

Telugu has a rounding harmony, not a backness harmony

Introduction. In this paper, I argue that the harmonic feature of vowel harmony in the Dravidian language Telugu is [round] (privative, following Steriade 1995), but not backness as argued for in the existing literature. Through a detailed examination of the distribution of vowels, I demonstrate that stress interacts with roundness in two distinct ways. Firstly, it licenses the marked mid round vowel /o/. Secondly, a lack of stress renders the high round vowel /u/ perceptually weak and unique in the inventory, since it is the only round vowel that can occur in unstressed positions. It follows that the grammatical imperative for an unstressed /u/ to trigger rounding harmony is to preserve the underlying [round] feature by achieving an increased temporal span of [round] and, in turn, a better perceptibility. Contrariwise, [round] is not licensed on an epenthetic vowel when rounding harmony cannot occur due to the dominance of input vowel faith. Thus, the paper brings to light a new rounding harmony and shows that it fits in the typology as it shares many characteristics with the well-documented rounding harmony systems e.g., in Turkic, Altaic, and Mongolian languages, Hungarian, Finnish, etc. (Kaun 1995, 2004, van der Hulst and van de Weijer 1995, Ringen and Vago 1998, Walker 2001, 2005, 2012, Harvey and Baker 2005). The characteristics include the markedness and non-licensing of roundness in certain environments, the perceptual basis of harmony, and the requirement that the trigger and target have the same height. An interaction between rounding harmony and vowel epenthesis constraints in OT is motivated to account for the vowel agreement.

Data and background. The vowel phonemes of Telugu are {i, i:, u, u:, e, e:, o, o:, a, a:} (Krishnamurti 1998). In plural forms in (1), the high vowels /i/, the potential target vowels of harmony (underlined), alternate to /u/ (in bold) of the plural suffix *-lu*. In (a), only the stem-final /i/ harmonizes to /u/. Pingali (1985) posits an interaction between stress and harmony in Telugu and argues that stress on the initial /i/ causes resistance to harmony. In stems like (c), Kolachina (2016) argues that Telugu also has secondary stress (i.e., (*pá.ri*).(mi.ti)) in addition to primary stress described by Pingali and that the penultimate vowel resists harmony because of secondary stress. Stress on this vowel also blocks harmony from proceeding to the pre-tonic vowel (Kolachina 2016). A stem-final /i/ never induces harmony in the plural suffix (e.g., **gíri-li*). Non-high vowels do not undergo harmony and block it in a preceding high vowel /i/ (Pingali 1985, Kolachina 2016). In contrast, in dative case forms in (1), high stem vowels /i/ do not alternate to /u/. Instead, the dative case suffix appears as *-ki*, but not as **-ku*. The same pattern is also found in accusative case as well as 1SG and 2SG person markers in the predicate of a clause (collectively referred to as *case suffixes* here for convenience), which occur after stems ending in /i/ as *-ni*, *-ni*, and *-wi* respectively.

(1) Plural and dative forms (from Chekuri 1976 *apud* Sastry 1987, Pingali 1985, Kolachina 2016)

<u>Noun stem</u>	<u>Plural (suffix: -lu)</u>	<u>Dative</u>
a) <u>gírī</u> ‘hill’	gír <u>u</u> -lu (*gír <u>i</u> -lu/*gír <u>u</u> -lu)	gír <u>i</u> -ki (*gír <u>i</u> -ku/*gír <u>u</u> -ku/*gír <u>u</u> -ku)
b) <u>mániṣi</u> ‘man’	mánu <u>ṣu</u> -lu (*máni <u>ṣi</u> -lu)	máni <u>ṣi</u> -ki (*máni <u>ṣi</u> -ku/*mánu <u>ṣu</u> -ku)
c) <u>párimīti</u> . ‘limit’	párim <u>ītu</u> -lu (*párum <u>ītu</u> -lu)	párim <u>īti</u> -ki (*párim <u>īti</u> -ku/*párim <u>ītu</u> -ku)
d) pó:t̪i: ‘contest’	pó:t̪i:-lu (*pó:t̪i:-lu)	pó:t̪i:-ki (*pó:t̪i:-ku)

The standard argument in previous work (e.g., Chekuri 1976 *apud* Pingali 1985, Sastry 1987, Kolachina 2016) is that the case suffixes in question are underlyingly {-ku, -nu, -nu, -wu}. Then, plural forms are analyzed as the result of a regressive [+BK] harmony triggered by /u/ of the plural suffix *-lu* and the *case forms* as the result of a progressive [-BK] harmony triggered by a stem-final /i/. But this approach cannot explain why /i/ in a stem undergoes harmony in plurals but triggers it in case forms. Therefore, as discussed below, I argue that while the former is a vowel harmony, the latter is not.

