

Distributed Morphology

Jochen Trommer

`jtrommer@uni-leipzig.de`

Universität Leipzig
Institut für Linguistik

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Overview

Architecture of the Grammar

Representations

More Morphological Rule Types

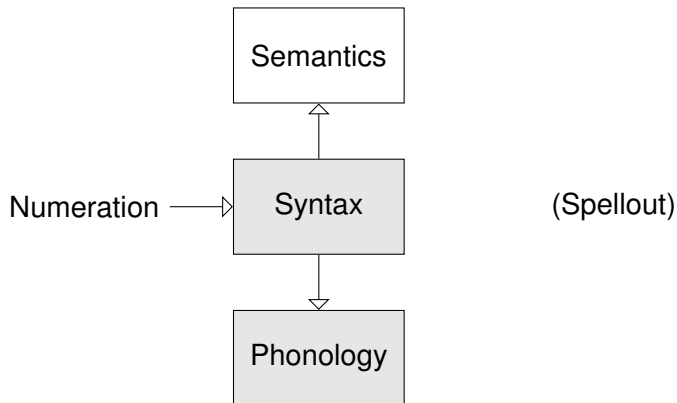
- Impoverishment

- Fusion

- Fission

- Readjustment

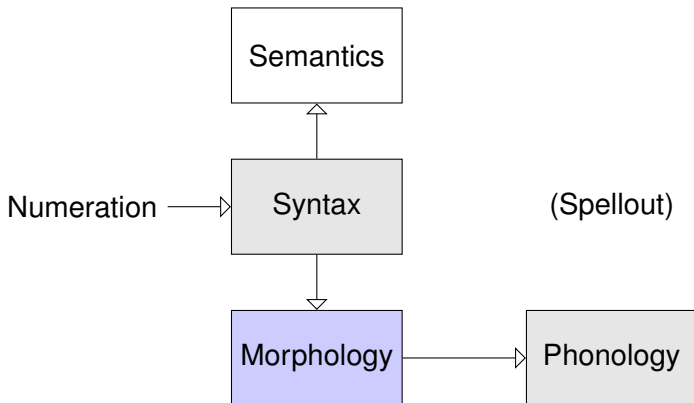
Minimalist Architecture



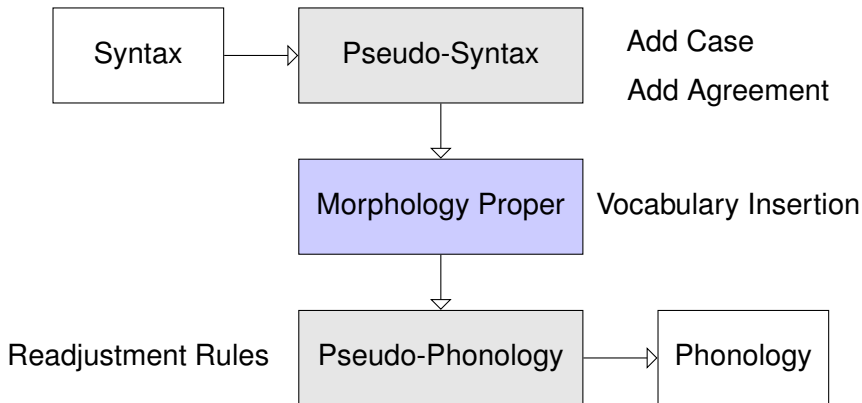
Role of Morphology in Distributed Morphology

- ▶ Syntax manipulates abstract heads without phonological content
- ▶ Morphology interprets the output of Syntax

Architecture of Distributed Morphology



Internal Structure of Morphology in DM



An Example (Albanian)

Unë-Ø

I-Nom

shkro-v-a

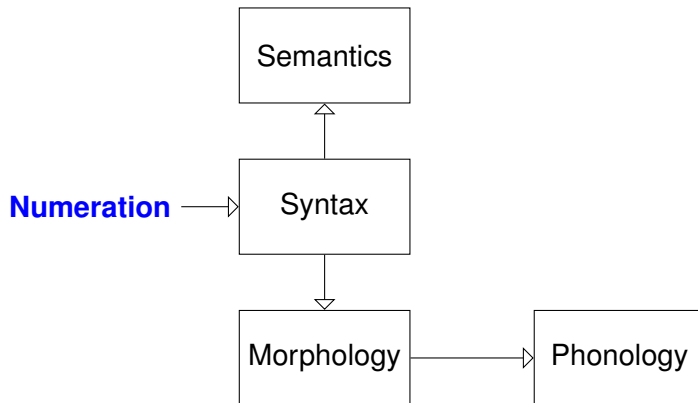
write-AOR-1 SG

Kurt-i-t

Kurt-DEF-DAT

'I wrote to Kurt'

