



Morphology

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Morphology

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« **Morphology** is at the conceptual center of linguistics. This is not because it is the dominant discipline, but because morphology is the study of word structure, and words are at the interface between phonology, syntax and semantics. Words have phonological properties, they articulate together to form phrases and sentences, their form often reflects their syntactic function, and their parts are often composed of meaningful smaller pieces »

Spencer & Zwicky 2017:1

Morphology

Study of word structure, as opposed to:

- ***Phonology***: study of sound structure
- ***Syntax***: study of phrase and sentence structure
- ***Morphology*** is particular amongst the subdisciplines of linguistics in that it closely interacts with other components of grammar, specifically syntax and phonology, hence *morphosyntax* and *morphophonology*.

Morphology: A historical outline

- In the (European) structuralist approach, only two levels of linguistic analysis are posited:
 - Phonological level
 - Morpho(phono)logical level

F. de Saussure 1879, *Mémoire sur le système primitif des voyelles dans les langues indo-européennes*.

- **René de Saussure** (1911) distinguished simple words (e.g. Fr. *plume* 'pen') from compounds (e.g. *porte-plume* 'pen-holder') and derived words (e.g. *violoniste* 'violinist', made of a root word *violon* + *iste*).
- Rise of the notion of morpheme: complex words are broken down into smaller units, i.e. **morphemes**.

cf. Anderson (2019)

Morphology: A historical outline

- For the purposes of studying the native languages spoken in North America, the American structuralists opted for a descriptive approach in which languages are classified according the nature of processes the words involve.
- Among the 'grammatical processes' (**Sapir** 1921), one finds:
 - Composition (compounding of stems)
 - Affixation
 - Internal modification
 - Reduplication
 - Variation in pitch, stress, etc.
- **Bloomfield** (1933: 208): "By the morphology of a language we mean the constructions in which *bound forms* appear among the constituents (...) the resultant forms are either bound forms or words, but never phrases."

Morphology: A historical outline

- Bound forms / alternants

- According to Bloomfield (1933: 210), the English plural marker is a bound form, whose shape "is determined by the last phoneme of the accompanying form":

glass[ɪz] pen[z] book[s]

- [ɪz] after sibilants and affricates
 - [z] after voiced phonemes
 - [s] after unvoiced phonemes
- 
- phonetic alternants

- The alternation is *regular* (automatic), as opposed to that found in German plural nouns, which, according to the author, is grammatical in nature (non-automatic) since it does not depend upon "phonetic (...) peculiarities of the underlying forms" :
 - [-en] suffixed to feminine nouns (e.g. fraw 'woman' / frawen 'women')
 - [-e] attached to masculine nouns, with certain vowel changes (e.g. hut [hu:t] 'hat' / hüte [hy:te] 'hats')
 - [-e] attached to neuter nouns, without any vowel change (e.g. jahr [ja:r] 'year' / jahre [ja:re] 'years').

Morphology: A historical outline

- French adjectives (Bloomfield 1933: 217)
 - Regular types: one form regardless of whether the accompanying noun is MS or FM (e.g. rouge [ru:ʒ] 'red')
 - Irregular types: the masculine and the feminine forms differ.

MS	FM	
plat [pla]	platte [plat]	'flat'
laid [lɛ]	laide [lɛd]	'ugly'
long [lɔ̃]	longue [lɔ̃g]	'long'
bas [ba]	basse [bas]	'low'

- Analysis: Either the masculine is the base form to which a consonant is added in the feminine (a costly analysis), or the feminine is the base form from which the masculine is derived "by means of a minus-feature, namely the loss of the final consonant".
- Alternative analyses within transformational generative rules (SPE-type of rules) or autosegmental representations (to be presented later).

Morphology: A historical outline

- Bloomfield (1933) distinguishes two types of languages:
 - **Analytic** languages, which use few bound forms, as opposed to **Synthetic**, which combine bound forms into one single word.

A 4-way distinction:

- **Isolating** languages use no bound forms, as opposed to **agglutinative** in which bound forms follow one another, **polysynthetic** (highly synthetic), where each word is made of many bound forms, and **inflectional** languages that display affixes expressing many grammatical categories.
- Bloomfield distinguishes two *classes of words* as *immediate constituents* in morphology:
 - **Primary words** consisting of either a single morpheme (e.g. man, boy, cut, run) or more than one bound morpheme (e.g. re-ceive, de-ceive, con-ceive).
 - **Secondary words** referring to compound words or secondary derived words (e.g. dark-ish)

Morphology: A historical outline

- **Harris (1942)** focused on the phonological shape of the morpheme:
 - A morpheme may have one single semantic content but various phonetic shapes that appear in complementary distribution (***allomorphs***).
 - Each allomorph is associated with a particular environment.
- Within the American structuralism, morphological theory revolved around the notion of morpheme, with particular attention to two issues: allomorphy and morphotactics.
 - *Allomorphy* deals with the phonetic realization(s) of morphemes
 - *Morphotactics* studies the combinatory principles grouping morphemes into larger units.

Morphology: A historical outline

- Within **Generative Grammar**, much of the territory of morphology is absorbed by other components of grammar, namely syntax and phonology.
 - Syntax deals with the internal structure of morphemes and their distribution.
 - Phonology deals with the realization of morphemes (allomorphy).
- In Classical Transformational Grammar (**Chomsky 1955**), there was no explicit approach to word structure, though one of the levels posited in the structure of natural languages was labelled M level.
- At the M level, linguistic objects are represented as complexes of morphemes.
- The distribution of these objects is governed by the syntax: e.g. the English auxiliaries **have** and **be** were introduced in phrase structure by transformational rules in combination with past tense marker **–ed**, and progressive maker **–ing** (Affix Hopping).

Morphology: A historical outline

- Words (morphemes) are introduced into sentences directly by transformational rules at the Phrase level (see also Chomsky 1957)
- In other words, morphemes are the terminal nodes of Phrase markers.
- Chomsky (**1965**) introduced two main changes with regard to the place of morphemes or lexical items:
 - Features rather than morphemes are the terminal nodes of Phrase markers.
 - Lexical Insertion adds morphemes in syntactic structure, provided that their features are compatible with that of the terminal nodes.
- Chomsky's (**1970**) "Remarks on nominalizations » introduced a difference in nominals between English gerundive nominals like *John's refusing the offer*, and derived nominals such as *John's refusal of the offer*.

Morphology: A historical outline

- Gerundive nominals display an internal structure comparable to that of sentences, while derived nominals behave as NPs.
- Consequently, derived nominals can be generated in the part of grammar that is responsible for providing words to the syntax: the lexicon.
- ***Lexicalism***: new approaches that distinguish between lexical processes related to words and syntactic processes governing phrases.
- The **Lexical Integrity Hypothesis** (a restrictive lexicalist approach) states that syntax and morphology are independent (no interaction): syntax has no access to the internal structure of words (contra. Distributed Morphology, Halle & Marantz 1993 and seq.).

Morphology: A historical outline

- The revival of morphology as a distinctive field of inquiry
 - **Halle (1973)**: - Morphology is independent from syntax and phonology.
 - Grammar contains lists of morphemes (roots and affixes), and rules of word formation that manipulate these morphemes.
 - **Aronoff (1976)**: rules of word formation are rules that trigger whole words relating them directly to one another, rather than rules combining morphemes
 - ⇒ beginning of **word-based approaches** to morphology (anti-decomposition), as opposed to root-based approaches.
 - ⇒ Some classes of English words cannot be decomposable into smaller meaningful parts (e.g. *perceive*, *deceive*, *conceive*).
 - **Matthews (1965, 1972)**: Word-and-Paradigm
 - ⇒ No reference is made to internal components of words
 - ⇒ Words are connected to each other within an inflectional paradigm
 - ⇒ A theory of inflectional structure
 - **Anderson (1992)**, *a-morphous morphology*
 - ⇒ Derivations and other types of morphological processes are word-based.

Morphology: A historical outline

- Halle & Marantz (1993, and seq.): Distributed Morphology
 - ⇒ Morpheme-based morphology (the morpheme is called a *vocabulary item* in DM)
 - ⇒ Words are formed by rules of syntax (*syntactic hierarchical structure all the way down*), there is no word-formation component distinct from syntax.
 - ⇒ Morphemes are manipulated in syntactic structure, prior to phonological interpretation.
- Nanosyntax (Starke 2009, 2011)
 - => Morpheme-based morphology
 - ⇒ Syntactic based representations
 - ⇒ Focus on *syncretism* in case marking and negation
 - « Syncretism can be looked at as a mismatch between syntactic structure and the Lexicon: there is only one lexical item but it corresponds to more than one syntactic representation and therefore consists of more than one feature. » (De Clerq 2013: 10)

Morphology: A historical outline

- Morphophonological approaches:
 - Prosodic Morphology (McCarthy & Prince 1990 and seq.)
 - Templatic Morphology (McCarthy 1979, 1980, Lowenstamm & Guerssel 1990 and seq.)
 - ⇒ Root-and-Pattern morphology (first applied to Semitic, then extended to other Afroasiatic languages).
 - ⇒ Fixed vs. variable shape templates (Semitic and Berber languages, Afroasiatic)
 - ⇒ Lexical vs. emergent templates (Representational vs. computational (OT)).
 - Templates within strict CV (Guerssel & Lowenstamm 1990, Lowenstamm 2003).
 - ⇒ Templates are made of a sequence of CV units (core syllables).
 - ⇒ Templates are internally structured, containing derivational positions.
 - ⇒ Words (major category, i.e. Adj, Noun, Verb) have a prefixal empty templatic position that hosts morphological operations (Lowenstamm 1999, Lahrouchi 2001, 2018, among others).

Morphology: A historical outline

To sum up, there are two main approaches to word structure:

1. Morpheme-based approaches

=> Morphemes are the atomic units of morphological analysis.

=> Morphologically complex words are compositional, i.e. decomposable into morphemes (Structuralists, early generativists (Chomsky 1957, Halle 1973, Halle & Marantz 1993), Distributed Morphology, Root-and-Pattern (McCarthy 1979, 1981)).

=> Speakers store lists of morphemes and the rules governing their combination into larger units.

Morphology: A historical outline

2. Word-based approaches

=> Words are stored as such in the speaker's mind, no decomposition is needed (Item-and-Process, Word-and-Paradigm, OT output-based derivations, lexematic morphology (Fradin 1993, Bonami et al. 2018))

=> As Aronoff (1976, 2018) noted, words such as *permit*, *omit*, *commit*, *submit* share $\sqrt{\text{mit}}$ (from Latin *mittere* 'send'), but have no common meaning.

Similarly, are *nature*, *nation*, *natural* reducible to $\sqrt{\text{nat}}$?

Blueberry, **blackberry** **strawberry**, **cranberry** => **staw* and **cran* are not attested in isolation, with no specific meaning, hence the label 'cranberry morphemes' first used by Bloomfield (1933).

The morpheme and other basic concepts

- The *word* is not a relevant unit for morphological analysis:
 - A word can be as short as a vowel or a syllable, and as long as a sentence
 - Tashlhiyt Berber: /tssfrħttnt/
t-ss-frħ-t-t-n-t
2s-caus-be happy-2s-3Cl.Obj-PL-FM
'you made them (FM) happy'
 - Classical Arabic /ra:saltuhunna/
ra:sal-tu-hu-nna
correspond.Perf.Reciprocal-1sg-CL3object-PL.FM
'I corresponded with them (FM)'
- In a "bottom-up" approach to morphological structure, a word may consist of a root (L-morpheme, also called free morpheme) combined with affixes (F-morphemes, also called bound morphemes).
- L-morphemes belong to an open list of items, as opposed to F-morphemes.

The morpheme and other basic concepts

- *Antidisestablishmentarianism* is one of the longest words in the English dictionary.
- Speakers know that this word is **complex**, decomposable into several morphemes (polymorphemic):

anti- as in *anti-constitutional*, *anti-aging*

dis- as in *disconnect*, *dislike*, *disable*

establish = root, lexical free morpheme that contributes the basic meaning.

-ment (nominal suffix) also found in *parliament*, *excitement*, *refinement*

-arian (nominal and adjectival suffix) as in *grammarian*, *phonetician*, *vegetarian*, *humanitarian*

-ism (noun-forming suffix) as in *tourism*, *capitalism*.

Pref1+pref2+**ROOT**+suff1+suff2+suff3

The morpheme and other basic concepts

Pref1+pref2+**ROOT**+suff1+suff2+suff3

- The root contributes the basic meaning.
- The affixes modify the meaning of the root.
- 4 types of affixes:
 - a *prefix* precedes the root
 - a *suffix* follows the root
 - an *infix* appears in root-internal position
 - a *circumfix* is an affix that is prefixed and suffixed at the same time.

The morpheme and other basic concepts

- Each speaker of English knows that some words are simplex, some others are decomposable into smaller pieces (morphemes).
- Their knowledge also involves the **morphotactics**, i.e. restrictions on the combination and the ordering of morphemes:
 - *dis-anti-establish...
 - *establish-anti-ment
 - *ment-dis-establish, etc.
- Linguists aim to explicitly and formally characterize the intuitive knowledge that speakers have about their native language, including morphological knowledge.

