

Mutation as Readjustment in Distributed Morphology

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Readjustment Rules

- ▶ do the dirty jobs
- ▶ but no one wants to know what they do and how

Overview

English Verbs (Halle & Marantz, 1993)

German Umlaut (Embick & Halle ,2005))

Remarks

Finite Verbs in English (Regular)

	sg	pl
1	play-∅	
2		
3	play-s	

	sg	pl
1	play-ed	
2		
3		

Partizip	Präsens	play-ing
	Preterite	play-ed
Infinitiv		play-∅

Basic Architecture of Distributed Morphology

- ▶ Syntax provides abstract heads (sets of morphosyntactic features) without phonological contents
- ▶ The main part of the morphology is an ordered list of Vocabulary Items, pairs of (possibly underspecified) head specifications and phonological specifications
- ▶ At vocabulary insertion one VI is inserted into every head

Vocabulary Items for English Verbs (regular)

/-d/ ↔ [+pret]

/-ing/ ↔ [+part]

/-z/ ↔ [+3,-pl]

∅ ↔ []

Algorithm for Vocabulary Insertion (Simplified)

(for a given head H)

Go through the list of Vocabulary Items

and insert the first VI

whose morphosyntactic features are a subset of H

(Stop)

Derivation for Preterite 3sg: (she) play-ed

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

Derivation for Present 3sg: (she) play-z

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

Derivation for Present 1 sg: (I) play-Ø

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

Finite Verb Forms in English (irregular I)

	sg	pl
1	dwell-Ø	
2		
3	play-s	

	sg	pl
1	dwell- t	
2		
3		

Participle	Present	dwell-ing
	Preterite	dwell- t
Infinitive		dwell-Ø

Finite Verb Forms in English (irregular II)

	sg	pl
1	beat-∅	
2		
3	play-s	

	sg	pl
1	beat-∅	
2		
3		

Participle	Present	beat-ing
	Preterite	beat- en
Infinitive		beat-∅

Vocabulary Items for English Verbs (“irregular”)

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

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

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

“~” = Verbs which take optionally /-d/ or /-n/

Derivation for Preterite 3sg: (she) dwell-t

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

Basic Model

Syntactic objects are replaced

by phonological objects

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

Vowel Change in English Verbs (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

Vowel Change in English verbs (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 with the Base Model

Vowel Change isn't an object

but a procedural change

(e.g. **s**ing → **s**ang)

Solution

Readjustment rules manipulate the phonological form
of VIs in specific morphosyntactic contexts

Readjustment rule for **sell** ~ **so**ld, **te**ll ~ **to**ld
$$V \rightarrow [+back+round] / W ____ U [+pret]$$

(WVU = sell, tell)

/sel/ /d/:[+pret]

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

/sol/ /d/:[+pret]

Readjustment Rule for shall ~ should, will ~ would

rhime → /u/ / X _____ [+pret]

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

/wɪl/ /d/:[+pret]

X = /w/, rhime = /ɪl/

/wu/ /d/:[+pret]

More Readjustment Rules

a. rhime → /i/ / Y _____ [+pret,-part]

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

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

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

Readjustment Rules are Hybrids

- ▶ they are triggered like morphological rule
- ▶ they manipulate structure like phonological rules

Evidence for 2 different Rule Types

Affixation and root change are independent:

∅	-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	toI-d	toI-d

Umlaut with Diminutives

Wald	‘forrest’	Wäld-chen	‘small forrest’
Schloss	‘palace’	Schlöss-chen	‘small palace’
Turm	‘tower’	Türm-chen	‘small tower’
Maus	‘mouse’	Mäus-chen	‘small mouse’

Umlaut with diminutives

/a/ → /ɛ/

/u/ → /y/

/o/ → /ø/

/au/ → /oy/

[+back] → [-back]

Readjustment Rule for Umlaut

$$V \rightarrow [-\text{back}]$$

Why Umlaut is Readjustment (I)

“We take it that Umlauting is accomplished via a Readjustment Rule. The important point for our purposes concerns the environments in which this Readjustment Rule is triggered.

The rule makes reference both to morphosyntactic features and to the identity of particular Roots.