Step 1



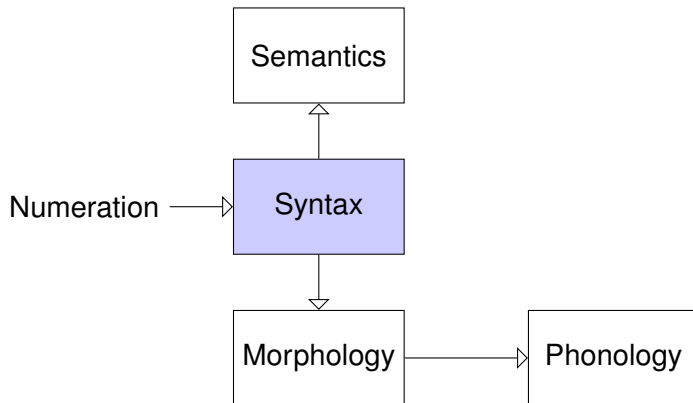
Step 1: Numeration

$$\begin{bmatrix} +\text{Det} \\ +1 \\ -\text{pl} \end{bmatrix} \quad \begin{bmatrix} +\text{Tense} \\ +\text{Aor} \end{bmatrix} \quad \begin{bmatrix} +\text{Det} \\ +3 \\ -\text{pl} \end{bmatrix}$$

$\sqrt{\textit{write}}$ $\sqrt{\textit{Kurt}}$

[+v] [+n]

Step 2



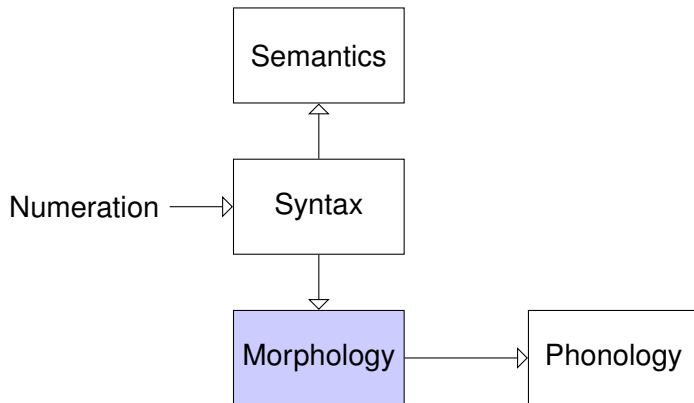
Step 2: Syntax

[+D+1-pl]

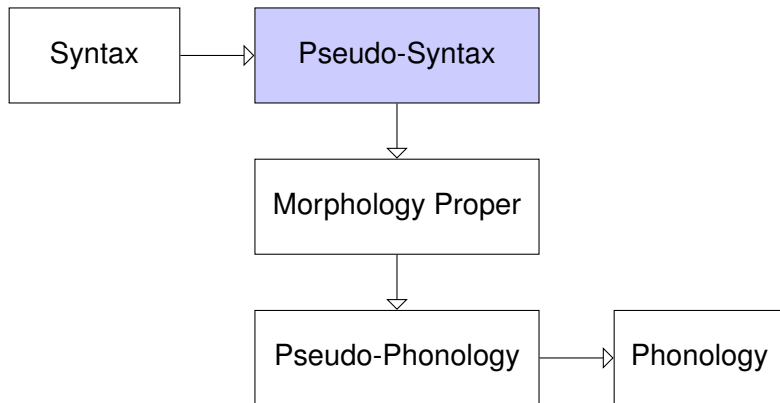
(($\sqrt{\textit{write}}$ [+v]) [+Tns +Aor])

(($\sqrt{\textit{Kurt}}$ [+n]) [+D +3 -pl])