The morpheme and other basic concepts

- A **word** may consist of one or more morphemes that can stand alone in a language.
- A **morpheme** is the smallest unit of language that has a (phonological) form and a meaning.
- Bloomfield (1933): a morpheme is 'the minimal meaningful element'.
- Association between form and meaning => Saussurian definition of a minimal sign:
 Signifiant (sound form): [k^hæt]
 Signifié (meaning):   {a small four-legged domesticated mammal that is carnivorous and has soft fur, claws, and whiskers}
- Depending on the theoretical framework, morphemes may be surface-true (concrete) or abstract, contentful or empty (zero morphemes).

The morpheme and other basic concepts

- A morpheme may have different realizations (exponents), called **allomorphs**.
- The allomorphs can be **phonologically conditioned**, that is their context of realization is phonologically determined:

E.g. the English plural endings

cat[s] => after a voiceless obstruent

dog[z] => after a voiced obstruent

hors[əz] => after a sibilant

- **Grammatically conditioned** allomorphy (Mathews 1991: 181) refers to alternants (allomorphs) that occur in specific grammatical contexts: e.g. *sold* is an allomorph of *sell*, used in the past tense context.

tell

told

foot

feet

bear

bore / borne

mouse

mice

The morpheme and other basic concepts

- **Lexically-conditioned** allomorphy (Castairs-McCarthy 2001): The selection of the allomorph is determined neither phonologically, nor grammatically.
 - E.g. In English plurals, most words select the suffix -s, some other select -en:
cat ~ cats ox ~ oxen child ~ children
 - In Arabic, some words form their plural by infixation, some other by suffixation:
kita:b 'book' ~ kutub 'books' razul 'man' ~ riza:l
ħaraka 'movement' ~ ħaraka:t nuqt'a 'dot' ~ nuqat'
 - In French, noun bases ending in /l/ often form their plural by suffixing -aux [o], sometimes -s:
cheval 'horse' ~ chevaux canal ~ canaux
festival ~ festivals carnaval 'carnival' ~ carnavals
- **Suppletion**, lexically determined, refers to words that are phonologically unrelated though they share the same basic meaning:
English: go ~ went Arabic: ?imra?a 'woman' ~ nisa:? 'women'

The morpheme and other basic concepts

- Another type of allomorphy that is not phonologically conditioned is the one found in German plural nouns.
- The allomorph selection is conditioned by the presence of another morpheme:
 - Any count noun suffixed by –heit or -keit forms its plural by –en suffixation (e.g. schwachheit-en ‘weaknesses’, flüssigkeit-en ‘fluids’)
 - Stems ending in a vowel + /t/ select one of the plural suffixes –e, -er or -en (e.g. streit-e ‘quarrels’, zeit-en ‘times’, kraut-er ‘plants’).

The morpheme and other basic concepts

- In English, certain verbs form their nouns by suffixation of –ion or -tion:
 - act / act-ion, cite / cit-ation, affiliate / affiliat-ion
- Some adjectives are formed by suffixing –ible or –able, other use -ic:
 - audible, defensible, reversible / taxable, payable, probable / terrific, mechanic, linguistic.
- In some works, allomorphy is restricted to alternations that cannot be explained by a phonological rule (Lieber 1982, Mathews 1991).
- Reducing allomorphy is a desirable outcome of any morphological analysis.

- Split the following English words into morphemes:

nationalized	compensations
unexpectedly	incompatibility
atomicity	blueberry
decomposition	blackboard
condensation	cranberry
nonaligned	books

- Split the following Georgian words into morphemes:

tbilisisa	tavebi
k'atsma	me gava k'ete
k'atsi	gavuk'etebdit

- Split the following Georgian words into morphemes:

- PV = preverbal marker, VER = version marker, Thm = thematic suffix (different meanings), Mood= indicative, imperative, optative, subjunctive, conditional), Mood occurs with Tense and Aspect (TAM).

tbilis-isa tbilis-GENETIVE	tav-eb-i head-PL-NOMINATIVE
k'ats-ma man-ERGATIVE	me ga-v-a-k'et-e I PV-Sbj1SG-VER/Num-do-Mood 'I did'
k'ats-i man-NOMINATIVE	ga-v-u-k'et-eb-d-i-t PV-Sbj1pers-VER/Num.Pl-do-Thm-Imperf-Mood-pl. 'We would do it for him/her/them'

Georgian verb template:

Preverb + AGR pronoun + version + ROOT + Thematic suffix + TAM + Aux + Num

- PV = preverbal marker is often a vowel (i-, u-, e-, a-).
- Agreement pronoun marks subject, direct or indirect object.
- Version originates from the Georgian grammatical tradition (meaning 'change'). It is one of the inflectional categories of a verb, along with TAM, person, number and other categories.
- The central function of Version is to semantically mark the participant affectedness or salience (objective, subjective, locative).
- Version also defines the conjugation type (perfect, plusperfect) as well as the lexical class of the verb.

Further readings:

Makharoblidze & Leonard (2022). Disentangling Structural Complexity In A (Challenging) Inflectional System: The Georgian Verb . Journal of Language and Linguistic Studies 18/2.

Gurevich, Olga (2006). Constructional Morphology: The Georgian Version . PhD, UC at Berkeley.

Basic concepts

- Inflection is generally syntactically determined. It refers to the type of morphological operations that express grammatical distinctions, including number, person, gender, noun class, case, tense, aspect, voice, and mood.
- Derivation commonly refers to category-changing operations (e.g. nature > natural > naturalize > naturalization).
- Inflectional suffixes generally follow derivational ones, and precede them when prefixed (outer affixes, as opposed to inner derivational affixes).

e.g. natur-al-iz-ed natur-al-iza-tion-s

Basic concepts

Sort the morphemes into inflectional and derivational:

deconstructing

sensational

repeatedly

revitalizations

counterdemonstrations

uglily

driver

longer

offside

interpretability

institutionalization

funniest

Basic concepts

- In the Indo-European type of languages, the **root** is a type of morpheme, considered to be the smallest meaningful lexical unit that a set of items share.
- It contains both consonants and vowels:
 - E.g., **reason**, **reasoning**, and **reasonable** share the root **reason**.
 - receive**, **deceive**, **perceive**, and **conceive** share the root **ceive**, which never occurs by itself.
- In Semitic languages, semantically related words are described as sharing a common root that consists entirely of consonants.
- Associated with vowels and affixes to specific templates, they form words (Root-and-Pattern morphology, McCarthy 1979, 1981):
 - E.g. In Classical Arabic root **ktb** 'write' associated with the vocalic melody **i-a** to the template **CVCVVC** derives the form **kita:b** 'book'
 - ka:tib** 'writer' is derived by associating the same root with the inverse melody **a-i** to the template CVVCVC.

Basic concepts

Compounding

- Complex words may consist of either one root + affixes or independent words (generally two), called compounds.
- Many languages form new words by concatenating two words (or stems).
- Not always easy to identify a sequence of words as a compound.
- In English, spelling may help: some compounds contain a dash

big-headed, blue-eyed, go-ahead, producer-director, space-time

Some other are written as one word: blackboard, blueprint, greenhouse

Others as two words: safety car, seat belt, apple pie, White House

- *Stress* often helps identifying a word as a compound in English: stress falls on the first, left-hand part of the compound: e.g. greenhouse/green house, blackbird/black bird.

Basic concepts

- *Modification* is another test that allows identifying a compound.
- A genuine compound cannot be modified by insertion of a word between its members: e.g. an apple pie / *an apple delicious pie
- Compounds can be made of combination of two nouns (apple pie), two adjectives (icy cold), adj+noun (greenhouse), noun+adj (sky blue), verb+noun (pick pocket), verb+verb (stir fry).
- Compounds are headed by one of the bases (often base 2). Their category (verb, noun or adjective) is determined by the category of the head (exceptions: blue-eyed, short-legged, etc.)

Basic concepts

<i>Compound elements</i>	<i>Category of compound</i>	<i>Examples</i>
N + N	N	dog bed, file cabinet, apple pie
N + A	A	sky blue, stone cold, bone dry
A + A	A	blue-green, icy cold
A + N	N	blackbird, greenhouse, fast food
N + V	V	hand wash, brainwash, babysit
V + N	N	pick pocket, sell sword, think tank
V + V	V	stir-fry, slam dunk, blow dry
A + V	V	hot glue, slow dance
V + A	A	go-slow
N + P	Adv?	year-in (Bauer et al. 2013: 452) ¹²
P + N	N	afterbirth, backseat
V + P	N	breakdown
P + V	V	downgrade
A + P	A	tuned-in
P + A	A	inbuilt
P + P	P	into

Basic concepts

- French compounds: category-determining heads

Compound elements	Category	Examples	
Verb+Noun	Noun	porte-clés	'key ring'
		garde-robes	'wardrobe'
Noun+Verb	Verb	arc-bouter	'to buttress'
Noun+Noun	Noun	Coeur-poumons	'heart-lung machine'
		timbre-poste	'postage stamp'
Adj+Noun	Noun	court-circuit	'short circuit'
		bleu ciel	'sky blue'
		long-courrier	'long-haul aircraft'
Verb+Verb	Noun	garde-manger	'meat safe'
		tournebouler	'to upset'
Noun+prep+Noun	Noun	pomme-de-terre	'potato'
		chemin de fer	'railway'
Noun+prep+Verb	Noun	pâte à modeler	'modelling clay'

Basic concepts

- Reduplication is a morphological process that repeats all or part of a word in order to convey some meaning or function.

- English

Are you leaving-leaving?

I want a salad-salad.

widdle waddle (going or rolling from side to side as a duck)

wishy-washy (not convincing, having no color, no firm ideas)

- Plural formation in Yidiny (Australian language, Urbanczyk 2017):

bupa	bupa-bupa	‘woman/pl.’
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ŋalal	ŋalal-ŋalal	‘bit/lots of big ones’
-------	-------------	------------------------

mulari	mula-mulari	‘initiated man/pl.’
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- Mukilese (Austronesian, Urbanczyk 2017)

podok	podpodok	‘plant/planting’
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kaso	kaskaso	‘throw/throwing’
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Basic concepts

- Expressive, ideophonic reduplication

- Berber (Morocco):

brbr	‘to boil’
frfr	‘to fly’
gawgaw	‘a kind of fish’
couscous	‘a kind of meal’
- English

flimflam	‘nonsensical or insincere talk’
zigzag	‘a line having abrupt alternate right and left turns’
click-clack	‘a repeated clicking sound’
- French

tic-tac	‘clock sound’
tam-tam	‘African drum’
cocorico	‘cock-a-doodle-do’

- French hypocoristics: Didier > Dédé, Michèle > Mimi, Laurent > Lolo, etc.

- Most accounts for reduplication are prosodic (syllable-, foot- or mora-based).

Basic concepts

- **Substruction** (disfixation): removal of segments or features from the base form.
 - Bloomfield (1933) analyzed French adjectives as an instance of segment substruction:

[blã]	[blã]	'white'
[gʁãd]	[grã]	'tall'
[pətit]	[pəti]	'short'

- Hypocoristics

French: Michael	Mica
Florence	Flo
Emmanuel	Manu
English: Robert	Bob
Elisabeth	Lisa
David	Dave

Other types of (morpho)phonological rules

- Velar softening (palatalization) –ic / -ity

atomic	atomicity	antique	antiquity
electric	electricity	panic	panicking
opaque	opacity	analog	analogy

- /k/ > [s] /___+[+high, +anterior, +vocalic]
- /g/ > [dʒ] /___+[+high, +anterior, +vocalic]

A horizontal line represents the word 'morphology'. An upward-pointing arrow is positioned under the 'p' in 'morph', and a downward-pointing arrow is positioned under the 'l' in 'logy'.

morpheme boundary
 [i]

- Velar softening is blocked in monomorphemic context.
- A morpheme-specific process: -ing does not trigger palatalization (panicking, logging).

Identity avoidance

char	charrette
BUT	
tarte	tartelette
côte	côtelette
- *tartelet / *côtelet /l/ is inserted in order to avoid a sequence of identical consonants: <u>Root-final /t/+ette</u>_{DIM}	

Identity avoidance

Insertion	French
or	
Deletion	English
When 3 sibilants in a row: two eighths (2/8) ['eɪ(ɾ)θ(s)] sixths [siksθs] or [siksθs]	
Deletion	German
ruder-er 'rower.MS' / ruder-er-in (FM) einwander-er 'immigrant.MS' / einwander-er-in (FM) (MENN & MACWHINNEY 1984: 522, DRESSLER 1977) Natives disagree about particular instances!	

