The Morphology of Nonconcatenative Languages

Theoretical Considerations

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Linguistics 105: Morphology
Fall 2012

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Announcements

Homeworks

- HW # 8 due Wednesday.
- You need to come to class Friday to get it back.

Others

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Root-and-Pattern Morphology Basics

Major Properties of RPM:

- Affixes exist, but most appear discontinuously
- Prosodic structure is very important
- Consonants and vowels play different roles
- Some prefixes and suffixes, but usually for *inflection only*

Semitic RPM Includes:

Root	Made up of 2-4 consonants
Vocalism	Affix carrying tense/aspect/voice; two vowels
Template	Pattern into which root and vocalism are placed
Other	Some prefixes and suffixes (more to come)

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An Overused Example

Table : The Ubiquitous $\sqrt{\text{ktb}}$ Example

Root	*Meaning*	*Template*
kataba	he wrote	CaCaCa
kattaba	he made someone write	CaCCaCa
nkataba	he subscribed	nCaCaCa
ktataba	he copied	CtaCaCa
kitaab	book	CiCaaC
kuttaab	Koranic school	CuCCaaC
kitaabii	written, in writing	CiCaaCa
kutayyib	booklet	CuCauuiC
maktaba	library, bookstore	maCCaCa
mukaatib	correspondant, reporter	muCaaCiC

The Arabic Derivational Verbal Paradigm - CCC Roots

Table : √fʕl, "doing, action"

Number	*Verb*	*Template*
I	faʕal	$C_1VC_2VC_3$
II	faʕʕal	$C_1VC_2C_2VC_3$
III	faaʕal	$C_1VVC_2VC_3$
IV	ʔafʕal	$ʔaC_1C_2VC_3$
V	tafaʕʕal	$taC_1VC_2C_2VC_3$
VI	tafaaʕal	$taC_1VVC_2VC_3$
VII	nfaʕal	$nC_1VC_2VC_3$
VIII	ftaʕal	$C_1tVC_2VC_3$
IX	fʕall	$C_1C_2VC_3C_3$
X	stafʕal	$staC_1C_2VC_3$

Examples!

Table : Examples of Real-Life Arabic Verbs I

Number	*Example*	*Gloss*	*Root*
I	ʧasar	'he broke'	ʧsr
II	ʧassar	'he broke into pieces'	ʧsr
III	kaatal	'he fought with'	ktl
IV	ʔatˤlaʕ	'he brought out'	tˤlʕ
V	taʧassar	'he was broken into pieces'	ʧsr
VI	takaatal	'he fought with himself'	ktl
VII	inʧasar	'he was broken'	ʧsr
VIII	intasaf	'he was blown up'	nsf
IX	ɪswadd	'he became black'	swd
X	ɪstazɣar	'he thought of something as small'	zɣr

Inflectional Morphology – Maltese

Table : qatel, 'he kill{ed, s}'

	Perfect	*Imperfect*
	Singular	
1	qtilt	noqtol
2	qtilt	toqtol
3.masc	qatel	joqtol
3.fem	qatlet	toqtol
	Plural	
1	qtilna	noqtlu
2	qtiltu	toqtlu
3	qatlu	joqtlu

Do We Even Need a Root?

Pretheoretical Question

- Seems descriptively like we might need a root
- But do we need it *theoretically*?
- **Question**: could we just get away with an augmented definition of stem?

Evidence to Consider

- Phonological processes bounded by the root (≠ stem)
- Phonological processes triggered/targeting the root
- Generalizations we can't state w/o the root
- Semantics contributed by the root

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Meaning Similarity Across Derived Forms

- We saw this one before:
- 33/35 words from $\sqrt{\text{ktb}}$ mean "writing, books"

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Greenbergian Restrictions on Root Consonants

Greenberg (1950)

- Fact: An asymmetry in root-consonant place distribution:
  - $C_1C_2C_2$ is common ($\sqrt{\text{ħbb}}$, $\sqrt{\text{ʃtt}}$, . . .)
  - *$C_1C_1C_2$ – it is *never* seen.
- This is the Obligatory Contour Principle at work!

Pierrehumbert (1993)

- This OCP effect is even stronger:
- Roots of the form $C_1C_2C_1$ are statistically rare
- . . . and speakers don't like nonce roots of this form

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Productive OCP?!

- The OCP is also synchronically active
- Hebrew speakers given $C_1C_1C_2$ have a harder time:
- With word-recognition
- With deciding phonotactic plausibility

Priming Studies

- Data from priming studies and Hebrew morphology:

Roots	Roots prime other roots
Templates	Templates do *not* prime templates
Vocalism	Somewhat inconclusive. . .

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Psycholinguistics II – Aphasia

French Speech & Background

- French/Arabic bilingual; stroke caused deep aphasia
- Aphasia surfaces as metathesis in speech:
- French:
  - *naval*, 'naval' → *vanal*
  - *pedalo*, 'pedal boat' → *palode*

Arabic Speech

- But his Arabic errors metathesis *only* root consonants!
  - *ʔuʃb*, 'grass' → *ʃuʔb*
  - *kuʔuus* 'glasses' → *kusuuʔ*
  - *ta-waqquf*, 'stopping' → *ta-qawwuf*
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A Bedouin Hijazi Language Game + Nickname Formation

Bedouin Game

- Bedouins sometimes play a language game (cf., Pig Latin) which switches root consonants.
- Outputs for word *difaʕna,* "we pushed" ($\sqrt{\text{dfʕ}}$):
  - daʕafna
  - fidaʕna
  - faʕadna
  - *nafaʕda

Arabic Hypocoristics (Nicknames)