Step 3



Step 3



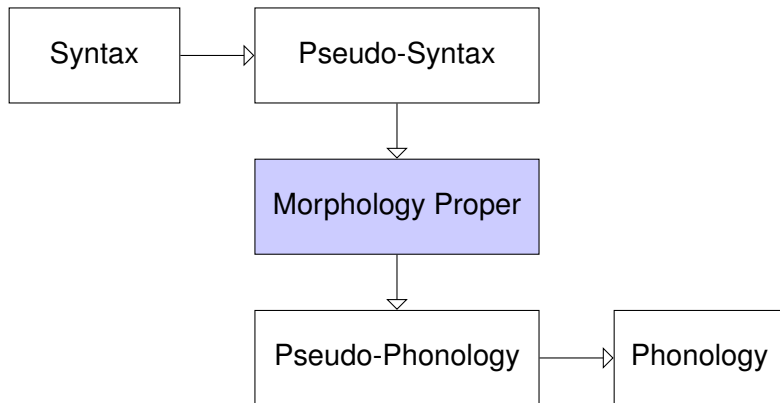
Step 3: Pseudo-Syntax

[+D+1-pl]

(($\sqrt{\text{write}}$ [+v]) ([+Tns +Aor][+Agr +1 -pl]))

(($\sqrt{\text{Kurt}}$ [+n]) [+D +3 -pl])[+Case +Dat])

Step 4



Step 4: Vocabulary Items

/unë/ ↔ [+D +1 -pl]

/-i/ ↔ [+D +3 -pl]

/-v/ ↔ [+Tense +Aor]

/-a/ ↔ [+Agr +1 -pl]

/shkrua/ ↔ $\sqrt{\text{write}}$ /_____ [+v]

/kurt/ ↔ $\sqrt{\text{Kurt}}$ /_____ [+n]

Step 4: Morphology Proper (Vocabulary Insertion)

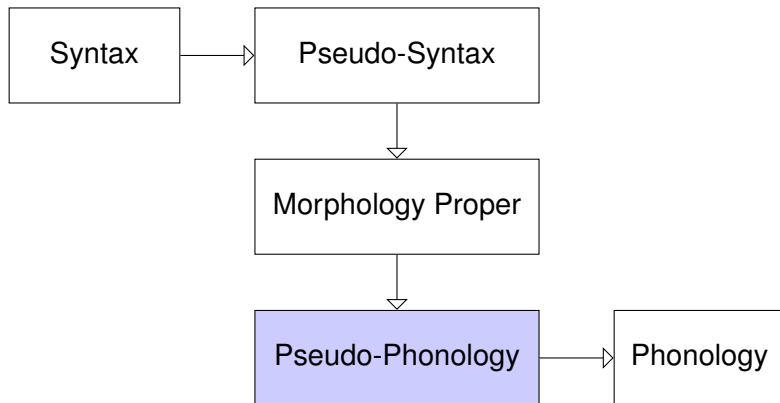
[+D+1-pl]

/unë/

(($\sqrt{\text{write}}$ [+v]) ([+Tns +Aor] [+Agr +1 -pl]))
/shkrua/ **/v/** **/a/**

(($\sqrt{\text{Kurt}}$ [+n]) [+D +3 -pl]) [+Case +Dat])
/kurt/ **/i/** **/t/**

Step 5



Step 5: Pseudo-Phonology

[+D+1-pl]

/unë/

(cf. *shkrua-j-a*, 'I wrote (Impf.)')

(($\sqrt{\text{write}}$

[+v])

([+Tns +Aor]

[+Agr +1 -pl]))

/shkrua/

/v/

/a/

/shkro/

(($\sqrt{\text{Kurt}}$

[+n])

[+D +3 -pl])

[+Case +Dat])

/kurt/

/i/

/t/

Why is it called ‘Distributed Morphology’

- ▶ Structure Building in Syntax
- ▶ Phonological Spellout in Morphology
- ▶ Morphology is Distributed
across different Modules of Grammar

Arguments for Late Insertion

- ▶ Syntax is not sensitive to phonological features of morphological items
- ▶ Avoids duplication of structure building
- ▶ Predictions for Affix Order (Julien, 2000; Trommer, 2001)
- ▶ Allomorphy is sensitive to syntactic context (Trommer, 2001)
- ▶ Morphological Underspecification

