen
Wodka	*Wödka-chen	*Wödka-chen
Europa	*Euröpa-chen	*Euröpa-chen

## Umlaut and ə-Deletion in Diminutives


- ▶ With stems where the stressed vowel is not final, stem-final ə is deleted to satisfy LIC-COR and BIN-SPAN
  - ▶ Full vowels are retained leading to ineffability (just as in Limburgian)
- ⇒ Different Ranking of MAX V (for full vowels) and MAX ə

# Umlaut and ə-Deletion in Diminutives

**Input:** bude-**U**chen

	MAX V	LIC-COR	BIN-SPAN	*∅	MAX ə
a. bude- <b>U</b> chen		*!			
b. büde- <b>U</b> chen			*!		
c. ∅				*!	
 d. büd- <b>U</b> chen					*

**Input:** monat-**U**chen

	MAX V	LIC-COR	BIN-SPAN	*∅	MAX ə
a. monat- <b>U</b> chen		*!			
b. mönät- <b>U</b> chen			*!		
 c. ∅				*	
d. mönt- <b>U</b> chen	*!				

## ə-Non-Blocking in Diminutives

Bruder Brüder-chen \*Brüder-chen

Vater Väter-chen \*Väter-chen

Gabel Gäbel-chen \*Gäbel-chen

Sockel Söckel-chen \*Söckel-chen

### but:

Haken \*Häken-chen Häken-chen

Laden \*Läden-chen Läden-chen

Korken \*Körken-chen Körken-chen

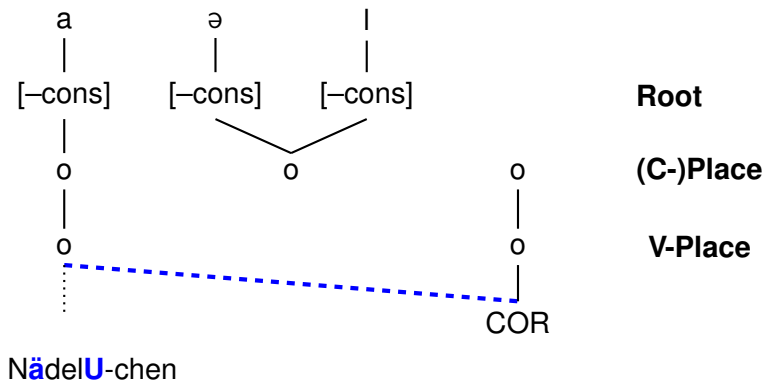
## ə-Non-Blocking in Diminutives

**Generalization:** [ə] does not intervene in umlaut licensing if it precedes [l] or is vocalized [ɐ]

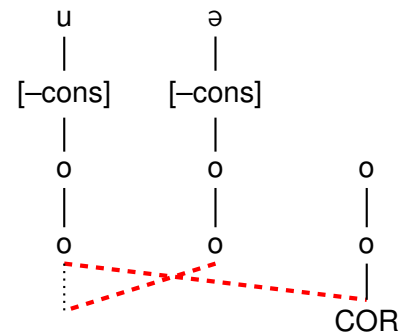
**Intuition:** [ə] must lean on the place features of another segment

**Assumption:** [ə] either shares the C-Place node of an appropriate right-adjacent consonant or links its V-Place node to V-Place of a preceding vowel

# Nonblocking by [ə]



## Blocking by [ə]



\*Budə-Uchen

Root

(C-)Place

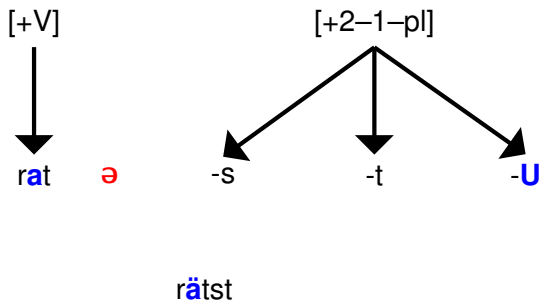
V-Place

COR

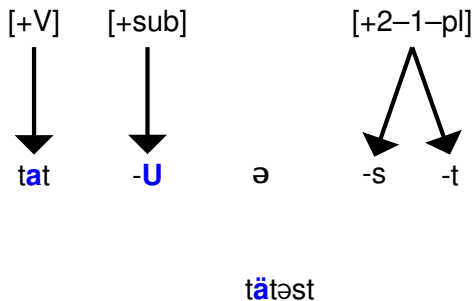
# Umlaut & ə-Non-Blocking in Subjunctive Forms

	‘to do’	‘to lie’	‘to come’
<b>Past 1sg</b>	ta:t	la:g	ka:m
<b>Subjunctive 2sg</b>	tɛ:t-ə-st	lɛ:g-st	kɛ:m-st
<b>Subjunctive 2pl</b>	tɛ:t-ə-t	lɛ:g-t	kɛ:m-t

## ə-Blocking in 2sg/3sg Indicative Forms



# ə-Non-Blocking in Subjunctive Forms



# Summary

- ▶ The interaction of umlaut and ə-epenthesis can be captured without recurring to paradigmatic distinctness
- ▶ The relevant phonological licensing conditions have widespread consequences for the morphophonology of German (and related dialects)
- ▶ ə acts as a context-sensitive intervenor