Identity avoidance

Vowel epenthesis	English
taxes [tæksɪz] buses [bʌsɪz]	
Blocking	English
adjectives ⇒ adverbs safe / safely manly / *manlily, friendly / *friendlily ugly / *uglily !! BUT lonely / lonelily, silly / sillily	

identity avoidance

	Verb + Object Clitic	PF	
a.	z ^ɾ r ^ɾ i-ɓ-t see-1SG-CL.OBJ	[z ^ɾ r ^ɾ iɓt]	'I saw him'
b.	z ^ɾ r ^ɾ i-ɓ-t-t see-1SG-CL.OBJ-FM	[z ^ɾ r ^ɾ iɓtt]	'I saw her'

Linear arrangement of grammatical markers:

- ✧ In (a), /-t/ is an object clitic pronoun, preceded by the 1PERS.SG marker /-ɓ/.
- ✧ in (b), the FM gender brings an additional -t resulting in a geminated cons.

identity avoidance at the right edge

	Verb + Object Clitic	PF	
c.	t-zʳʳi-t-t 2SG-see-2SG-CL.OBJ	[tzʳʳitt]	'you saw him'
d.	t-zʳʳi-t-s-t-t 2SG-see-2SG-EP-CL.OBJ-FM	[tzʳʳitstt]	'you saw her'
e.	t-zʳʳi-t-t-n-t 2SG-see-2SG-CL.OBJ-PL-FM	[tzʳʳittnt]	'you saw them (FM)'

- ✧ [tt] in (c) is the result of the concatenation of 2PERS.SG and CL.OBJ.
- ✧ FM /-t/ is added in (d) resulting in 3 identical consonants, in addition to a sibilant consonant, which breaks up the cluster.

identity avoidance at the left edge

	Neg+ Object Clitic +Vb	PF	
f.	ur- t t -z ^ɸ r ^ɸ i- t NEG-OBJ 2SG-see-2SG	[urttz ^ɸ r ^ɸ it]	'you didn't see him'
g.	ur- t-t-i t -z ^ɸ r ^ɸ i- t NEG-OBJ-FM-EP 2SG-see-2SG	[urttitz ^ɸ r ^ɸ it]	'you didn't see her'
h.	ur- t-n-t t -z ^ɸ r ^ɸ i- t- NEG.OBJ-PL-FM 2SG-see-2SG	[urtnttz ^ɸ r ^ɸ it]	'you didn't see them (FM)'

- ✧ CL.OBJ, PL and FM markers move to the left, attracted by the negative marker /ur/.
- ✧ 2SG marker is a 'CIRCUMFIX'.

Identity avoidance

- In phonology, the Obligatory Contour Principle (OCP) has been the natural way of addressing melodic identity.
- A structural constraint that prohibits adjacent identical elements at the melodic level (McCarthy 1986: 208, see also Leben 1973, Goldsmith 1976, Odden 1986, Yip 1988).
- Active either within the lexicon or in the course of derivation.
- OCP extended to morphology.

Identity avoidance

- Avoidance of identity in morphology takes several forms (Yip 1998: 220):
 - a.** The same morpheme cannot appear twice in the same word.
 - b.** Different but homophonous morphemes cannot appear adjacent in the same word or sentence.
 - c.** Homophonous morphemes cannot appear on adjacent words
 - d.** The output of reduplication cannot be total identity.
- Identity avoidance is achieved through deletion (haplology), insertion, or feature change.
- Language-specific, subject to exceptions, optional, interspeaker variation.

Identity avoidance

- Several proposals:
 - *Morphological haplology vs. vacuous rule application* (Stemberger 1981):
series > series, species > species
(no plural suffix added, no rule applied)
 - *The Repeated Morph Constraint, affix-checking* (Menn & MacWhinney 1984): take a word from the lexicon, check if it already contains the affix to be added, and add the affix only if it is not already present.

Other types of (morpho)phonological rules

- Semi-vocalization (gliding), Berber:

	<i>Verb</i>		<i>Noun</i>	
a.	gru	“pick up”	agraw	“assembly”
	xlu	“destroy”	amxlaw	“madman”
	aru	“give birth to”	arraw	“child”
	nu	“be cooked”	tinwi	“cooking”
b.	bri	“crush”	abraj	“crushed seeds”
	sti	“sort”	astaj	“sorting”
	fsi	“untie”	afssaj	“untying”
	ngi	“overflow”	angaj	“overflowing”

Other types of (morpho)phonological rules

- **Semi-vocalization blocked, Berber:** The context in which high vowels cease to alternate with glides is when a morpheme boundary occurs between the stem and the enclitic.

	<i>Verb</i>		<i>Dative</i>	
a.	gru	“pick up”	gru-j-as	“pick to him/her”
	xlu	“destroy”	xlu-j-as	“destroy for him/her”
	kru	“rent”	kru-j-as	“rent him/her”
	zru	“delouse”	zru-j-as	“delouse him/her”
b.	bri	“crush”	bri-j-as	“crush for him/her”
	sti	“sort”	sti-j-as	“chose for him/her”
	fsi	“untie”	fsi-j-as	“untie him/her”
	z ^ɰ l ^ɰ i	“isolate”	z ^ɰ l ^ɰ i-j-as	“put aside for him/her”

Selected references

Anderson, Stephen R. (2019). "[A Short History of Morphological Theory](#)." in *The Oxford Handbook of Morphological Theory* (Jenny Audring and Francesca Masini, eds.), pp. 19–33. Oxford: Oxford University Press.

Anderson, Stephen. 1992. *A-morphous morphology*. Cambridge: CUP.

de Saussure, René. 1911. *Principes logiques de la formation de mots*. Geneva: LibrairieKündig.

de Saussure, René. 1919. *La structure logique des mots dans les langues naturelles, considérées au point de vue de son application aux langues artificielles*. Berne: Librairie A. Lefilleul.

Embick, David. 2015. *The Morpheme: A Theoretical Introduction*. Boston/Berlin: Mouton de Gruyter.

Embick, David. 2010. *Localism versus Globalism in Morphology and Phonology*. Cambridge, MA: MIT Press.

Lowenstamm, Jean. 1999. The beginning of the Word. In John Rennison & Klaus Kühnammer (eds.), *Phonologika 1996: Syllables !?*, 153–166. The Hague: Thesus.

Spencer, Andrew. 1991. *Morphological theory: An introduction to word structure in Generative Grammar*. Oxford/Cambridge: Blackwell.

Spencer, Andrew & Arnold Zwicky (eds). 2017. *The handbook of morphology*. Willey.

Morphology

Current approaches

Fall School of linguistics 2023, Ilia State University, Tbilisi

Mohamed Lahrouchi

Distributed Morphology

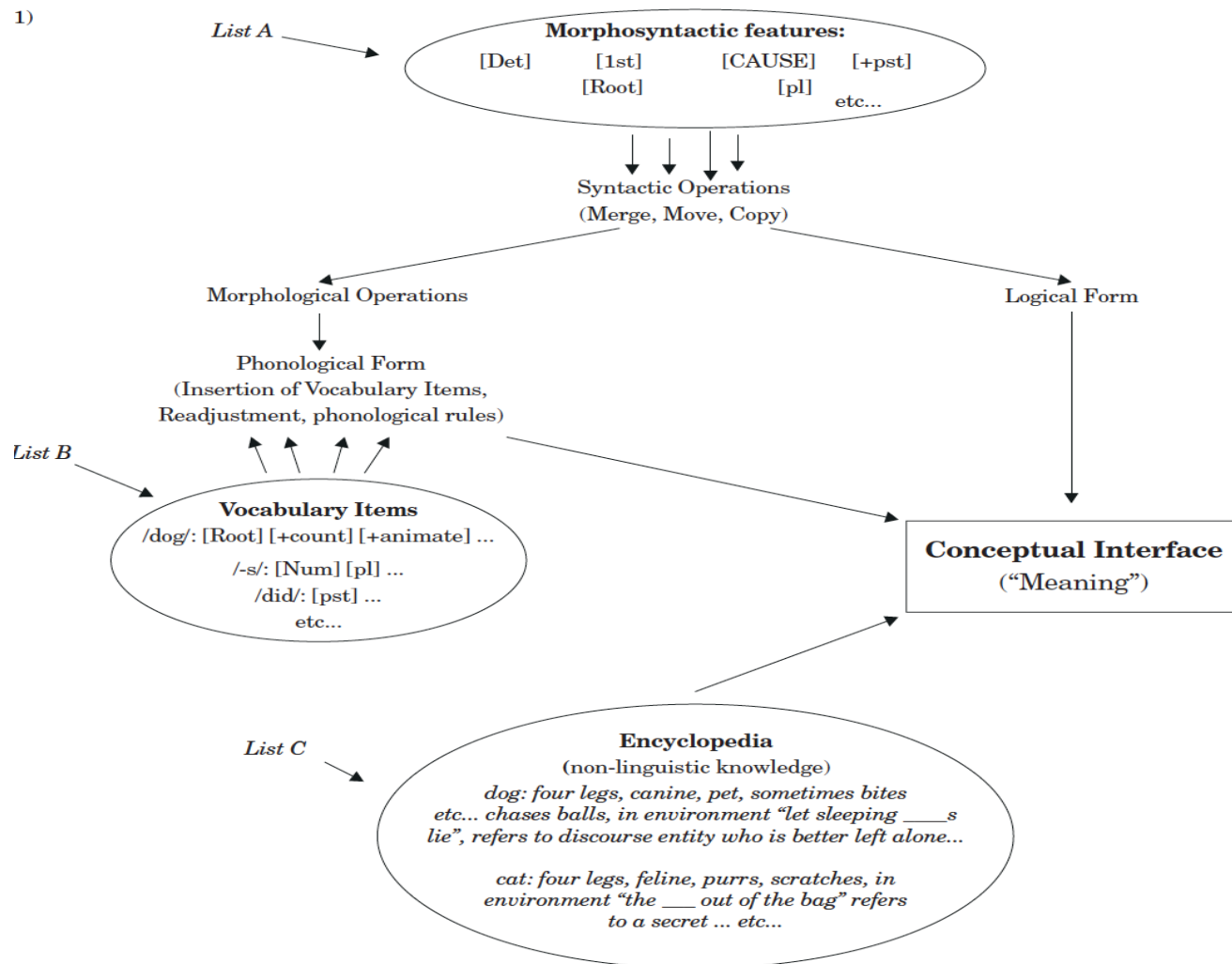
- Halle & Marantz (1994)
 - The **Vocabulary Item (VI)** is the basic unit of Morphology in DM.
 - Equivalent to the morpheme or the lexical item in other theories.
 - VI has semantic, syntactic and morphological features that are computed within syntactic structure.
 - VI also has phonological content (features) that is added once the syntactic computation is done (Late insertion).
 - The phonological properties contribute to the spell-out operation (pronunciation).

Distributed Morphology

- VIs have 3 properties in DM:
 - **Syntactic structure all the way down:** Words are built by means of syntactic operations (Merge, Move, Copy) achieved within a hierarchical structure whose terminal nodes host Vis.
 - **Late insertion:** VI are inserted into the terminal nodes of the structure later after syntactic operations.
 - The terminal nodes of syntactic structure contain semantic and syntactic features but no phonological feature.
 - VIs are inserted into the terminal nodes if their semantic and syntactic features match all those or a subset of those contained in the terminal nodes.
 - **Underspecification:** in order for a VI to be inserted into a terminal node, it has to contain a subset of the syntactic and semantic feature of the terminal node.
 - **Competition** holds among VIs for insertion. The VI that displays a larger subset of features wins.

Distributed Morphology

- The architecture of Grammar in DM (Harley & Noyer 1999)



- The syntactic component generates structures by selecting and combining morphosyntactic features by means of Move, Merge, and Copy.
- The morphological operations (fusion, fission, impoverishment) take place.
- Only after morphosyntactic operations that the phonological form, called VI, is inserted through a process called Spell-out (hence, Late Insertion) + semantic interpretation (meaning).
- Readjustment rules apply if necessary.
e.g. **destroy** => **destruction**
bear => **bore**, **born** => **birth**

Distributed Morphology

- In DM, syntax manipulates “morphemes”, made of semantic and syntactic features, with no phonological content.
- In DM, morphemes refer to feature complexes (e.g. [+pl] as a morpheme for number).
- In the PF component, the operation of VI provides the morpheme with phonological content.
- A Vocabulary Item has the following schema:
 - Morpheme $\Leftrightarrow$ signal + context of insertion OR signal $\Leftrightarrow$ context of insertion
 - E.g., VIs for English plural:
 - [+PL] $\Leftrightarrow$ -s (= /z/) {Vdog}
 - [+PL] $\Leftrightarrow$ -en {Vox, Vchild}
 - [+PL] $\Leftrightarrow$ $\emptyset$ {Vfoot, Vmouse}
 - "The plural morpheme [+Pl] has the Vocabulary Item [+pl] $\Leftrightarrow$ /z/ applied to it, such that it receives the phonological form /z/" (Embick 2016: 278).

Distributed Morphology

- Based on the examples below, provide the VI for Past Tense in English.
 - leave
 - keep
 - feel
 - live
 - reach
 - work
 - hit
 - beat
 - sing

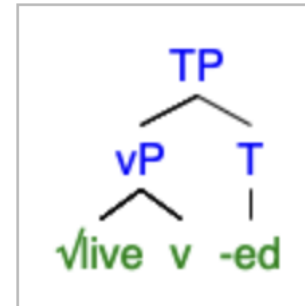
Distributed Morphology

- The VI for Past Tense in English?

- leave / left
 - keep / kept
 - feel / felt
- T[Past] $\Leftrightarrow$ -t / __ (Inserted in the context of certain roots)

- live / lived
 - reach / reached
 - work / worked
- T[Past] $\Leftrightarrow$ -d (the default VI)

- hit / hit
 - beat / beat
 - sing / sang
- T[Past] $\Leftrightarrow$ - $\emptyset$ / __ (a phonologically empty VI)



Distributed Morphology

- What are the VI for Past Tense in English?