Two Types of Minimal Elements

Lexical Items: $\begin{bmatrix} +1 \\ -pl \\ +Nom \end{bmatrix}$

Vocabulary Items: $\begin{bmatrix} +1 \\ -pl \\ +Nom \end{bmatrix} \leftrightarrow /un\ddot{e}/$

Underspecification: Gender Agreement in Italian

lui e pazz-**o**
 he is nuts-masc



Pseudo-Syntax: Copy gender features
 from subject to adjective

lei e pazz-**a**
 she is nuts-fem

Vocabulary Insertion

$$\begin{bmatrix} +\text{Det} \\ +3 \\ +\text{masc} \end{bmatrix} \quad \text{e} \quad \text{pazz} \quad \begin{bmatrix} +\text{Agr} \\ +\text{masc} \end{bmatrix}$$

$$\begin{bmatrix} +\text{Det} \\ +3 \\ +\text{masc} \end{bmatrix} \quad \begin{bmatrix} +\text{Agr} \\ +\text{masc} \end{bmatrix}$$
 \updownarrow

/lui/

 \updownarrow

/-o/

Gender Agreement in 2nd Person

tu sei pazz-**o**
 you (masc.) are nuts-masc



tu sei pazz-**a**
 you (fem.) are nuts-fem

Underspecified Vocabulary Insertion

$$\left[\begin{array}{l} +\text{Det} \\ +2 \\ +\text{masc} \end{array} \right] \quad \text{sei} \quad \text{pazz} \quad \left[\begin{array}{l} +\text{Agr} \\ +\text{masc} \end{array} \right]$$

$$\left[\begin{array}{l} +\text{Det} \\ +2 \end{array} \right]$$

$$\updownarrow$$

$$/\text{tu}/$$

$$\left[\begin{array}{l} +\text{Agr} \\ +\text{masc} \end{array} \right]$$

$$\updownarrow$$

$$/\text{-o}/$$

Subset Principle

1. Only VIs which specify a subset of a head's features can be inserted
2. Only the most specific VI is inserted

Vocabulary Insertion

	sg	pl
1	leg- e	leg- en
2	leg- st	leg- t
3	leg- t	leg- en

Syntax: [+Agr +2 -1 +pl]

Vocabulary Items

[+2 -pl] : **st**
 [+2 +pl] : **t**
 [+pl] : **en**



[+2 +pl]:**t**

Competition: English Verb Agreement

	sg	pl
1	come- \emptyset	come- \emptyset
2	come- \emptyset	come- \emptyset
3	come- s	come- \emptyset

Syntax: [+Agr +3 -pl]



Vocabulary Items

[+Agr +3 -pl] ↔ **s**
 [+Agr] ↔ \emptyset

[+ Agr +3 -pl] ↔ **s**

Additional Operations in Halle & Marantz (1993)

- ▶ Impoverishment
- ▶ Fission
- ▶ Fusion
- ▶ Readjustment

Impoverishment

Delete features of a syntactic head

$$\begin{bmatrix} +1 \\ +pl \end{bmatrix} \rightarrow [+1]$$

$$\begin{bmatrix} +1 \\ +pl \end{bmatrix} \rightarrow [\]$$

Fission

Split a syntactic head into two

$$\begin{bmatrix} +1 \\ +pl \end{bmatrix} \rightarrow [+1] [+pl]$$

Fusion

Fuse two syntactic heads into one

$$\begin{bmatrix} +1 \\ +pl \end{bmatrix} \quad \begin{bmatrix} +2 \\ -pl \end{bmatrix} \rightarrow \begin{bmatrix} \begin{bmatrix} +1 \\ +pl \end{bmatrix} \\ \begin{bmatrix} +2 \\ -pl \end{bmatrix} \end{bmatrix}$$

Fusion

$$\left[\begin{array}{c} \left[\begin{array}{c} +1 \\ +pl \end{array} \right] \\ \left[\begin{array}{c} +2 \\ -pl \end{array} \right] \end{array} \right] \text{ allows insertion of}$$

$$\left[\begin{array}{c} +1 \\ +pl \end{array} \right] \text{ or } \left[\begin{array}{c} +2 \\ -pl \end{array} \right] \text{ but not of both}$$

