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Anti-antigemination: Syncope and Epenthesis in Telugu

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1 Preliminary Assumptions

- Phonology – a mapping of feature representations to feature representations.
- Features – symbolic, formal primitives drawn from a universally available, but finite, inventory.
- Universal – the 'Universal' of UG – limits of the hypothesis space for possible natural languages. A universal feature is **not** one that is found 'universally' but rather a feature which 'could' be present in a particular instantiation of natural language.
- No Plan – languages do not have goals to achieve (and, therefore, have no special plans, rules, or constraint rankings to achieve any goals).
- No Homunculus – each individual's phonology is a computational system which, for any one particular input, will provide only one particular output.

2 Is There An OCP?

2.1 The ever-popular 'homunculus' approach

Evidence used to support the claim that the Obligatory Contour Principle (OCP) is at work in a broader domain than simply tonal phonology comes from vowels which appear to be exempt from deletion processes.

Biblical Hebrew /ka:tab-u:/ $\rightarrow$ [ka:θvu:] but /sa:bab-u:/ $\rightarrow$ [sa:vavu:].

The vowel in [sa:vavu:] is said to survive because deletion would bring together the two underlying [b]'s (both of which are spirantized by an unrelated process).[1] McCarthy (1986) calls the 'failure' of the deletion rule to apply *antigemination*, since the rule is 'blocked' if its application would produce a geminate and invokes the OCP as the constraint which blocks the deletion rule from applying. In other words, the OCP causes the failure or the deletion rule to apply just in cases where the rule would result in a string of identical adjacent consonants.

[1] It seems that vowel length in Hebrew can be difficult to determine but additional examples of the same type of phenomena are provide below.

Consider the following discussion of McCarthy's proposal from Yip (1988:67):

> If a language has a general phonological rule that is blocked just when the output would contain a sequence of identical feature matrices, we can conclude that the OCP is operating to constrain derivations . . . The alternative is an ad hoc condition on such rules, as in [i]:
>
> [i] $A \rightarrow \emptyset / B\_\_C$
>
> Condition: $B \neq C$
>
> Such a condition not only incurs an additional cost (whereas the OCP is taken to be universal) but also lacks explanatory power, particularly if contexts B and C are necessary only to state the ad hoc condition.

In Yip's model the 'cure' is effected by language specific rules. In OT models that make use of similar constraints the 'cure' emerges from the constraint ranking. Because of the violability of OT constraints, the winning candidate in an OT derivation is typically not fully 'cured'—certain marked structures may be present in the output form. According to Yip, the OCP not only *blocks* rule application as in McCarthy's antigemination cases, but also *triggers* it—it may be the case that a rule applies only to an input that violates the OCP. Instead of an argument based on formal simplicity in rule statements Yip's discussion of the OCP as a rule trigger exemplifies the widely held notion that phonological processes are goal-oriented—they repair structures that are pathological or ill-formed or marked or disfavored: "The main contribution of the OCP is that it allows us to separate out condition and cure. The OCP is a trigger, a pressure for change" (1988:74)

One of our goals is to work towards removing the notion of ill-formedness from the generative component of the phonology. There are representations that are generated, or formed, by grammars; there are representations that are not generated—that is, not formed; but there is no reason to believe that anything a grammar actually generates is ill-formed. Generated representations are neither ill-formed, nor well-formed—they are just formed (see Reiss 2002 for discussion). OT has preserved the notion of ill-formedness with markedness constraints and the ability of a candidate to 'win' in spite of being far from the perfect, unmarked form.

2.2 The Question of Universality

Odden (1999) discusses a number of cases of vowel syncope that are problematic for any account in which the OCP is held to be universal, such as McCarthy (1986). Odden gives a list of the relevant deletion scenarios as follows (1988:462):[2]

a. Delete a vowel unless flanking Cs are identical.

b. Delete a vowel blindly [whatever the flanking Cs are].

c. Delete a vowel only if flanking Cs are identical.

[2]The original list contains three epenthesis rules, as well. Because they are not immediately relevant to our topic, we have not repeated them here.

The examples that Yip (1988) mentions conform only to the first (the (a) examples) of the above three types of conditions on rule application. Note that (c) has exactly the opposite effect as (a) – it *creates* geminates. A subset of these 'antiantigemination' cases are of particular interest to us here for several reasons.

2.3 Identical, Kind of Identical, and A Lot Less Identical – Koya and Telugu

Koya – Syncope between identical consonants (not counting retroflexion)

Underlying	Surface	Gloss
na:ki ka:va:li	na:kka:va:li	'to me it is necessary'
a:ru ru:pa:yku	a:rru:pa:yku	'6 rupees'
verka:ḍi digte	verka:ḍdigte	'the cat got down'

The Koya data above are not only counterexamples to the OCP but also pose a number of problems for feature geometry. For a detailed discussion of these problems, see Archangeli and Pulleyblank (1994:368-70). Reiss (2003) proposes a replacement for feature geometry which uses symbolic logic to capture notions such as 'identity' and 'non-identity' which are difficult to impossible to state in feature geometric terms.

