

Phonological Domains, Nominal-Verbal Parallelism, and Telugu Vowel Harmony

Akshay Aitha - University of Chicago

Introduction: Syntactic literature (Abney 1987 a.o.) assumes structural parallelisms between noun (phrase)s and verbs/clauses, including with respect to phasal structure (Svenonius 2004 a.o.). Other literature (Uriagereka 1999 et seq.) assumes that phases correspond to domains for spell-out to PF, predicting parallelism between phases and (cyclic) domains in morphology and phonology.

Claim: I argue, using data from Telugu vowel harmony in nouns and verbs, that the morphological sequences $\sqrt{-n}$ and $\sqrt{-v}$ are both phonological domains for regressive harmony – striking, as categorizing heads are often assumed to be phasal across the board. However, in Telugu these domains are crucially non-cyclic: some views of phasal spell-out (Sande et al. 2020 a.o.) do not predict this, while others (Cheng & Downing 2016, Guekguezian 2017) may.

Regressive vowel harmony in verbs: In Telugu, regressive vowel harmony in verbs is triggered by /i/, /e/, and /a/, and affects preceding short /u/, which surfaces as /i/ before the first two triggers and as /a/ before the final one. It can be triggered by a large number of verbal suffixes:

(1) Verbal Regressive Harmony

Gloss	Underlying Form	Surface Form
wash-COND	kaḍugu-tē	kaḍigitē
wash-PROG	kaḍugu-tū	kaḍugutū
wash-INF	kaḍugu-a	kaḍaga

Kiparsky’s (2023) analysis of this pattern assumes that the triggering suffix is always the first to attach to the monomorphemic root. Phonological computation at that stage cannot take into consideration stem faithfulness constraints, as there is not yet a stem to be faithful to. Thus, root vowels can harmonize to the vowel of the first-attached suffix.

However, this is not strictly true in Telugu; what Kiparsky assumes to be a monomorphemic root in many cases looks analyzable into a verbal root and a separate *v* suffix:

(2) *v* in Modern Telugu

Basic Stem	Intransitive	Transitive
māru- ‘change’	māru- ‘to change’	māru-cu- ‘to change (smth.)’
jaru- ‘move’	jaru-gu- ‘to move’	jaru-pu- ‘to move (smth.)’
gaḍu- ‘pass (of time)’	gaḍu-cu- ‘to pass (of time)’	gaḍu-pu- ‘to spend (of time)’

Taking the root *jaru-* as an example, we see that affixing *-gu* vs. *pu* to it affects its valency and argument structure. If we affix it with the conditional suffix *-tē*, we can see that both the root and the *v* suffix are part of the domain for harmony: *jaripitē* ‘if (subj.) moves (smth.)’. If the harmony-triggering suffix is not the first suffix attaching to the bound root, Kiparsky’s solution no longer works.

Assuming that phonological cycles correspond to syntactic phases does not fare better. A natural implementation is that regressive harmony occurs at a certain Spell-Out domain. It is not clear what that Spell-Out domain should be. The perfective aspectual marker *-i* can trigger regressive harmony; the basic phase-based view would then expect that any suffixes intervening between *-i* and *v* should also undergo harmony, because such suffixes would undergo phonological computation in the same phase. However, this is not borne out:

(3) Reflexive *-kun* does not undergo /i/-harmony:

Gloss	Underlying Form	Surface Form
wash-PERF	kaḍugu-i	kaḍigi
wash-REFL-PERF	kaḍugu-kun-i	kaḍugukuni

As we can see, the *-i* suffix triggers harmony when it is directly attached to the verb stem, but does not when another suffix intervenes, even one which has a short /u/ which should in principle be a target for verbal regressive harmony. It appears that the ‘first suffix’ intuition was correct, only that the harmony trigger isn’t the first suffix attached after the monomorphemic root, but instead the first suffix attached after a phonological domain consisting of $\sqrt{-v}$.

Non-cyclic domain: A puzzle: if $\sqrt{-v}$ is a cyclic domain for phonological computation, how can that step

of phonology know what vowel is in the first suffix *outside* of the domain? A simple solution is that the phonological domain is not a cyclic one – instead, phonology is evaluated all at once at the word-level, but crucially, this word-level phonology must be able to make reference to the boundary following *v*:

(4) **Input to/Output of Phonology:**

- a. jaru-pu]-i → jarip]i
- b. jaru-pu]-kun-i → jarupu]kuni

We can then give a simple phonological analysis on which faithfulness constraints for vowels to the left of the boundary are different from the relevant constraints for vowels to the right, resulting in harmony only occurring inside the domain, but being triggered by the first vowel to the right of the boundary.