Fusion

$$\left[\begin{array}{c} \left[\begin{array}{c} +1 \\ +pl \end{array} \right] \\ \left[\begin{array}{c} +2 \\ -pl \end{array} \right] \end{array} \right]$$

doesn't allow insertion of

$$\left[\begin{array}{c} +1 \\ -pl \end{array} \right] \quad \text{or} \quad \left[\begin{array}{c} +2 \\ +pl \end{array} \right]$$

Impoverishment

	sg	pl
1	leg- e	leg- en
2	leg- st	leg- t
3	leg- t	leg- en

	sg	pl
1	leg-t- e	leg-t- en
2	leg-t- est	leg-t- et
3	leg-t- e	leg-t- en

Vocabulary Items

[+2 -pl]	↔	st
[-2 -1]	↔	t
[-2]	↔	e

Problem:

Violation of the
Subset Principle

Impoverishment

Syntax: [+Agr -2 -1 -pl]

Impoverishment: [1] → ∅ / ____ [+past]

[+Agr -2 -pl]

Vocabulary Items

[+2 -pl] ↔ **st**

[-2 -1] ↔ **t**

[-2] ↔ **e**



[-2] ↔ **e**

Georgian Verb Agreement

		Object				
		1sg	1pl	2sg	2pl	3
Subject	1sg			<i>g-vedav</i>	<i>g-xedav-t</i>	<i>v-xedav</i>
	1pl			<i>g-xedav-t</i>	<i>g-xedav-t</i>	<i>v-xedav-t</i>
	2sg	<i>m-xedav</i>	<i>gv-xedav</i>			<i>xedav</i>
	2pl	<i>m-xedav-t</i>	<i>gv-xedav-t</i>			<i>xedav-t</i>
	3sg	<i>m-xedav-s</i>	<i>gv-xedav-s</i>	<i>g-xedav-s</i>	<i>g-xedav-t</i>	<i>xedav-s</i>
	3pl	<i>m-xedav-en</i>	<i>gv-xedav-en</i>	<i>g-xedav-en</i>	<i>g-xedav-en</i>	<i>xedav-en</i>

Assumptions in Halle & Marantz (1993)

- ▶ Prefixes and **-t** realize clitic heads
all other affixes subject agreement
- ▶ Clitic heads fuse to a single head
- ▶ [+pl] is fissioned off in clitics

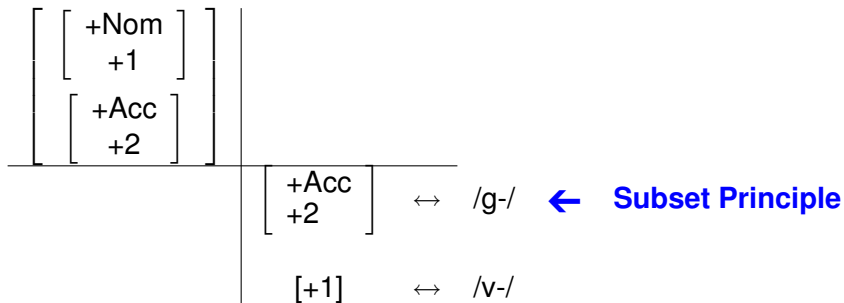
Blocking in Georgian Prefixes (Clitics)

- (1) a. v-xatav b. xatav-s
 S1-see see-S3s
 'I see' 'he sees'
- c. g-xatav-s g-xatav/*g-v-xatav/*v-g-xatav
 O2-see-S3s O2-see
 'he sees thee' 'I see thee'

Fusion in Halle & Marantz (1993)

$$\begin{bmatrix} +\text{Nom} \\ +1 \end{bmatrix} \begin{bmatrix} +\text{Acc} \\ +2 \end{bmatrix} \rightarrow \begin{bmatrix} \begin{bmatrix} +\text{Nom} \\ +1 \end{bmatrix} \\ \begin{bmatrix} +\text{Acc} \\ +2 \end{bmatrix} \end{bmatrix}$$

Fusion in Halle & Marantz (1993)



Georgian Split Agreement (I)

a. v-xedav
1-see
'I see (him)'

b. v-xedav-t
1-see-PL
'we see (him)'

c. Ø-xedav
2-see
'you (sg.) see (him)'

d. Ø-xedav-t
2-see-PL
'you (pl.) see (him)'