Telugu – Syncope between identical consonants (not counting retroflexion and a few other features...)

Here, Odden (1988) cites data from Krishnamurti (1957) which illustrates short vowels deleting "...if the flanking consonants are homorganic (in coronals, minor features such as [distributed] are ignored, and along with voicing are subject to regressive assimilation); the rule applies within word [meaning across morpheme boundaries-mk/cr] and between words."[463] We repeat the Telugu data:

Underlying	Surface	Gloss
gulābi mogga	gulābmogga	'rose bud'
cūci ceppu	cūcceppu	'look and tell'
nāṭ-aṭam	nāṭṭam	'plant+ing'
pāta ceppu	pācceppu	'old sandal'
peruku-kō	perukkō	'pull it out for yourself'
ceruku-gaḍa	ceruggaḍa	'sugarcane stick'

Additional data on syncope reveals a slightly different picture. Telugu has regular syncope of short vowels before vowels across word or morpheme boundaries.

amma:yi + akkaḍa	amma:yakkaḍa	'there's the girl'
pedda + illu	peddillu	'big house'
me:ku + ekkaḍa	me:kekkaḍa	'where's the nail?'

In addition, final short [u] is lost across the board before word and morpheme boundaries (but see below).

Additional short vowel syncope cases before consonants include:

pa:lu + le:vu	pa:lle:vu	‘there’s no milk’
ve:ɖi + ni:ɭu	ve:ɳɳi:ɭu	‘hot water’
pe:ru + lu	pe:rlu	‘name (pl).’
guɖi + lu	guɭu	‘temple (pl.)’

Finally, Odden (1988) states that “Telugu Syncope requires only rough identity computed at the place of articulation, which ignores voicing and narrow place distinctions such as alveolar / retroflex / palatal.”[461] Examples such as those below suggest that there really is no point in trying to group the consonants affected by syncope into any sort of natural class.

nellu:ru biyyam	nellu:r biyyam	‘Nellore rice’
ka:npu:ru ceppulu	ka:npu:r ceppulu	‘Kanpur sandals’
amma:yi peɭi	amma:y peɭi	‘daughter marriage’

The variety of place is greater than alveolar to retroflex or palatal. Telugu has no alveolars with the exception of the trill, [r], and one nasal. The representations [t], [d], and [l], stand for dentals in the data. The following non-identical clusters are attested (voicing is identical unless otherwise indicated):

- alveolar trill - lateral
- alveolar trill - labial stop
- alveolar trill - palatal affricate
- palatal glide - (voiceless) labial stop
- retroflex stop - retroflex lateral
- dental stop - palatal affricate
- retroflex stop - alveolar nasal
- labial stop - labial nasal
- voiceless velar stop - voiced velar stop

With generalized [u] syncope, this comes close to exhausting the possible consonant pairings found at word or morpheme boundaries (ignoring the intervening final vowel of the first word or morpheme). While this encompasses clear cases of antiantigemination, this syncope is by no means directed toward antiantigemination specifically, judging from the data.

2.4 Epenthetic [u]

As noted above, final [u] behaves slightly differently than final [a] or [i]. In fact, there is ample evidence that [u] is the epenthetic vowel in Telugu and that, therefore, all cases which involve syncope of [u] are suspect.

Lombardi (2002) states that "...the epenthetic vowel is the least marked vowel possible given the contents of the language's vowel system" [14] and that ".../u/ and /e/ are marked under any view of the facts about vowels"[11] and cites Maddieson (1983) for the proposal that /u/ is the most marked vowel. (This is relative to a standard 5 vowel inventory.) Further, Lombardi says "Epenthesis of [u] is sometimes claimed to exist but it is unclear whether there are any cases that don't involve additional contextual conditioning... The 'enunciative' vowel in Dravidian is sometimes [u], but it's not clear whether these cases are productive epenthesis..."[17].

Evidence from loanword phonology, realization of vocalic segments, and other phenomena strongly support the analysis of [u] as the productive epenthetic vowel in Telugu.