- leave / left
- keep / kept
- feel / felt



T[past]

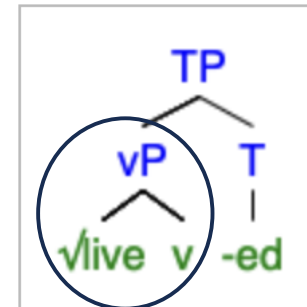
⇔ -t / __ (Inserted in the context of certain roots)

- live / lived
- reach / reached
- work / worked



T[Past]

⇔ -d (the default VI)



- hit / hit
- beat / beat
- sing / sang



T[Past]

⇔ -∅ / __ (a phonologically empty VI)

- Roots are acategorical.
- **vP** is a verbal projection within which the root $\sqrt{\text{live}}$ is categorized as a verb.
- **v** is a category-defining head.
- **-ed** is a VI inserted under T for [+Past]

Allomorphy in DM

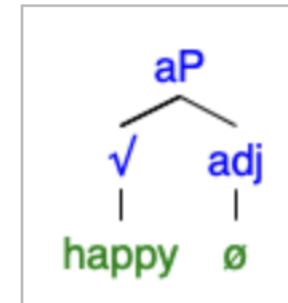
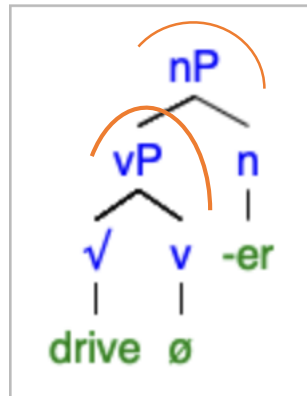
- Two types of allomorphy in DM: **suppletive** allomorphy and **morphophonological** allomorphy (Harley & Noyer 1999).
- Suppletive allomorphy occurs in the forms that are not phonologically related.
- Suppletive forms stand for different Vocabulary Items that compete for insertion in a terminal node: e.g. English *go* / *went*, *bad* / *worse*.
- Dutch plurals suffixes –en and –s:
 - Nouns can be marked for plural by suffixation of either –en or –s
 - –s and –en are not phonologically related. They behave as different VI that compete for insertion under a syntactic node.
 - boek [bu:k] (sg) / boeken [bu:kən] (pl) ‘book’
 - haar [ha:r] (sg) / haaren [ha:rən] (pl) ‘hair’
 - auto [autɔ] (sg) / auto’s [autɔs] (pl) ‘car’
 - tafel [ta:fəl] (sg) / tafels [ta:fəls] (pl) ‘table’

Distributed Morphology

- Words, boundaries, cycles and derivation by phase:
- A long-standing issues in morphology and phonology relates to phonological processes that fail to occur when they come up against a certain type of boundaries.
- Structuralist phonologists drew a distinction between phonemes as basic units of phonological analysis and juncture phonemes as carriers of grammatical information in phonology (cf. Kager 1962, Lehiste 1965).
- Generative phonologists resorted to similar objects, including classical SPE types of diacritics and prosodic constituents as means by which phonologically relevant domains are delimited.
- Phonological cycles, levels or strata are also used to account for such non automatic processes (Mascaro 1976, Kiparsky 1982, 1985, Mohanan 1982, Bermudez-Otero 2011).
- Chomsky's (2001, 2008) Phase Theory offered a new approach at the interface between syntax and phonology.

Distributed Morphology

- According to the author, vP and CP correspond to phases, within which lexical material is inserted and constituents may move up to higher syntactic positions.
- Generalizing from vP, proponents of DM claim that any category-forming projection uniformly defines a phase within which the phonological and semantic properties of words are interpreted (see Marantz 2001, 2007).



Derivation by Phase

- Relying on the proposal that category-forming heads define a phase, Marvin (2002) addressed among other phenomena the opacity characterizing schwa-insertion in words like **meter** [mi:tər], **metering** [mi:təriŋ], and **metric** [mɛtrɪk].
- The adjectival suffix **-ic** which prevents schwa from appearing in **metric** is spelled out in the same phase as /**metr**/.
- The gerund suffix **-ing** is added later in the syntactic structure, once /metr/ is spelled out with schwa.
- The *Phase Impenetrability Condition* (Chomsky 2001) allows explaining why a previously spelled-out schwa resists deletion.
- See Marvin (2013) for a phase-based account of stress assignment in English.

Derivation by Phase

- Unlike phonological cycles that may appear as ad hoc stipulations and which lack external evidence, phases have independent morpho-syntactic motivation, outside the realm of phonology.
- Derivation by phase allows specific chunks to be spelled-out, leading to a grammar whose computation is much simpler in terms of memory load and processing.
- A phase-based account for glide-high vowel alternations in Berber is possible:

gru 'pick up'

agraw 'assembly'

bri 'crush'

abraj 'crushed seeds'

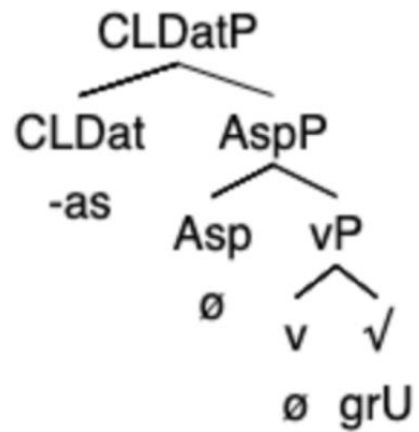
grujas 'pick to him/her'

brijas 'crush for him/her'

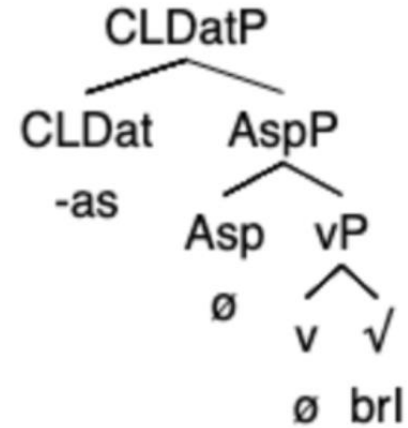
- The high vocoids of verbs like gru and bri are spelled out inside the vP phase as vowels before the dative enclitic /-as/ is added.
- The phase domain is rendered opaque to further operations, including the suffixation of the dative enclitic, whose initial vowel cannot recover the phonological identity of the verb's final segment, hence j-epenthesis.

Derivation by Phase

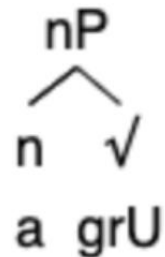
a. *gru-j-as* ‘pick up for him!’



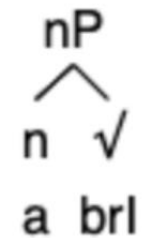
b. *bri-j-as* ‘crush for him!’



c. *agraw* ‘assembly’



d. *abraaj* ‘crushed seeds’



Haitian Creole

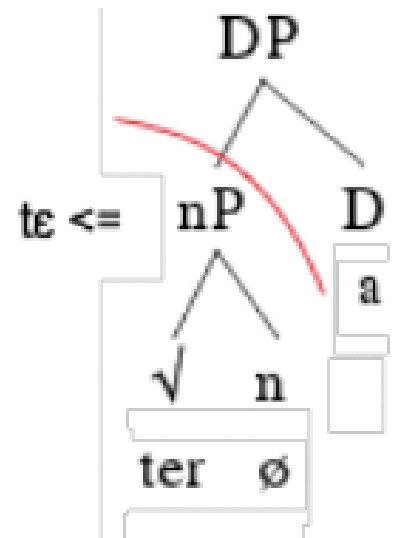
- Allomorphy?

mεg	‘thin’	mεgri	‘become thin’
tε	‘ground’	ãtere	‘to bury’
masak	‘massacre’	masakre	‘to massacre’
kɔf	‘chest, box’	kofre	‘to put inside a box’

Haitian Creole

- Allomorph [la] after consonants
 - nap-la 'table cloth'
 - ʃat-la 'the cat'
 - dātis-la 'the dentist'
 - liv-la 'the book'
- Allomorph [a] after oral vowels
 - ne-a 'the nose'
 - ʒunu-a 'the knee'
 - tɛ-a 'the earth'
 - kɛ-a 'the heart'
- Allomorph [ã] after nasal vowels
 - gasõ-ã 'the boy'
 - ʒadẽ-ã 'the garden'
 - kuzẽ-ã 'the cousin'
- Allomorph [lã] and [nã]
 - bãk-lã 'the bank'
 - dãs-lã 'the dance'
 - maʃin-nã 'the engine'
 - ʃãm-nã 'the room'

Haitian Creole



For an alternative analysis, see Lahrouchi & Ulfsgjorninn (2022) Nasal assimilation counterfeeding and allomorphy in Haitian: Nothing is still something!. *Linguistic Inquiry*. doi: https://doi.org/10.1162/ling_a_00469

Number in MA nouns

	singular	broken Pl.	sound Pl.	
a.	muʒa	mm ^w aʒ	muʒat	‘waves’
b.	ʕd ^ʕ əṁ	ʕd ^ʕ am	ʕəd ^ʕ mat	‘bones’
	d ^ʕ elʕa	d ^ʕ loʕ	d ^ʕ əlʕat	‘muscles’
c.	qamiʒa	qwamʒ	qamiʒat	‘shirts’
	gamila	gwaml	gamilat	‘bowls’
d.	blas ^ʕ a	blajəs ^ʕ	blas ^ʕ at	‘places’
	ryifa	ryajəf	ryifat	‘pancakes’

Number in MA nouns

- Internal plurals are morphologically irregular, whereas external plurals invariably resort to –at suffixation.
- Internal plurals have a collective reading, while external plurals indicate a definite number.

Number in MA nouns

- ❑ In MA, internal and external plurals show their plurality in agreement:

tt-baʕ-u

passive-sell.perf-3pl

l-kwasʕətʕ / l-kasʕetat

tapes

- ❑ In CA, internal plurals can behave like singulars:

l-fala:sifatu

the philosophers

t-aqu:l-u

3F-say-NOM

‘Philosophers say this’

ha:ða:

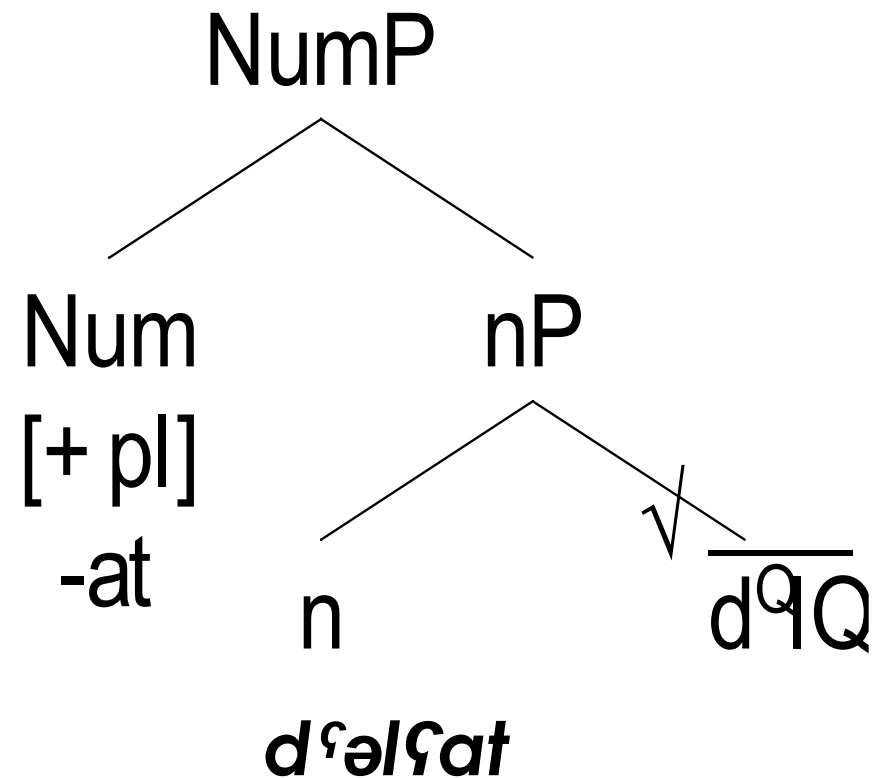
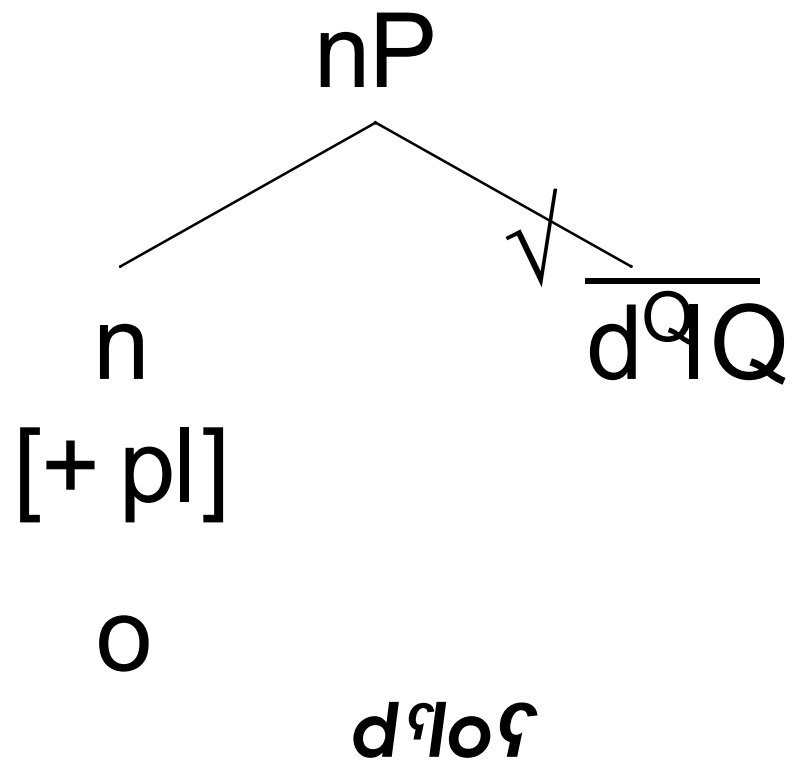
this