Georgian Split Agreement (II)

a. g-xedav
O2-see
'I see thee'

b. g-xedav-t
O2-see-PL
'I see you (pl.)'

c. m-xedav
O1-see
'you (sg.) see me'

d. gv-xedav/*m-xedav-t/*gv-xedav-t
O1p-see
'you (sg.) see us'

Fission in Halle & Marantz (1993)

Generalization

plural for a clitic (prefix) is expressed by suffix *-t*
 except for a 1pl object

Fission Rule

$$\begin{array}{c} \text{Cl} \\ | \\ [+pl] \end{array} + \text{Stem} \rightarrow [+pl] + \text{Cl} + \text{Stem} \text{ (linear order irrelevant)}$$

unless the [+pl] is part of a [+1], ACC argument

Derivation in Halle & Marantz (1993)

	2pl ← 1sg	1pl ← 2sg
Syntax	[+2+pl] V	[+1+pl] V
Fission	[+2] V [+pl]	[+1+pl] V
Vocabulary Insertion	<i>g-</i> <i>-t</i>	<i>gv-</i>

Finite Verbformen im Englischen (regulär)

	sg	pl
1	play-Ø	
2		
3	play-s	

	sg	pl
1	play-ed	
2		
3		

Partizip	Präsens	play-ing
	Präteritum	play-ed
Infinitiv		play-Ø

Vocabulary Items für Englische Verben (regulär)

/-d/ ↔ [+prät]

/-ing/ ↔ [+part]

/-z/ ↔ [+3,-pl]

∅ ↔ []

Ableitung für Präteritum 3sg: (she) play-ed

		play	[+3-pl+prät-part]
/-d/	↔	[+prät]	-d
/-ing/	↔	[+part]	—
/-z/	↔	[+3,-pl]	—
∅	↔	[]	—

Ableitung für Präsens 3sg: (she) play-z

		play	[+3-pl-prät-part]
/-d/	↔	[+prät]	⚡
/-ing/	↔	[+part]	⚡
/-z/	↔	[+3,-pl]	-z
∅	↔	[]	—

Ableitung für Präsens 1 sg: (I) play-Ø

		play	[+3-pl-prät-part]
/-d/	↔	[+prät]	⚡
/-ing/	↔	[+part]	⚡
/-z/	↔	[+3,-pl]	⚡
Ø	↔	[]	-Ø

Finite Verbformen im Englischen (irregulär I)

	sg	pl
1	dwell-Ø	
2		
3	play-s	

	sg	pl
1	dwell- t	
2		
3		

Partizip	Präsens	dwell-ing
	Präteritum	dwell- t
Infinitiv		dwell-Ø

Finite Verbformen im Englischen (irregulär II)

	sg	pl
1	beat-∅	
2		
3	play-s	

	sg	pl
1	beat-∅	
2		
3		

Partizip	Präsens	beat-ing
	Präteritum	beat- en
Infinitiv		beat-∅

Vocabulary Items für Englische Verben (“irregulär”)

/-n/ ↔ [+part,+prät] / X + _____
 (X = ~hew, ~prove, go, beat, ...)

∅ ↔ [+prät] / Y + _____
 (Y = beat, drive, bind, sing, ...)

/-t/ ↔ [+prät] / Z + _____
 (Z = dwell, buy, send, ...)

“~” = Verben, die optional /-d/ oder /-n/ nehmen.

Ableitung für Präteritum 3sg: (she) dwel-t

	dwel	[+3-pl+prät-part]
/-t/ ↔ [+prät]		
/Z + _____ (Z = dwell, buy, send, ...)		-d
/-d/ ↔ [+prät]		—
/-ing/ ↔ [+part]		—
/-z/ ↔ [+3,-pl]		—
∅ ↔ []		—

Grundmodell

Syntaktische Objekte werden

durch phonologische Objekte ersetzt

Lexical Item	Lexical Item	Lexical Item	...
↕	↕	↕	...
Vocabulary Item	Vocabulary Item	Vocabulary Item	...