- Arabic nickname formation is truncation
- But it *always* preserves root consonants!
- Thus *muħammɛd* → *ħammuud* (**maħħam*)

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Form VIII Semivowel Assimilation

Form VIII/*ftaʕal* Pattern in Arabic Weak Verbs

- Weak Verbs: verbs in Arabic with semivowels the root
- In form VIII, the semivowel disappears:
  - ttijah, "to head (for)" ($\sqrt{\text{wjh}}$; *utijah, *wtijah)
  - ttiqan, "to master, know well" ($\sqrt{\text{yqn}}$, *itiqan, *ytiqan)
  - ttixað, "to take, adopt" ($\sqrt{\text{ʔxð}}$, *ʔtixað)

No Assimilation Elsewhere

- Crucially, this does not happen elsewhere:
  - mawwtooni, "they would have killed me"
  - beythum, "their house"
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Form VIII Voicing Contradictions

Form VIII Infix Assimilates to [α voice]

- The infix also has progressive assimilation for [± voice]:
  - ddiʕa, "to claim" (*dtiʕa)
  - zdiʒam, "to be crowded" (*ztiʒam)

Voicing Assimilation Elsewhere

- But normally, voicing assimilation is regressive:
  - ʔaðgalˤ, "heavier" (*ʔaθgal)
  - ʔazdaas, "sixths" (*ʔasdaas)
  - maθkuur, "mentioned" (*maðkuur)
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A Prosodic Theory of Nonconcatenative Morphology

- McCarthy (1981): first systematic attempt to explain RPM
- Takes roots, vocalisms, and templates as real
- Association governed by the tenets of Autosegmental Phonology
- After association, tier conflation applies, linearizing the string
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Templatic Inventory

Table : McCarthy (1981)'s Inventory of Templates for Arabic

CVCVC	CVCVCCVC
CVCCVC	CVCVVCVC
CVVCVC	CCVCCVC
CCVCVC	CCVVCVC

- Or by rule:
  1. $[(\left\{ \begin{array}{c} C \\ CV \end{array} \right\})CV([+seg])CVC]$
  2. $V \rightarrow \emptyset / [CVC\_\_CVC]$

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Vocalic Inventory

- Recall that vowels encode {voice, aspect, tense, . . . }
- Often in Arabic, it's the same vowel in both
- Don't need to go through them all, but. . .
  1. /a/ = [perfective, active]
  2. /u/ = [perfective, passive]
  3. /u. . . a/ = [participle, active]
  4. /u. . . a. . . i/ = [participle, passive]

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Applying All These Things. . .

- From here, things associate according to the following conventions:
  1. If there are several unassociated melodic elements and several unassociated melody-bearing elements, the former are associated one-to-one from *left to right* with latter.
  2. If, after application of the first convention, there remain one unassociated melodic element and one or more unassociated melody-bearing elements, the former is associated with *all* of the latter.
  3. If all melodic elements are associated and if there are one or more unassociated melody-bearing elements, all of the latter are assigned the melody associated with the melody-bearing element on their immediate left, if possible.
  4. All tier activity is *tier internal*.
  5. Everything respects the OCP.

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The Good

- McCarthy's analysis gets us a few things nicely:
  1. OCP-Effects: combined with L→R spreading, this comes for free by stating OCP over the root
  2. RPM: this is built into the very architecture of the system
  3. Semantics: since the roots and vowels are morphemes, we can give them semantics
  4. Item/Arrangement: technically, this is like an I+A model of RPM (sorta?)
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The Bad and the Ugly

- However, there are some problems, too:
  1. Cyclicity: we have no intrinsic account of (Brame's) cyclicity facts
  2. Templates: recall that templates don't prime. . .
  3. Templates: also, we've really just stipulated template inventory
  4. Typology: the formal grammar of RPM is *really* weird from the standpoint of other languages
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Introducing Fixed-Prosody

- We could take another tack in explaining RPM
- So what if there's a lot of evidence for the root? Maybe it's an accident. . .
- We already know that at least some of the time the input is a word
- **Idea**: Prosody is primary: it stays fixed once it's set
- This theory developed right here at UCSC!

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- So what if there's a lot of evidence for the root? Maybe it's an accident. . .
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Where did All These Consonants Come from?!

- Bat-El (1994): sometimes consonant clusters exist which shoudn't
- Always in *denominal* verbs
- The corresponding noun *always* has the cluster

Examples!

- priklet, "to practice law" (from base *praklit*, "lawyer")
- ʃrivrev, "to plumb" (from base *ʃravrav*, "plumber")
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Imperative Truncation in Colloquial Hebrew

- In Colloquial Hebrew, one can form imperatives by truncation
- . . . but this truncation doesn't really follow any templatic form
- However, it is predictible from the 2nd person future form

Table : Patterns of Truncating Imperatives in Modern Hebrew

Base	*Imperative*	*Truncation*	*Pattern*	*Meaning*
telamed	tlamed	V	CCVCVC	"to teach"
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Vowels in Hebrew Deverbal Nouns

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- Sometimes, one can only predict the deverbal noun from the noun:
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Semantics and Compositionality

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- Fixed Prosody proceeds by noticing that word prosody is highly valued in Semitic
- **Idea**: When deciding what to do about affixes, the grammar:
  1. The stem (i.e., base word) must be ANCHORED to the edges of the word
  2. So the affixes must be *infixes*
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- Prosody: Templates are *less* stipulative (but we need to derive the base)
- Typology: Semitic languages are *more* like other languages
- Templates: No templates (maybe) so they don't prime

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- Languages have strongly *nonconcatenative* morphologies
- They implicate a lot of the theory we've discussed in class
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