(Fassi Fehri 2012:98)

Number in MA nouns

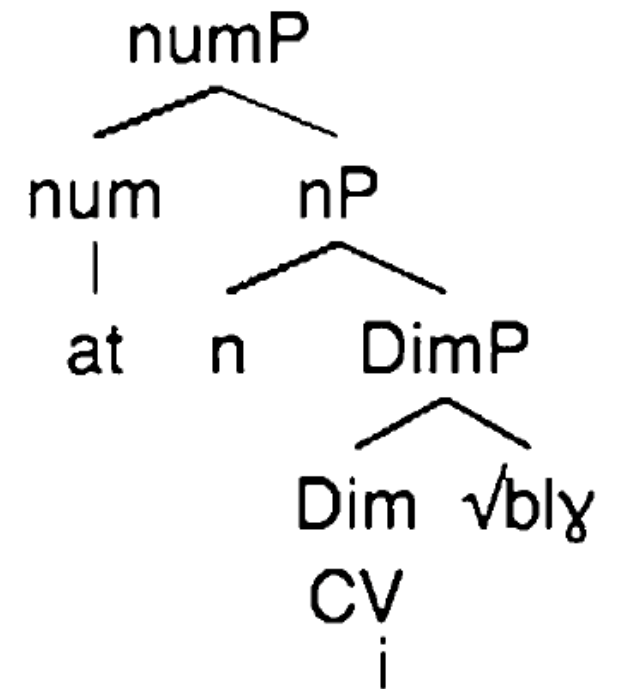
- The facts just discussed suggest that not all MA plurals are located in the same syntactic position
- broken and sound plurals must reside in distinct syntactic positions.
- In line with recent work on number and plurality (Lowenstamm 2008, Fassi Fehri 2012, Kramer 2012), we argue that:
 - Sound plurals in MA are associated with the standard *Num* projection.
 - Broken plurals are associated lower in the structure with the *n* projection

Number in MA nouns



Number in MA nouns

<i>Singular</i>	<i>Plural</i>	<i>Diminutive</i>	<i>Plural of diminutive</i>	
bəlyə	blayi	bliya	bliyat	‘slipper’
dəmfa	dmuɸ	dmiɸa	dmiɸat	‘tear’
kura	kwari	kwira	kwirat	‘ball’



Templatic Morphology

- Word derivation in “templatic” languages makes extensive use of non-concatenative operations (Root-and-Pattern Morphology).
- **Templates** refer to fixed sequences of consonantal and vocalic positions, arranged in a specific way so that they convey grammatical information (e.g. verb conjugation types “forms”, aspect (perf vs. imperf), nominal forms, etc.)
- Classical Arabic (along with Hebrew) is probably the best known templatic language.
- Well before McCarthy’s work (1979, 1981), which argues for the morphological role of the skeletal tier in Classical Arabic verb conjugation, linguists of the Middle Ages such as Sibawayh used faʿal ‘to do’ as a template model for derivation.
- The novelty with McCarthy is the way he extends the proposal of autosegmental phonology (Goldsmith 1976, Leben 1973) to Classical Arabic verbal conjugation.

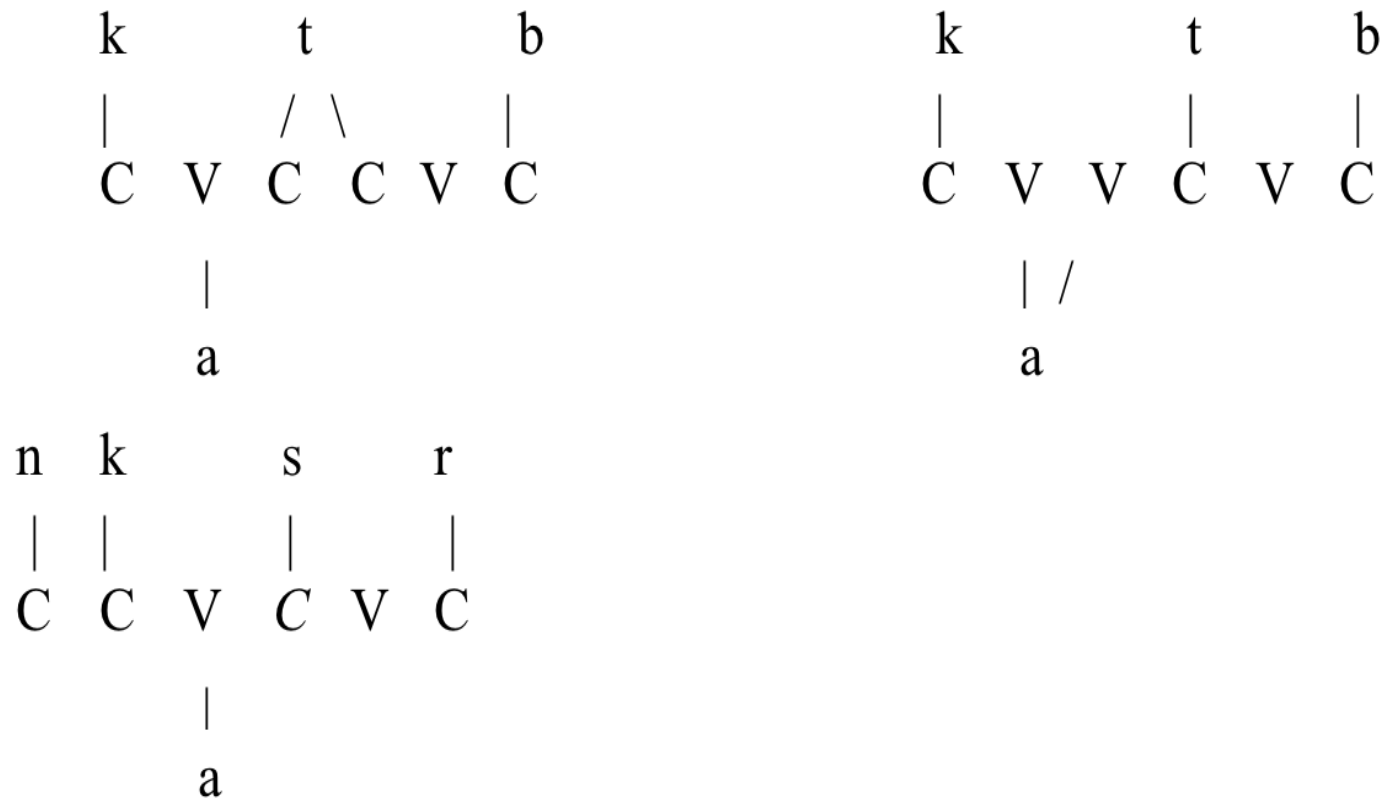
Templatic Morphology

- The various forms of the verb are obtained in a natural way from the association of a consonantal root with vocalic melodies to prosodic templates (McCarthy 1979, 1981).

		√fɪl	√ktb
I	CVCVC	faɪala	kataba
II	CVCCVC	faɪɪala	kattaba
III	CVVCVC	faːɪala	kaːtaba
IV	CVCCVC	ʔafɪala	ʔaktaba
V	CVCVCCVC	tafaɪɪala	takattaba
VI	CVCVVCVC	tafaːɪala	takaːtaba
VII	CCVCVC	nfaɪala	nkataba
VIII	CCVCVC	ftaɪala	ktataba
IX	CCVCVC	fɪalala	ktababa
X	CCVCCVC	stafɪal	staktaba

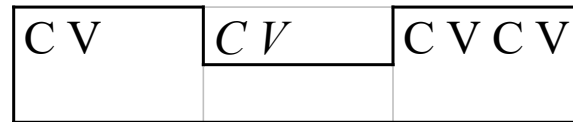
Templatic Morphology

- Classical Arabic *katab* 'he wrote' / *ka:tab* 'he corresponded' / *nkasar* 'it broke'



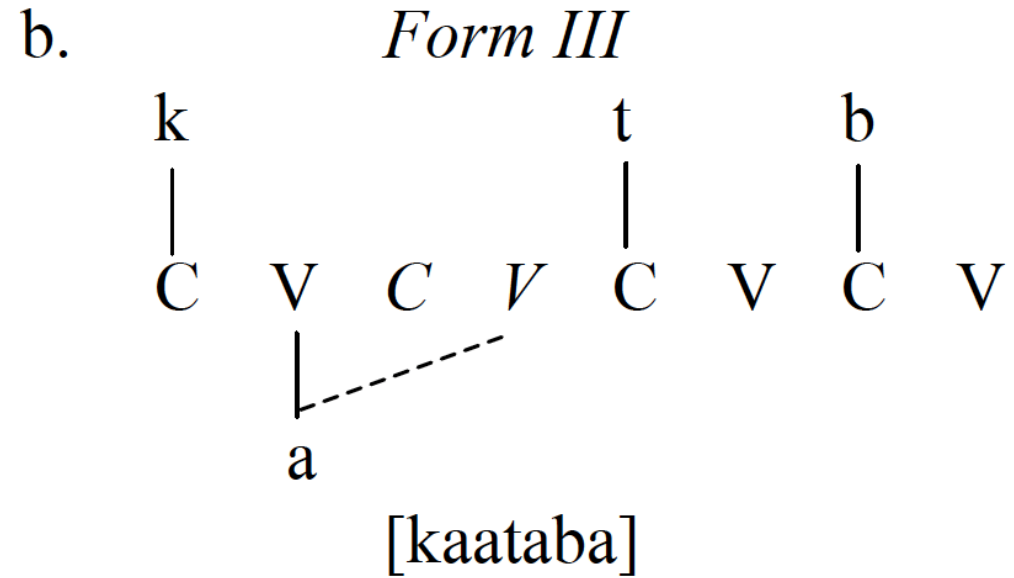
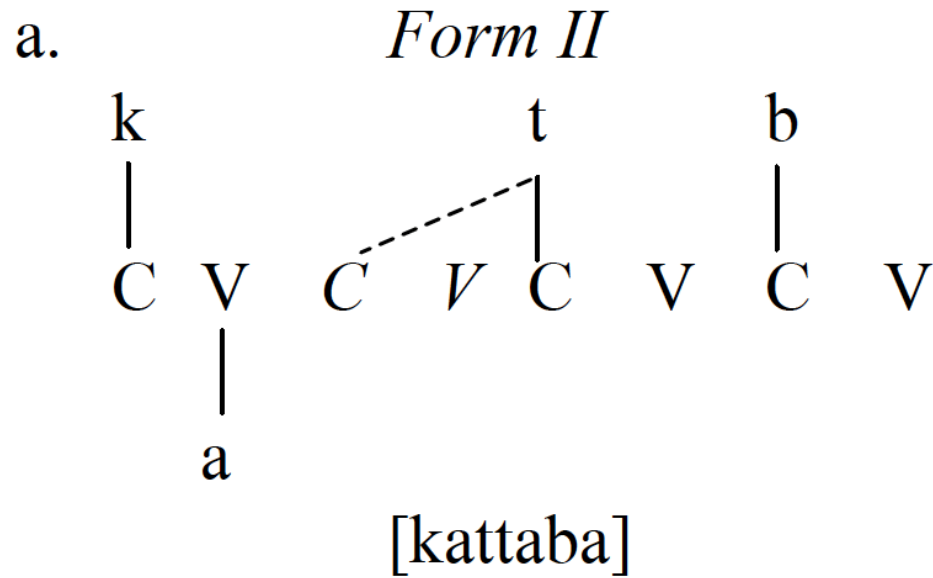
Templatic Morphology

- Guerssel & Lowenstamm (1990) and Lowenstamm (2003) proposed to reduce the number of templates that the verbal forms use to a single template, composed of four CV units:



- The template consists of strictly alternating C and V positions, referring to the Strict CV approach to syllable structure (Lowenstamm 1996, Scheer 2004).
- The template is made of two components: the italicized syllable is a derivational site that serves as the morphological head of the form, and the boxed syllables constitute the complement of the head.
- These components are filled one after the other by means of two operations:
 - (1) root formation
 - (2) verb derivation

Templatic Morphology



- The derivational site allows C2 to geminate in Form II in and V1 to lengthen in Form III.
- Reminiscent of the templatic approach to word formation is the nature and the status of the root morpheme in Arabic.

Templatic Morphology

- Standard theories claim that words in Semitic (by extension Afroasiatic) are decomposed into consonantal roots combined with other morphological units (*cf.* among others McCarthy 1979, Prunet *et al.* 2000, Frost *et al.* 2000).
- Alternative theories hold that whole words are stored in the lexicon and that they are derived from other words (*cf.* among others Hammond 1988, Ratcliffe 1987, Ussishkin 1999 and Dell & Elmedlaoui 1992).
- Various attempts to define the root in Afroasiatic languages:
 - What is a root made of?
 - What is its role in word formation processes?