Vokalwechsel bei englischen Verben (I)

- a. (i) beat beat beat-en
 drive drove driv-en
 break broke brok-en
 fall fell fall-en
- (ii) put put put
 sing sang sung
 bind bound bound
 come came come

Vokalwechsel bei englischen Verben (II)

b.	dwell	dwel-t	dwel-t
	leave	lef -t	lef -t
	send	sen-t	sen-t
	buy	bough -t	bough -t
c.	(i) prove	prove-d	prov-en
	do	di -d	do -ne
	(ii) yell	yell-ed	yell-ed
	tell	tol -d	tol -d

Problem mit dem Grundmodell

Vokalwechsel bestehen nicht aus Objekten

sondern aus prozeduralen Veränderungen

(z.B. **s**ing → **s**ang)

Lösung

Readjustment-Regeln manipulieren die phonologische Form
von VIs in bestimmten morphosyntaktischen Kontexten

Readjustment Regel für **sell** ~ **so**ld, **tell** ~ **to**ld

V → [+hinten+rund] / W ____ U [+prät]

(WVU = sell, tell)

/sel/ /d/:[+prät]

W = /s/, V = /e/, U = l

/sol/ /d/:[+prät]

Readjustment-Regel für shall ~ should, will ~ would

Reim → /u/ / X ____ [+prät]

(X-Reim = shall, will, can, stand)

/wɪl/ /d/:[+prät]

X = /w/, Reim = /ɪl/

/wu/ /d/:[+prät]

Noch mehr Readjustment-Regeln

a. Reim → /i/ / Y _____ [+prät, -part]

Reim → /ʌ/ / Y [+prät, +part], [-prät, +3, -pl]
(Y-Reim = do)

b. Reim → /e/ / Z _____ [+prät], [-prät, +3, -pl]
(Z-Reim = say)

c. C → ∅ / Q _____ [+prät], <[-prät, +3, -pl]>
(QC = make, <have>)

Readjustment-Regeln sind Zwitterwesen

- ▶ sie werden wie morphologische Regeln ausgelöst
- ▶ sie manipulieren Struktur wie phonologische Regeln

Evidenz für 2 verschiedene Regeltypen

Affigierung und Wurzelveränderung sind unabhängig:

∅	-t	-t
dwell	dwel-t	dwel-t
leave	lef-t	lef-t

∅	-d	-n
prove	prove-d	prov-en
do	di-d	do-ne

∅	-d	-d
yell	yell-ed	yell-ed
tell	to-d	to-d

Morphologische Theorien

- ▶ **Morphembasiert:**

Wörter/Wortformen werden aus Morphemen aufgebaut
die Bedeutung und Struktur von Wörtern ergibt sich
aus den Eigenschaften ihrer Morpheme
(vorherrschend bei Theorien über Wortbildung)

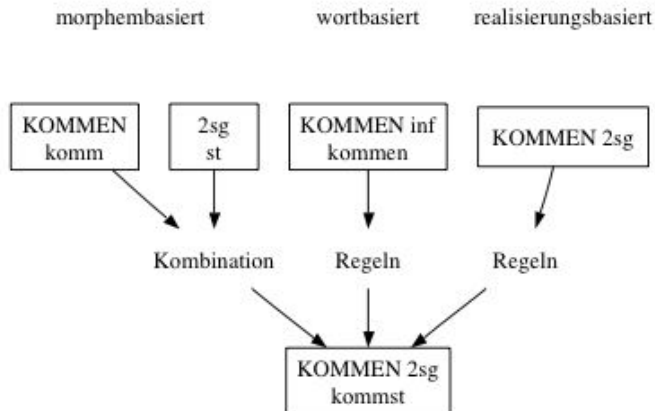
- ▶ **Realisational:**

Morpheme/morphologische Regeln realisieren Eigenschaften,
die einzelne Wörter oder syntaktische Strukturen vorgeben
(vorherrschend bei Theorien über Flexion)

- ▶ **Wortbasiert:**

Wörter sind entweder als ganzes gespeichert oder werden
paradigmatisch aus anderen Wörtern abgeleitet
(selten verwendet aber Thema dieses Seminars)

Morphologische Theorien



Morphologische Theorien: Terminologie

- ▶ **Morphembasiert:**
Wortsyntax
- ▶ **Realisational:**
Word-and-Paradigm-Theory (falsch)
- ▶ **Wortbasiert:**
Word-and-Paradigm-Theory (richtig)