Regressive vowel harmony in nouns: Strikingly, the behavior of regressive harmony in nouns with respect to domain-sensitivity is very similar. Like verbs, nouns feature a set of overt *n* exponents which can be diagnosed by allomorphy triggered by case:

(5) **Evidence for overt *n***

Nominative	Dative
il- lu ‘house’	iṇ- ṭi -ki
nāga- li ‘plough’	nāga- ṭi -ki
kūtur- u ‘daughter’	kūtur- i -ki
nē- yī ‘ghee’	nē- ti -ki

The bolded, alternating pieces are overt reflexes of *n* which supplete with respect to case. The plural marker *-lu* (which always immediately follows *n*) triggers regressive vowel harmony in nouns; preceding short /i/ becomes /u/ (Kolachina 2016, Ramarao 1976):

(6) **Regressive Harmony in Nouns**

Singular	Plural
(‘pu.li) ‘tiger’	(‘pu.lu).lu
(‘kā).ki ‘crow’	(‘kā).ku.lu
(‘kat).ti ‘knife’	(‘kat).tu.lu
(‘ko.li).mi ‘forge’	(‘ko.lu).mu.lu
(‘pa.ri).(‘mi.ti) ‘limit’	(‘pa.ri).(‘mi.tu).lu

Nominal regressive harmony is stress-sensitive (Kolachina 2016); Telugu is a moraic trochee language, so harmony only proceeds past the vowel directly preceding the plural marker when the vowel preceding that is also unstressed. Crucially, the plural marker itself is excluded from this calculation of stress; otherwise, it would form a foot with the preceding monomoraic syllable in the cases of *crow*, *knife*, and *forge* in (6) and harmony would be blocked entirely. Nouns featuring overt *n* do not show different behavior: *cē-yi* ‘hand-*n*’, *cē-ti-ki* ‘hand-*n*-DAT’, *cē-tu-lu* ‘hand-*n*-PL’. Thus, we can say that the domain for undergoing harmony/prosodification appears to be $\sqrt{-n}$, but the trigger for harmony is outside the domain in Num.

Non-cyclicity in nouns: Since in this case the trigger is always *-lu* and not ‘the first suffix’, one could imagine an analysis on which $\sqrt{-n}$ is a cyclic domain for prosodification, and that that prosody is relevant for harmony, which occurs in the following cycle. One argument that this is not the case is that syncope triggered by *-lu* can interact with harmony: *nemili* ‘peacock’ should have the plural **nemululu*, but in fact we instead get *nemil-lu*, where it appears that the fact that the second syllable inside the domain is heavy/bimoraic *after syncope* is relevant for harmony. Thus, it makes more sense to say that prosodification, syncope, and harmony are all occurring in the same cycle of phonology, only that the boundary between *n* and Num is relevant at that phonological cycle:

(7) **Input to/Output of Phonology:**

- a. kolimi]-lu → (‘ko.lu).mu.]lu
- b. nemili]-lu → ne.(‘mil)].lu

What's crucially important for the calculation of harmony is the prosodic structure of *domain-internal* string, but that the entire string, including material outside the domain, is included in the phonological computation. In the talk, I give further evidence for this from exceptions to syncope and (the lack of) root-internal harmony.

Discussion: Interactionist models like Kiparsky (1982, 2000), Inkelas (1997, 1998) and Kalin (2022) would have trouble with these data: for them, every step of morphological exponence corresponds to a step of phonological computation, and domain-sensitivity is purely epiphenomenal. Many cyclic spell-out models, too, would have trouble here: they usually assume, similarly, that domain-sensitivity is an epiphenomenon of cyclicity, except that the cyclic domains correspond to syntactic phases. In Telugu, regardless of whether or not we want to say the parallelism in $\sqrt{-v}$ and $\sqrt{-n}$ being domains is due to parallelism in phases, we cannot say that domain-sensitivity = cyclicity in Telugu. One possible model is that of Cheng & Downing (2016), who argue that Spell-Out is cyclic in the syntax, but not in the phonology; for them, the phonology is sensitive to boundaries corresponding to phase edges, but the domains created by these boundaries are not cyclic. Possibly, the domains in Telugu nouns/verbs correspond to a prosodic constituent such as a prosodic stem (Nespor & Vogel 1986, Selkirk 1984). **Kiparsky** 2023: Oxf. Handb. Vow. Harm. **Kolachina** 2016: MIT MA Thesis. **Sande** et al. 2020: NLLT. **Cheng & Downing** 2016: Syntax. **Kalin** 2022. NLLT. **Guekguezian** 2017: USC PhD diss.