The consonantal root

- In Indo-European languages, the root corresponds to the smallest meaningful lexical unit that a set of items share.
- Roots are assumed to contain both consonants and vowels:
 - e.g. *reason, reasoning, reasonable* share {reason}
 - receive, deceive, perceive, conceive* share {ceive}
 - cranberry, huckleberry / blueberry, strawberry*

The consonantal root

- {ceive}, {cran} and {huckle} are bound roots that can neither be assigned a specific meaning nor function as independent words (see Aronoff 1976, Spencer 1991).
- In Semitic languages, semantically and morphologically related words are traditionally described as sharing a common root that consists entirely of consonants, combined with other morphemes.
 - In Classical Arabic, *katab* 'he wrote', *kattab* 'he made write', *ka:tab* 'he corresponded', *ka:tib* 'writer' and *maktab* 'office' share the root {ktb}.
 - In Modern Hebrew, *tasmir* 'handout', *méser* 'message', *masar* 'pass on' and *mimsar* 'relay' share the three consonants {msr}.

The consonantal root

- In Berber, *krz* 'plough', *ikrz* 'he ploughed', *amkraz* 'ploughman', and *tayrza* 'ploughing' the root {k,r,z}.
- *dl* 'cover', *addal* 'scarf', *imdl* 'lid' and *amdlu* 'cloud' share the root {dl}.
- This leads to the assumption that the lexicon of the Afroasiatic languages consists mainly of consonantal roots (Greenberg 1955, Diakonoff 1970).
- Associated with templates, they allow deriving various verbal and nominal forms.

The consonantal root

- Further evidence for the existence of the consonantal root is found in word games and language impairment:

- Word games

Classical Arabic: kattab > battak, kabbat, tabbak...(McCarthy 1981: 379, 1991:12)

Moroccan Arabic: walu / lawu 'nothing', razəl / zarəl 'man' (Berjaoui 1997)

Tashlhiyt Berber: skr 'do' > tissakrjukr / iksud 'he is afraid' > tikkasdjurd.

- Language impairment (Prunet *et al.* 2000, Idrissi *et al.* 2008)

ʔiħ-t-ima:l > ʔiħtila:m 'probability', ma-sbaħ > ma-ħbas 'swimming pool'

The consonantal root

- Alternative theories, couched for the most part within the Optimality Theoretic framework (Prince & Smolensky 1993), reject the consonantal root and instead suggest that words are derived from other words "surface-based derivations" (Bat-El 1994, Ussishkin 1999, Bensoukas 2001).
- See also stem and word-based theories other than OT (Hammond 1988, Ratcliffe 1997, and Dell & Elmedlaoui 1992).
- The consonantal root is an abstract morpheme, which never surfaces as such (i.e. without vowels).
- In Tashlhiyt Berber, root consonants can surface without any vowel (e.g. *skr* 'do', *lkm* 'arrive', *krf* 'tie').

The consonantal root

- [illegible]

The consonantal root

- OT reinterprets the internal morphological operations in terms of concatenative operations, using *Alignment constraints* (Generalized Alignment, McCarthy & Prince 1994).
- *Prosodic Circumscription* (McCarthy & Prince 1994), captured by means of authentic units of prosody (mora, syllable, foot, prosodic word):
e.g. raml (sg) 'sand' / [rima:l] (pl), sult^ʕa:n 'Sultan' / [sala:t^ʕ]i:n.

The consonantal root

- Languages games: evidence for the root as an abstract unit of morphological analysis in Tashlhiyt Berber.
- Two secret languages used by women in *Tashlhiyt Berber*:
 - a. *Taqjmit* (Lahrouchi & Ségéral 2009), Isouktane south-west Morocco
 - b. *Tagnawt* (data from Douchaïna 1996, 1998), Tiznit south-west Morocco.
- Users of these languages have access to abstract levels of representation.

The consonantal root

- Users are able to extract only root consonants from words and use them as an input to derivation.
- Affixes and vowels are dropped.
- The morphological operations used to disguise words are captured as the direct result of the association of a consonantal root to a fixed-shape template (made of a sequence of CV units, Strict CV model (Lowenstamm 1996, Scheer 2004)).

The consonantal root

<i>Tashlhiyt</i>	<i>Taqjmit</i>	
krf	ti kk ar fj ur f	'tie'
i-ksud ^ʕ	ti kk a sd ^ʕ ju sd ^ʕ	'be afraid'
laxbar	ti xx a br ju br	'news'
<i>Tashlhiyt</i>	<i>Tagnawt</i>	
skr	aj ss a kr wa kr	'do'
i-ksud ^ʕ	aj kk a sd ^ʕ wa sd ^ʕ	'be afraid'
n-s ^ʕ br	aj ss ^ʕ a br wa br	'we endure'
ta-frux-t	aj ff a rx wa rx	'girl'

The consonantal root

- Only the consonantal material of Tashlhiyt forms is kept in the disguised forms.
- The vocalic material is replaced in the disguised forms by a default vocalism :
I A U (Taqjmit), A (Tagnawt).
- Affixes : *aj-* is prefixed and *-wa-* inserted in all *Tagnawt* forms
 ti- and *-ju-* in all *Taqjmit* forms
- In case the root contains less than three consonants, the lacking material is supplied by epenthetic *t* in *Tagnawt*, *i* in both *Tagnawt* and *Taqjmit*.

Templatic competition (Lahrouchi 2013, 2018)

- Competition is not to be understood as in Distributed Morphology. It holds between phonological forms (exponents) for insertion in a specific templatic position.
- It is not the number of features the items contain and the extent to which they match the features specified in the terminal nodes that determine the inserted item (Subset Principle in DM, Halle 1997)
- Rather, it is the hierarchical structure of the syntactic nodes and the place where the templatic position is located that determine which of the competing items is realized.
- When two exponents compete for the same templatic position, the exponent generated lower in the structure blocks the realization of the upper one.

Templatic competition

- In Tashlhiyt Berber, gender t- and CS w- compete for the same position in the template.

Free State		Construct State		
MS	FS	MS	FS	
a-frux	t-a-frux-t	u-frux	t-frux-t	‘child’
a-maziɤ	t-a-maziɤ-t	u-maziɤ	t-maziɤ-t	‘free man’
a-nfunas	t-a-funas-t	u-funas	t-funas-t	‘ox / cow’
a-tbir	t-a-tbir-t	u-tbir	t-tbir-t	‘pigeon’
a-gadir	t-a-gadir-t	u-gadir	t-gadir-t	‘castel’

Templatic competition

- Only one empty C slot is available in the word initial position.
- Gender t- connects to this empty C slot before CS u- is added, yielding a feminine form from which CS u- is absent.
- In the masculine forms, where gender is unmarked, CS u- shows up.

MS

FM

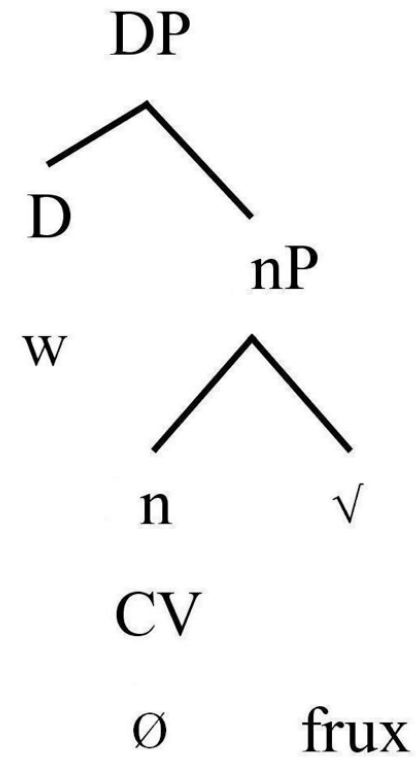
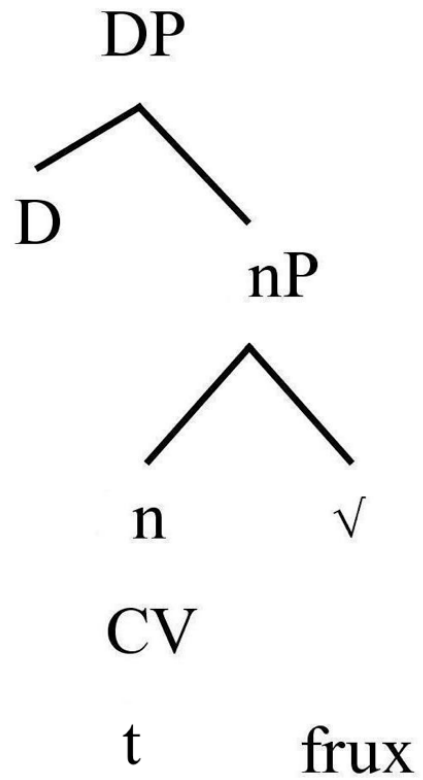
a-frux

t-a-frux-t

u-frux

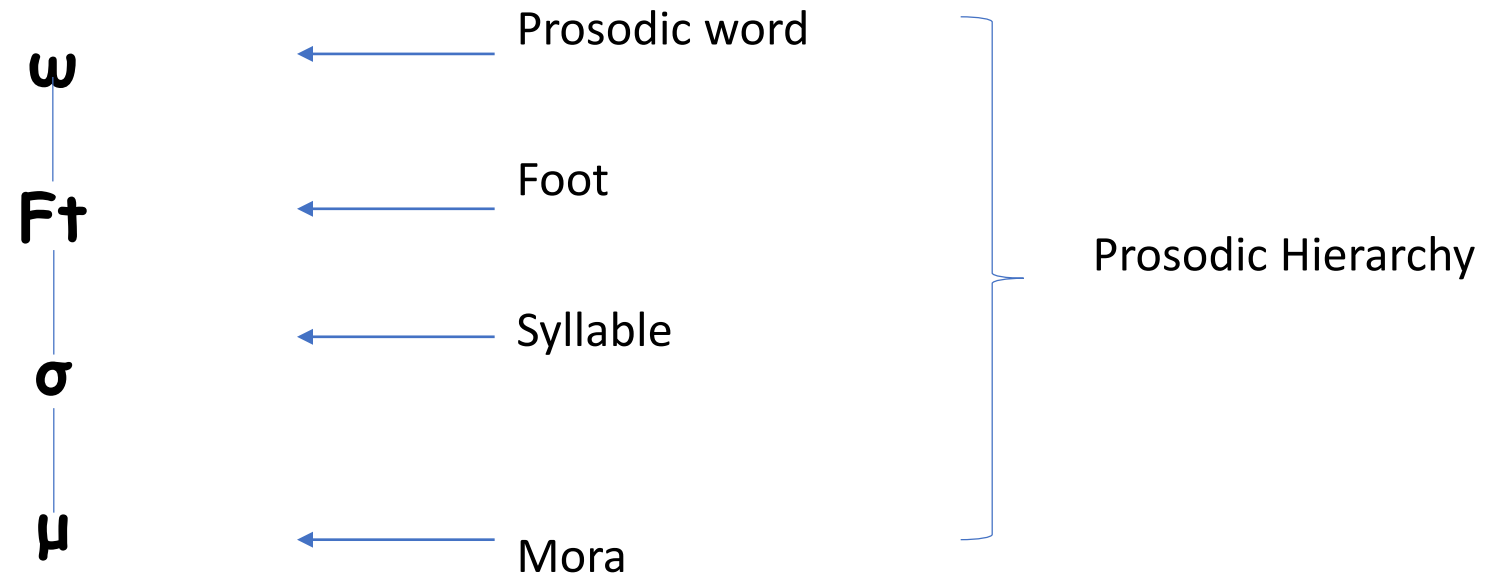
t-frux-t/ ***t**ufruxt

Templatic competition



Prosodic Morphology

- McCarthy & Prince 1986, 1995: A universal set of prosodic categories hierarchically structured.



- Categories established outside morphology, used in phonology to account for stress assignment and quantity sensitive systems.

See also Selkirk 1980, 1984, Nespor & Vogel 1986, among others.

Prosodic Morphology

- **Minimality condition:** defined in terms of the authentic units of prosody.
 - The minimum size corresponds to a bisyllabic or bimoraic foot the **Minimal Word**, (McCarthy & Prince 1995: 321).
 - Foot binarity: Feet are maximally binary at the syllabic or moraic level.
 - Syllables are either light or heavy.
 - Trochaic feet are head-initial (HL), iambic ones are head-final (LH).
 - Quantitative systems (languages) make extensive use of prosodic categories:
 - 3 types of quantitative systems:
 - i. Feet may be syllabic or moraic
 - ii. Feet are only syllabic
 - iii. Feet are only moraic

Prosodic Morphology

In Mokilese, a Micronesian language spoken in the Caroline Islands (Pacific Ocean), the progressive aspect of the verb is formed by prefixation of a heavy CVC σ (= 2 μ).