Moreover, the morphosyntactic environments in which Umlaut applies are not a natural class; rather, they must be listed”

(Embick & Halle, 2005:8)

Umlaut: Morphosyntactic Environments

- a. **Verb forms:** fahr-en 'drive' Inf, fährt 3s Pres.
- b. **Noun Plurals:** Huhn 'hen', Hühn-er 'hens'
- c. **Diminutives:** Vater 'father'; Väter-chen 'father-DIM'
- d. **Adjective Formation:** Europa 'Europe', europä-isch 'European'
- e. **Comparatives:** lang 'long', läng-er 'longer'

Why Umlaut is Readjustment (II)

“In addition, it is also the case that a Root that undergoes Umlaut in one of these environments may or may not be subject to this process in another environment.

This fact must evidently be listed;”

(Embick & Halle, 2005:8)

Inconsistent Umlauting of Single Lexemes

Infinitive	Agentive	3sg
back(-en)	Bäck-er	back-t
fahr(-en)	Fahr-er	fähr-t

Bare Noun	Plural	Denominal verb
Maus	Mäus-e	maus-en;
Luft	Lüfte	lüft-en

Why Umlaut is Readjustment (II)

“a Readjustment Rule like Umlaut may be triggered in a number of distinct syntactico-semantic environments, while at the same time being a single rule of the grammar.

In this way Readjustment Rules can potentially show distributions that are much broader than those found with exponents inserted by Vocabulary Insertion. ”

(Embick & Halle, 2005:9)

Characteristic Properties of Readjustment Rules

- ▶ are triggered by specific roots
- ▶ don't establish natural classes by their distribution

The Piece Assumption

“some further questions remain about the relationship between Vocabulary Insertion and Readjustment Rules, since both of these rule types are required in the grammar.

Given that word formation is grounded in syntactic structure, a guiding hypothesis concerning these two rule types is that the default assumption should be that morphological alternations involve pieces:”

(Embick & Halle, 2005:29)

The Piece Assumption

“All other things being equal, a piece-based analysis is preferred to a Readjustment Rule analysis when the morpho-syntactic decomposition justifies a piece-based treatment.”

(Embick & Halle, 2005:29)

Does DM really need Readjustment?

Suppletion Analysis of sing/sang/sung

/sung/ ↔ \sqrt{SING} / ____ [+pret +part]

/sang/ ↔ \sqrt{SING} / ____ [+pret]

/sing/ ↔ \sqrt{SING}

Does DM really need Readjustment?

Reanalysis of German umlaut the day after tomorrow

Embick & Halle against Suppletion

“Suppletion is very rare in natural language, and constitutes a sort of ‘worst case scenario’

– a maximally opaque phonological relationship between two syntactico-semantic objects that are taken to have a common derivational source.

As such, it is clearly undesirable to generalize suppletion to cover all morphological alternations that involve some change in the phonology of a Root.”

(Embick & Halle, 2005:18)

Specific properties of Readjustment in DM

- ▶ Cooccurs with affixal morphology
- ▶ Exhibits unnatural Syncretisms
- ▶ Dependent on specific roots

Is Readjustment Different from Vocabulary Insertion?

- ▶ Also affixes cooccur with other affixes expressing roughly the same features (“Extended Exponence”)
- ▶ Also affixes show apparently unnatural syncretisms (Baerman et al. 2005)
- ▶ Also affix-allomorphy is triggered by specific roots

Extended Exponence in German

Nom sg	Nom pl	Dat pl	
Ecke	Ecke- n	Ecke- n	'angle'
Kind	Kind- er	Kind- er-n	'child'

Arbitrary Syncretism in Affixal Morphology: Schwa in German Morphology

- a. **1sg Verb forms:** fahr-e 'I drive'
- b. **Verb Imperative:** fahr-e 'I drive'
- c. **Verb Subjunctive:** führ-e-st 'you would drive'
- d. **Noun Formation:** Ge-fahr-e 'driving'
- e. **Nominal Plural:** Hund-e 'dogs'
- f. **Adjectival Inflection:** wahr-e 'true', (fem. nom. sg.)

Affix Allomorphy & Single Stems

Albanian 1pl-Aorist-Forms

regular

puno-va 'I worked'
 pi-va 'I drank'
 la-va 'I washed'

irregular

pa-shə 'I saw'
 la-shə 'I left'
 dha-shə 'I gave'

Only 3 verbs in the language take -shə

Problems with Readjustment

- ▶ There is no principled way to distinguish readjustment and featural affixation
- ▶ There seem to be no substantial restrictions on what Readjustment Rules can do
- ▶ Doesn't account for the interaction of umlaut with phonological factors (tomorrow)