- Loanwords: [brɛɖu]; [kāru]; [ɖakṭaru]
- [r̥], [r̥ː] and [l̥ː] pronounced as [ru], [ru:], and [lu:], respectively
- Distribution – heavily weighted toward word-final position
- Deletion – across the board before V or C. Differs from deletion of other short vowels.
- Apparent distinction between 'real' and 'epenthetic' [u] in syncope environments e.g., [perugu ka:va:li] → [perukka:va:li], but [nalugu ka:va:li] → [nalkka:va:li] [3]

3 Diachronic explanation

3.1 Analogical Change?

Blevins (2003) reviews cases of antigemination, degemination, and antiantigemination under the following assumption about sources of synchronic patterns:

> Central Premise of Evolutionary Phonology (Blevins, to appear)
> Principled diachronic explanations for sound patterns have priority over competing synchronic explanations unless independent evidence demonstrates, beyond reasonable doubt, that a synchronic account is warranted. [1]

Based on findings from this review, Blevins proposes that analogical change accounts for the various patterns (paradigm levelling, in the case of morphologically-related forms). In addition, she suggests that Evolutionary Phonology predicts the following (Blevins 2003:9):

a. Antigemination is strongly correlated with languages which have either lexical geminate/non-geminate contrasts or degemination.

b. Pure antigemination as a regular feature of an exceptionless phonological syncope alternation with origins in unstressed/weak vowel loss is rare or non-existant. (General Yup'ik is 'impure', due to post-schwa gemination.)

[3] Cross morpheme and word boundary assimilations only occur when segments are adjacent.

c. In languages with only open syllables, production constraints may result in syncope between identical consonants only. (Blevins, to appear).

Telugu has lexical geminate/non-geminate contrasts (but no degemination that we know of):

- [vala]:[valla] ‘net:because’
- [tanu]:[tannu] ‘self:kick’
- [paɽu]:[paʈʈu] ‘strong:silk’

Telugu has (close to) only open syllables but syncope between non-identical consonants (as well as between identical consonants).

More crucially, the broad domain of the Telugu cases – spanning both morpheme boundaries and word boundaries – contradicts an analogical change or paradigm levelling.

3.2 Phonetically Motivated Change?

Odden (1988) makes some suggestions related to the fact that the consonant closure gestures for nonidentical places of articulation can overlap in time, since they involve different articulators, whereas repeated, identical consonants cannot have overlapping gestures. He proposed (1988:470) that “The conflicting effects of Antigemination and Antiantigemination, or geminate epenthesis and geminate fusion, could be explained as phonologized alternative resolutions of this neural timing problem.”

We believe that this is a productive line to follow, though not entirely in the manner proposed by Odden (1988). We base our explanation entirely on the ambiguous nature of the phonetic data and the multiple possible analyses of such data.

For acquisition to result in a pattern of antigemination, the acquirer simply has to decide that that the much shorter vowel between non-identical consonants is not, in fact, a vowel but simply a vagary of the production system in its transition from one place of articulation to another. (Here we do follow Odden.) The obvious result is geminates separated by vowels and non-geminates immediately adjacent to one another, giving the appearance of a constraint against identical adjacent consonants.

Antiantigemination seems more likely to be the result of a series of *different* (mis)analyses by the acquirer. We use the same starting point (i.e., vowels between non-identical consonants will be shorter), but a series of different steps leads to a different synchronic analysis:

Step 1: Acquirer analyzes short vowels between non-identical consonants as *epenthetic* vowels e.g., VCvCV where ‘v’ = some epenthetic vowel. The result of this step is that the outputs of this grammar have epenthetic vowels between non-identical consonants.

Step 2: The *lack* of an epenthetic vowel between identical consonants allows the acquirer to hypothesize that there is a syncope process which deletes vowels between identical consonants. Hereafter, any concatenation which produces a CVC sequence undergoes vowel deletion. The epenthetic vowels cease to be analyzed as epenthetic and are simply analyzed as part of the UR.

Do we want to account for accidents of history in the phonology? i.e., build constraint rankings or rules around epiphenomena such as these? Odden (1988) didn't think so: "It is misguided to attribute every accidentally true statement about human language [or particular human languages–mk/cr] to UG, for doing so trivializes the theory of UG itself"(461). We don't think so, either.

The following (common) procedure is fatally flawed:

- Observation: English has almost no lax vowels in coda or absolute final position (unless you're from Boston and/or you have a cousin named Kevin).
- Descriptive Result: Re-classify tense/lax features for English vowels to remove annoying [lɔ]-type cases.
- Conclusion: English does not *allow* lax vowels in coda or absolute final position.
- Implications for Phonological Theory: Rerank constraints to disfavor lax vowels in these positions.

The relevant question is whether lax vowels in coda or absolute final position are *possible* in human language. Assuming they are, the fact that they are not present in a particular language could be due to one of two things – accident or language-specific constraints.

1. Attested Languages $\subset$ Attestable Languages $\subset$ Humanly Computable Languages $\subset$ Statable Languages
2. Attested: idiolects of Cree, English, Dutch, etc.
3. Attestable: idiolects of Cree, English, Dutch, etc. in 400 years
4. Humanly computable: /p/ $\rightarrow$ [a] / __ d
5. Statable: /V/ $\rightarrow$ [V:] in prime numbered syllables ($pa_1ka_2nu_3tipa_5fose_7 \rightarrow$ pa:ka:nutipa:fose:)

The set of *diachronically* impossible languages $\neq$ the set of *computationally* impossible ones.

Goal: To construct a model that will get every attestable form (not necessarily through the phonology!) in the most general terms possible.

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