Reduplication in Mokilese, /CVC.../ Stems

pɔdɔk	pɔd-pɔdɔk	‘plant’
m ^w iŋe	m ^w iŋ-m ^w iŋe	‘eat’
kasɔ	kas-kasɔ	‘throw’
wadek	wad-wadek	‘read’
pilɔd	pil-pilɔd	‘pick breadfruit’
dɔp ^w ɔ	dɔp ^w -dɔp ^w ɔ	‘pull’
poki	pok-poki	‘beat’

Prosodic Morphology

Prefixation of a heavy σ CVV (= 2 μ).

Reduplication in Mokilese, /CV/ and /CV.V.../ Stems

pa	paa-pa	‘weave’
wi.a	wii-wi.a	‘do’
di.ar	dii-di.ar	‘find’

Reduplication in Mokilese, /CV:.../ Stems

kookɔ	koo-kookɔ	‘grind coconut’
sɔɔrɔk	sɔɔ-sɔɔrɔk	‘tear’
čaak	čaa-čaak	‘bend’

OT: Markedness & Faithfulness

Principles vs. Parameters (Chomsky 1981)

- The central claim is that languages share a fixed set of universal properties (principles) a specification of a limited number of universal binary choices (parameters).
 - In syntax, constituents are universally headed (principle), but languages may differ on the position of the head element (left or right-headed).
 - In phonology, syllables universally have onsets (principle), but in some languages a syllable may not have an onset (parametric setting).
- Universal principles can only be universal if they are never violated in any language.
- Markedness embodies universality in a 'soft' way, in that linguistic structures can be either marked or unmarked. Unmarked structures are crosslinguistically preferred and found in all grammars.

OT: Markedness & Faithfulness

Markedness vs. Faithfulness

- Markedness plays a central role in Optimality Theory (Prince & Smolensky 1993).
- OT defines UG as a set of universal constraints.

"At the heart of Optimality Theory lies the idea that language, and in fact every grammar, is a system of conflicting forces" (Kager 2004: 4).

- The constraints are ranked and violable.
- Grammars differ in their ranking of the constraints.
- Two types of conflicting constraints: *Markedness* and *Faithfulness*.
- OT is a theory of the language human capacity, rather than a theory of phonology or morphology.

OT: Markedness & Faithfulness

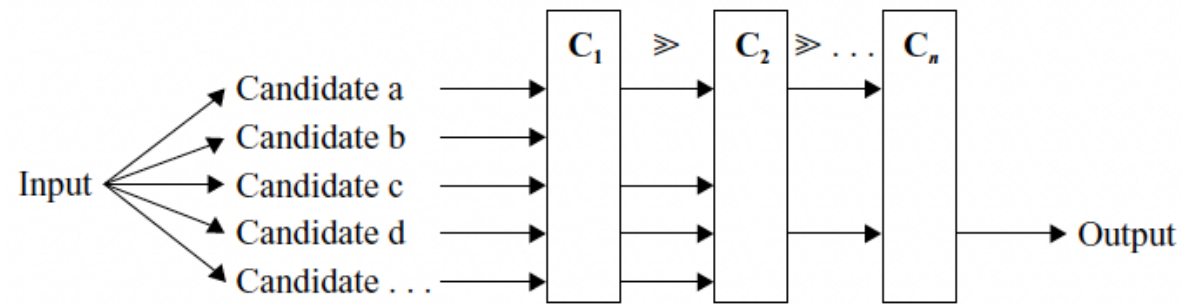
Components of the OT Grammar

- **Lexicon**: contains lexical representations (or underlying forms) of morphemes, which form the input to:
- **Generator**: generates output candidates for some input and submits them to:
- **Evaluator**: the set of ranked constraints, which evaluates output candidates as to their harmonic values, and selects the optimal candidate.

OT: Markedness & Faithfulness

Kager (2004: 8)

(1) Mapping of input to output in OT grammar



- The Grammar (GEN) generates and evaluates an infinite set of output candidates.
- The optimal candidate is selected as the actual output.
- The optimal output candidate is the one that incurs the least serious violations of constraints (harmonic candidate).
- Constraints are ranked, languages differs in their hierarchical ranking.
- The violation of certain constraints can be fatal to the derivation.

OT: Markedness & Faithfulness

- Markedness constraints require that output candidates meet some criteria of structural well-formedness.
- Examples of Markedness constraints:
 - a. Vowels must not be nasal
 - b. Syllables must not have codas
 - c. Syllables must have onsets
 - d. Obstruents must not be voiced in coda position
 - e. Sonorants must be voiced
- Faithfulness constraints require that outputs preserve the properties of their basic, lexical forms (inputs).

OT: Markedness & Faithfulness

- Faithfulness constraints require that outputs preserve the properties of their basic, lexical forms (inputs).
- Examples of faithfulness constraints
 - a. The output must preserve all segments present in the input
 - b. The output must preserve the linear order of segments in the input
 - c. Output segments must have counterparts in the input.
- The derivation (evaluation) and selection of the optimal candidate with regard to the number of constraint it violates are presented in a **TABLEAU**.

OT: Markedness & Faithfulness

- A simple tableau with two constraints and two candidates

	C_1	C_2
a. ✖ <i>candidate a</i>		*
b. <i>candidate b</i>	*!	

OT: Markedness & Faithfulness

- Most languages lack nasal vowels. Their grammar involve the following computation:

*V_{NAS}: Vowels must not be nasal.

*V_{ORAL}N: Before a tautosyllabic nasal, vowels must not be oral.

IDENT-IO(nasal): Correspondent segments in input and output have identical values for the feature [nasal].

*V_{NASAL} $\geq$ *V_{ORAL}N, IDENT-IO(nasal)

Input: /pan/	*V _{NASAL}	*V _{ORAL} N	IDENT-IO(nasal)
a. pãn	*!		
b. pa pan		*	

OT: Markedness & Faithfulness

- OT constraints can be phonological or morphological (prosodic) in nature:
 - Phonological relating to segments features and syllables.
 - Morpho(phonological) relating to prosodic constituents as well as the alignment (left or right alignment) of segments or affixes within specific domains (root, stem, prosodic word).

McCarthy (2006: 309): "Alignment constraints relevant to the prosody-morphology interface as well. For example, ALIGN (Stem, L; PWd, L) requires that the left edge of a stem coincides with the left edge of a phonological word. »

- Timugon Murut reduplication instantiates another case of Alignment constraints:

<i>Basic</i>	<i>Derived</i>	<i>Meaning</i>
bulud	bu-bulud	'hill/ridge'
limo	li-limo	'five/about five'
abalan	a-ba-balan	'bathes/often bathes'
ompodon	om-po-podon	'flatter/always flatter'

OT: Markedness & Faithfulness

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- Two constraints are needed: ONSET that requires syllables have an onset and ALIGN(RED, L; Pwd, L) that requires the reduplicative morpheme (RED) be aligned with the left edge of the prosodic word.

ONSET >> ALIGN(RED, L; Pwd, L)

<i>/RED + abalan/</i>		<i>ONSET</i>	<i>ALIGN</i>
a.	ba a-ba-balan	*	*
b.	a-abalan	**!	

Hypocoristics

French (Nelson 1998)

- a. ka.ro.lin → ka.ro 'Caroline'
 - b. do.mi.nik → do.mi 'Dominique'
 - c. ga.bri.el → ga.bi 'Gabrielle'
 - d. do.ro.te → do.ro 'Dorothée'
- Truncation: the truncated form contains at most 2 syllables (1 foot).
 - Feet are maximally binary at the syllabic level.
 - Hypocoristics in French anchor left by default (right-anchor in Elisabeth > Zabeth).

Hypocoristics

Constraints

- a. ANCHOR LEFTBT: Anchor L(Trunc, Base). The left edge of the truncated form must correspond to the left edge of the base.
- b. ANCHOR RIGHTBT: Anchor R(Trunc, Base). The right edge of the truncated form must correspond to the right edge of the base.
- c. CONTIGUITY: The portion of the base standing in correspondence forms a contiguous string, as does the correspondent portion of the truncated form.! (McCarthy & Prince 1994)
- d. ONSET: $*\sigma[V]$ (Itô 1989)
- e. NO CODA: $*\dots C] \sigma$
- f. MAX BT: Every segment of the base form must correspond to a member of the truncated form.

Ranking

CONTIGUITY » ONSET » ANCHOR LEFTBT » !ANCHOR RIGHTBT » NO CODA » MAXBT

Hypocoristics

Input: do.ro.te	Onset	Anchor Left	Anchor Right	NoCoda	MAXBT
a.  doro			*		te
b. dorot			*	*!	e
c. rote		*!			do

Hypocoristics

Input: e.li.za.bet	Onset	Contig	Anchor Left	Anchor Right	No Coda	MAXBT
a.  zabet			*		*	eli
b. zabe			*	*!		eli,t
c. liza			*	*!		e,bet
d. eli	*!			*		zabet
e. ebet	*!	*			*	liza

Hypocoristics

- Weight-by-Position (Hayes 1989: 258): "prevocalic consonants must be parsed as non-moraic onset elements and thus can never receive weight by position".
- Coda consonant may or not count in weight calculation, onsets never count (e.g. Lardil where a CVC syllable counts as light, Hayes 1989: 255, Hyman 1985: 8).
- Counterevidence
 - (initial) geminates can be moraic in languages such as Turkese and Pattani Malay (see Topinzi 2008, 2010, 2011).
 - Complex onsets can affect weight in quantitative meter (Ryan 2014).
 - French hypocoristics (Lahrouchi 2022).

Onsets in hypocoristics

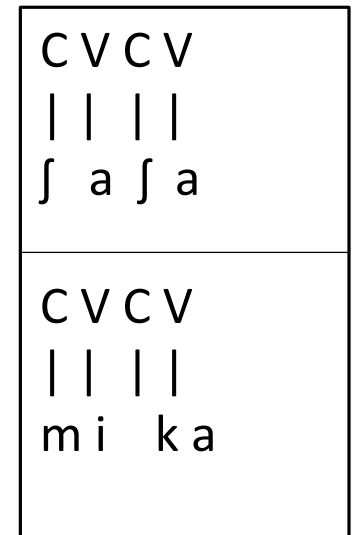
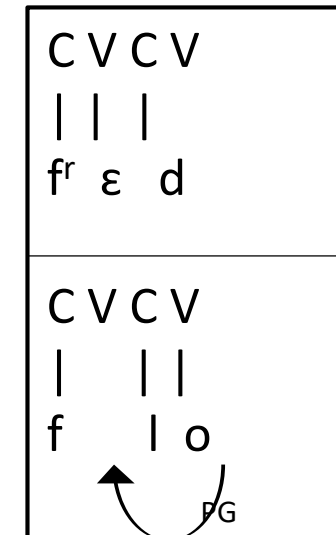
- French hypocoristics require their onsets to be weighted in order to meet the minimum size.
- Complex onsets may contribute to weight, provided that their second consonant contains a closure element (Element theory, see Harris 1990, 1994, Backley 2011).
- flo, klo, but never *fre or *kri
- Two types of *Obstruent-Liquid* clusters:
 - Obstruent-Rhotic are monopositional (k^r , f^r ...).
 - Obstruent-Lateral are bipositional, they contain an empty nucleus which contributes to weight ($k\emptyset l$, $f\emptyset l$...).
 - The closure element $|\text{?}|$ present in $/l/$ but not in $/r/$ requires the consonant to be associated to its own C-slot.

	Base	Hypo.	Weight
a.	ʃaʁlɔt mikaɛl gabrijɛl	ʃaʃa mika gabi	$2\sigma, \mu$
b.	kristjã frederik viktwar	kris fred vik	$1\sigma, 2\mu$
c.	florãs klod Joana	flo klo dʒo	$1\sigma, \mu$

The minimal template

- The minimum size template which French hypocoristics display consists of two CV units.
- CVCV is the minimal domain where Proper Government holds (Kaye et al. 1990, Lowenstamm 1996, Scheer 2004).

FRENCH



The minimal template

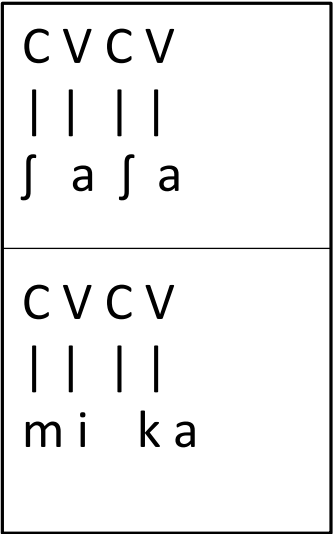
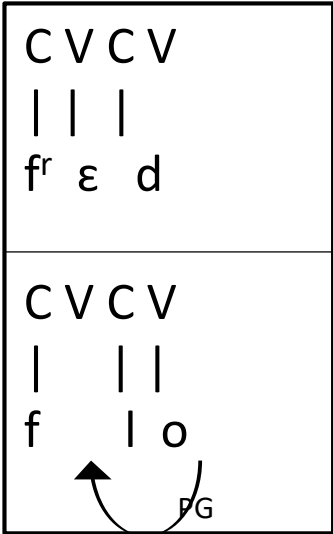
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❑ Berber (Lahrouchi 2022)

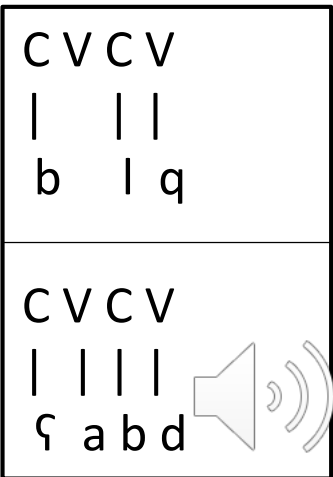
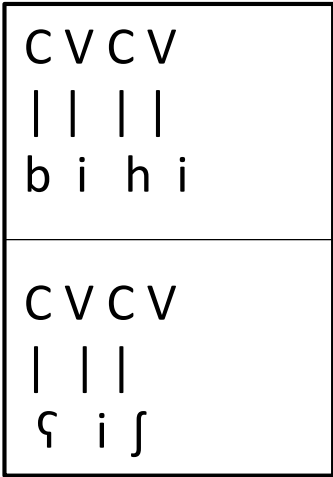
- Any segment can be syllabic in Tashlhiyt Berber.
- Ungoverned V slots host syllabic consonants.

