

Grammatical tone in Distributed Morphology



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Grammatical tone (GT)

Many languages use **tone** to distinguish certain morphosyntactic features (tense, case, number, etc.)

- 1) **Noni number** (cl.9/10) (Hyman & Leben 2008)
bwě ~ bwé 'dog.SG/PL'
dʒǒn ~ dʒón 'star.SG/PL'
- 2) **Uspanteko genitive** (Bennett & Henderson 2013)
aqan ~ w-áqan 'leg/my leg'
ixk'eq ~ w-íxk'eq 'nail/my nail'

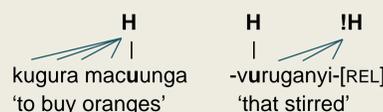
Is GT a problem for piece-based theories of morphology (like DM)?

No. (1), for example, can be analyzed in a piece-based or process-based way:

- 3) a. **tonal prefix** b. **morphophonology**

Autosegmental representations like (3a), widely adopted since Goldsmith 1976, enable piece-based analyses of GT in addition to explaining...

- 4) **tone spread:** In Logoori (Odden 2018), H spreads leftward 'unboundedly and variably' until it hits another tone.



- 5) **tone displacement:** Igbo subordinate-clause marker [SUB] docks leftward onto the *subject* (if present, otherwise rightward onto verb) (9).

Without autosegments, we'd have to allow **nouns** (as well as verbs) to host [SUB], e.g.: L → H / [N+SUB ...]

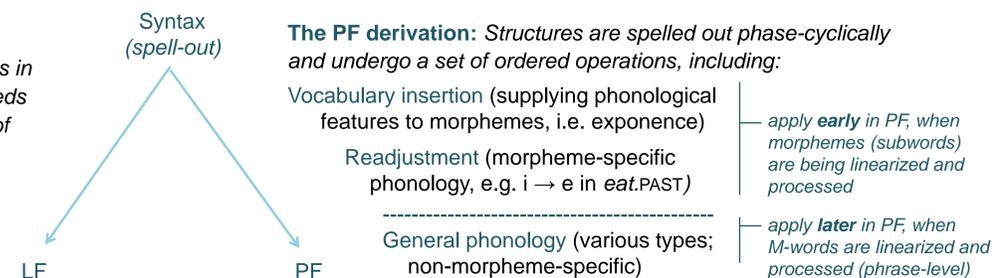
So the mere *existence* of GT is not a challenge for DM. But how exactly GT is to be analyzed in DM is an open question.

Some recent studies (Rolle 2018, Sande 2016) adopt a hybrid DM-OT model, with morpheme-triggered cophonologies explaining (certain kinds of) GT.

My goal is to maintain a traditional DM architecture where GT is derived by the same operations—and subjected to the same locality constraints—as segmental morphology.

Proposal: Grammatical tone is fully compatible with a Distributed Morphology (DM) architecture that features the same set of PF operations as those used in segmental morphology—including **vocabulary insertion**, **readjustment** and **general (phrasal) phonology**.

DM architecture: Word-formation begins in the syntax and proceeds through a further set of operations in the PF and LF components. (Halle & Marantz 1993, Embick & Noyer 2007)



Tonal affixes

In autosegmental theory, **tier-association rules** link tones to TBUs. Their timing and directionality are responsible for tone spread (4), displacement (9b), etc.

Integrating autosegmental principles into DM doesn't require any special additions: GTs are added at **vocabulary insertion** (early); tier-association is done in **general phonology** (late).

Moreover, vocabulary insertion can add content to the **segmental tier, tonal tier, or both**. The vocabulary items in (6)-(10) differ only minimally from vocabulary items for segmental exponents like English D[+DEF] ↔ di.

Step 1. Tone insertion

Vocabulary insertion, early PF

Step 2. Tone association

General phonology, late PF

	segment + tone	tone-only	allomorphy
6) <i>Logoori</i> (Odden 2018)	Agr _o [3PL] ↔ va		
7) <i>Margi</i> (Pulleyblank 1986)	[LOC] ↔ ngəri		
8) <i>Uspanteko</i> (see (2))	F[+PARTIC.] ↔ ∅		
9) <i>Igbo</i> (Goldsmith 1976)	[SUB] ↔ ∅		
10) <i>Mixtepec Mixtec</i> (Paster & Beam de Azcona 2004)			

Is GT ever process-based?

Yes. Some cases of GT can't be analyzed as (only) affixal because they involve tone **deletion** or **replacement**. These cases (*dominant GT* in Rolle 2018) require an intermediate third step—**readjustment**, or morphologically restricted phonology.

- 11) **Somali subject case** (Appleyard 1991:9)
gabhdo ~ gabhdo 'girls.SUBJECT/NON-SUBJECT'
nín ~ nín 'man.SUBJECT/NON-SUBJECT'
inan ~ inan 'boy.SUBJECT/NON-SUBJECT'
This looks like **deletion** of H in subject case—done by a **readjustment rule** (early in PF):
H → ∅ / [SUBJECT] ___
- 12) **Logoori imperative** (Odden 2018)
Toneless verbs remain toneless.
H-tone verbs get (i) H → L on root, and (ii) H-tone suffix, which may then spread leftward (cf. (4)).
ko-sooma ~ sooma 'to read / read!'
ko-réeta ~ reetá 'to bring / bring!'
ku-záázama ~ zaazámá 'to taste / taste!'
ku-fúnyiriiza ~ funyírízá 'to smell / smell!'
This can be analyzed with the same three steps as e.g. English mean ~ meant:
vocabulary insertion (with allomorphy), **readjustment**, and **general phonology**.

Step 1.

Vocabulary insertion

Step 2.

Readjustment

Step 3.

General phonology

	Logoori	English
	Mood[IMPER] ↔ -∅ / X ___ ↔ -∅ 'Insert H if preceding root has H; otherwise insert nothing.'	T[+PAST] ↔ -t / X __, X = MEAN, FEEL... -∅ / Y __, Y = HIT, MEET, RUN... -(ə)d
	H → L / ___ Mood[IMPER]	i → ε / [[z __] [+PAST]], Z = MEET, KEEP, MEAN...
	tone spread: H spreads leftward until it hits another tone (4).	glottalization, flapping, etc. (e.g. I <u>meant</u> it vs. That's what I <u>meant</u>)
	funyiiriza -∅	√MEAN [+PAST]: min -t
	funyiiriza -∅	mɛn -t
	funyiiriza -∅	mɛn?, mɛr, etc...

Unlike general phonological rules, readjustment rules are limited in

- occurrence (only some morphemes trigger/undergo them; must be memorized)
- locality (trigger and target must be visible early in PF, when **word-internal** structures are being processed (Embick & Shwayder 2018))

GT involving irregular tone deletion or replacement has the same locality conditions as segmental readjustment—so should not be able to 'see across' word or phrase boundaries. Apparent locality violations like (9b) are possible because they involve only vocabulary insertion + late tier-association, *not* readjustment.