	Base	Hypo.	Weight
a.	brahim	bihi	2σ,μ
	ʕbdʕollah	ʕabd	
	fadʕna	fadʕn	
b.	muḥmmad	muḥ	1σ,2μ
	ʕija	ʕij	
	lḥusajn	ḥus	
c.	blʕid	blʕ	1σ,2μ
	ʕbdʕollah	ʕbl	
	blqasm	blq	

FRENCH



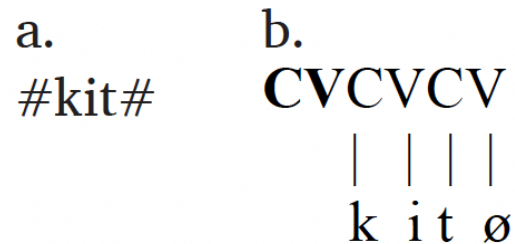
Tashlhiyt Berber



The beginning of the word

The initial CV hypothesis

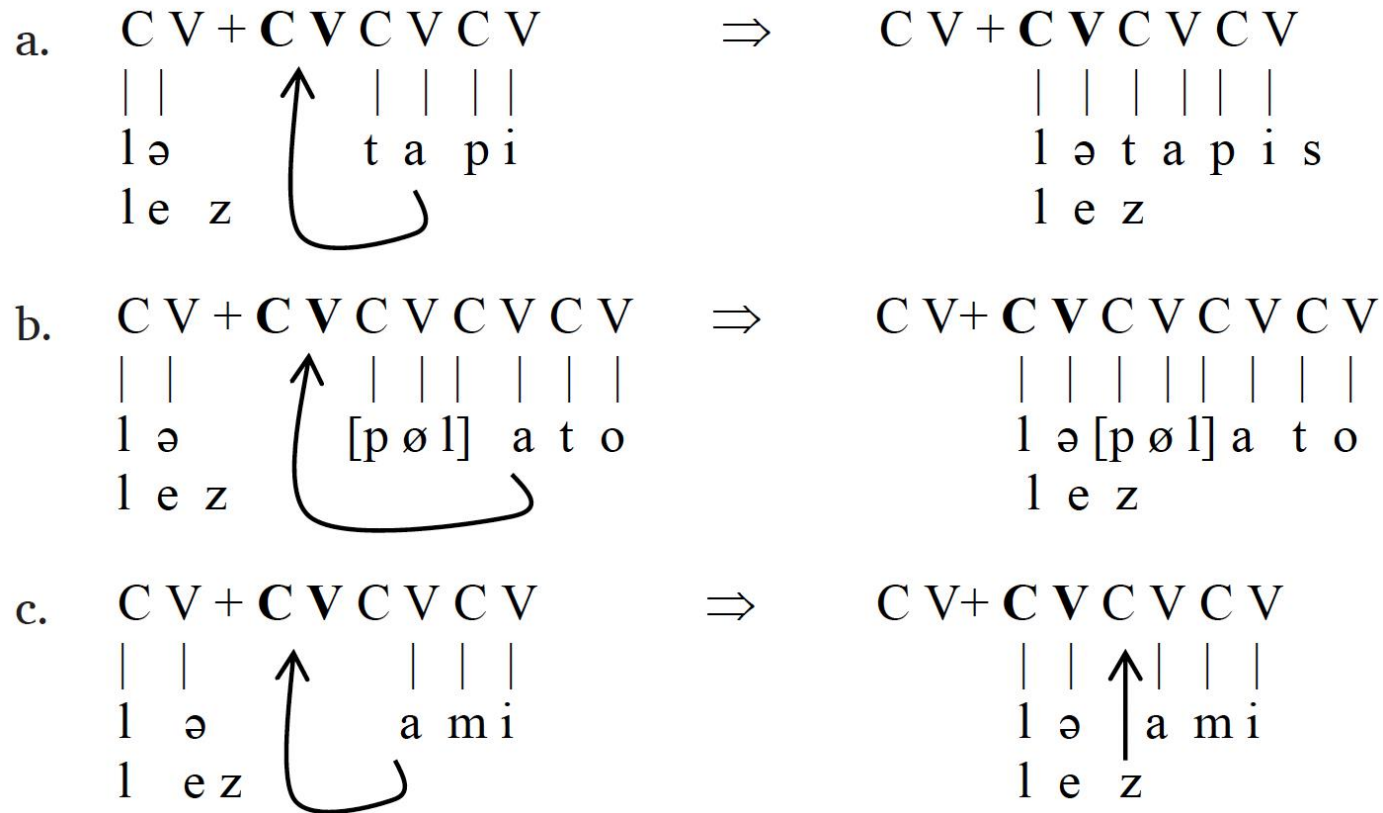
- In an attempt to rationalize the asymmetry between languages with only sonority-rising clusters at the beginning of the word and languages where initial clusters are made sonority-free, Lowenstamm (1999) argues that each word of a major category is preceded by an empty CV site.



- The site is filled by means of phonological and morphological operations involving licensing condition. Two types languages:
 - Type I languages such as English and French where the initial site is always licensed by the following vowel.
 - Type II languages such as Maghrebi Arabic and Hebrew where it is not always licensed.

The beginning of the word

- In French, the initial site, always licensed, hosts proclitics

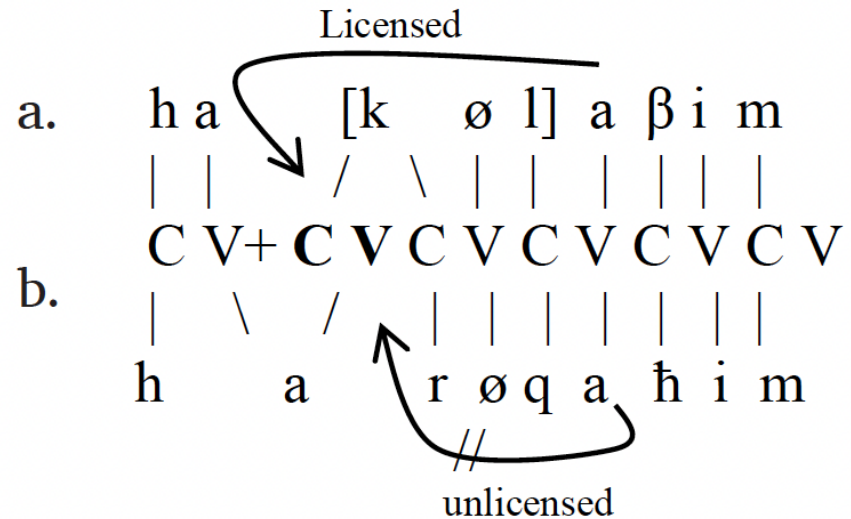


The beginning of the word

- In Hebrew, the initial site is not always licensed, but a uniformity convention allows the initial CV to remain unlicensed throughout the language, even in words beginning with sonority-rising clusters.

[hakklaβim] ‘the dogs’

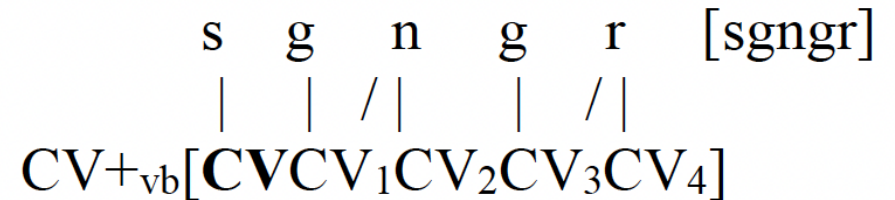
[ha:rqahim] ‘the spices’



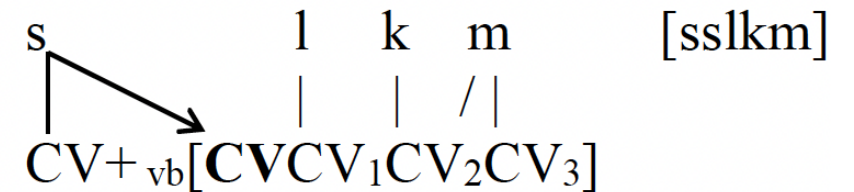
The beginning of the word

- In Berber, the initial site hosts prefixes. The licensing status of the site determines the phonological shape of the prefixes.
- The variation in the shape of the causative prefix results from the use of the initial site through two distinct operations: *spreading* and *movement*

	Verb		Causative
a.	mun	'be picked'	smun 'pick up'
	gngr	'be dislocated'	sgngr 'dislocate'
	gudi	'be in a pile'	sgudi 'put in a pile'
	gawr	'sit down'	sgawr 'seat'
b.	knu	'lean'	ssknu 'tilt'
	rku	'be dirty'	ssrku 'soil'
	lkm	'arrive'	sslkm 'make arrive'




 Licensed

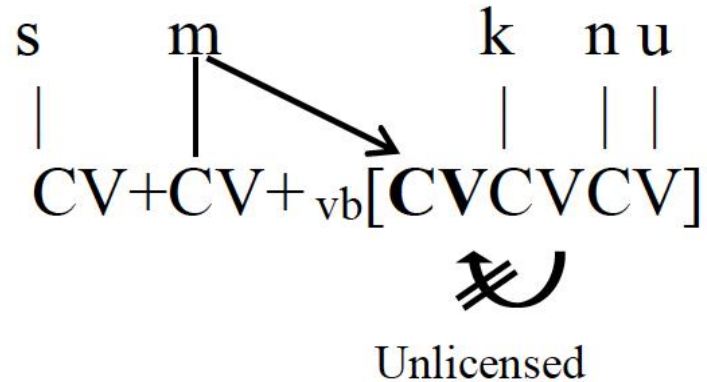



 Unlicensed

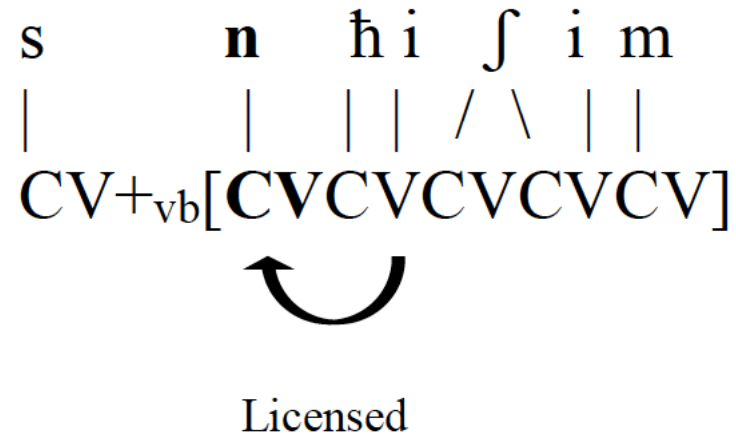
The beginning of the word

- When of causative and reciprocal prefixes are combined, only the inner prefix displays quantity alternation.

smmknu 'make lean mutually'



snħiffim 'cause (them) shame each other'



Selected references

- Anderson, Stephen R. (2019). "[A Short History of Morphological Theory](#)." in *The Oxford Handbook of Morphological Theory* (Jenny Audring and Francesca Masini, eds.), pp. 19–33. Oxford: Oxford University Press.
- Anderson, Stephen. 1992. *A-morphous morphology*. Cambridge: CUP.
- de Saussure, René. 1911. *Principes logiques de la formation de mots*. Geneva: LibrairieKündig.
- de Saussure, René. 1919. *La structure logique des mots dans les langues naturelles, considérées au point de vue de son application aux langues artificielles*. Berne: Librairie A. Lefilleul.
- Embick, David. 2015. *The Morpheme: A Theoretical Introduction*. Boston/Berlin: Mouton de Gruyter.
- Embick, David. 2010. *Localism versus Globalism in Morphology and Phonology*. Cambridge, MA: MIT Press.
- Lowenstamm, Jean. 1999. The beginning of the Word. In John Rennison & Klaus Kühnammer (eds.), *Phonologika 1996: Syllables !?*, 153–166. The Hague: Thesus.
- Marantz, Alec. 2001. *Words*. Ms, MIT.
- Marantz, Alec. 2007. *Phases and words*. In *Phases in the Theory of Grammar*, Sook-Hee Choe (ed.), 191-222. Seoul: Dong In.
- Spencer, Andrew. 1991. *Morphological theory: An introduction to word structure in Generative Grammar*. Oxford/Cambridge: Blackwell.
- Spencer, Andrew & Arnold Zwicky (eds). 2017. *The handbook of morphology*. Willey.