Analysis. Pingali (1985) and Kolachina (2016) note that in verb roots vowels other than {i, a, u} are always found in stressed syllables. Here, I show that the non-occurrence of /o/ in unstressed positions is not limited to verb roots alone and that /o/ always occurs only in stressed positions in Telugu but never in unstressed ones. Crucially, I argue that the restriction on its distribution is due to its roundness. Kaun (1995) points out that non-high round vowels are disfavored in the vowel inventories of languages because the lip rounding gesture of roundness and the jaw-lowering gesture of non-high vowels conflict with each other. I argue that in Telugu the marked mid round vowel /o/ is only licensed by stress. This is consistent with the widely noted cross-linguistic observation that prominent positions such as a stressed syllable, a root-initial syllable, etc. license marked featural specifications (Beckman 1997, Majors 1998, 2006, Walker 2005, etc.).

Thus, /u/ is unique in the vowel inventory of Telugu because it is the only round vowel that can occur in unstressed positions. I argue that it is this distinction that makes it the trigger of rounding harmony. Kaun (1995, 2004) shows that rounding harmonies are perceptually driven i.e., a round vowel triggers harmony if it carries some phonetic information that is phonologically significant but lacks enough acoustic cues for clear perception by listeners. Harmony increases the temporal span of roundness and, in turn, its perceptibility. In Telugu, the long round vowels /u:/ and /o:/ carry stress because of their length. The short mid round vowel /o/ only occurs in stressed positions. Stress on these vowels provides strong acoustic cues. Therefore, stressed round vowels do not run the risk of low perceptibility. In contrast, a short /u/ can occur in unstressed positions, but a lack of stress makes it perceptually weak. If it triggers rounding harmony, its [round] feature will be associated with more than one vowel resulting in a higher temporal span of [round] and better perceptibility. This argument makes the following prediction for Telugu: a stressed round vowel never triggers harmony, whereas an unstressed /u/ always does. Through a detailed examination of the co-occurrence patterns of vowels in the lexicon, I show that this prediction is true. Stems with sequences of unstressed /i/ and /u/ in either order are not found in the lexicon because an unstressed /u/ would trigger rounding harmony from any position of the word and in either direction. The plural suffix *-lu* triggers harmony because it *happens* to contain an unstressed /u/. This also explains the anomaly that a suffix, rather than the stem, controls harmony in Telugu, even though affix-controlled vowel harmonies are cross-linguistically uncommon (Baković 2000, 2003, Hansson 2001, Hyman 2002, Walker 2012). Crucially, the stressed /o:/ in the locative suffix *-lo:* does not trigger harmony: *gíri-lo:* (**gíru-lo:*).

In this context, I analyze vowel agreement in case forms (e.g., *gíri-ki*/**gíri-ku*) as follows. At first, I point out an observation by Sastri (1969) and Ramanarasimham (1998) for Old Telugu (before circa 1000 CE) that the accusative case suffix was underlyingly *-n* (not **-nu*). I extend the pattern of the phonological shape of the accusative suffix to the other case suffixes as well in contemporary Telugu. That is, I argue that the URs of the case suffixes in contemporary Telugu are: dative *-k*, accusative *-n*, 1SG marker *-n*, 2SG marker *-w* i.e., {-k, -n, -n, -w}. Now note that the appearance of a default epenthetic vowel (/u/ or /i/) as a means of avoiding consonants word-finally has been well documented for Telugu (e.g., Pingali 1985, Kissock and Dworak 2009, Kolachina 2016). Therefore, after the case suffixes {-k, -n, -n, -w}, an epenthetic vowel appears. If this epenthetic vowel is /u/, as [round] feature is not underlyingly present, the question of preserving [round] does not arise. In other words, the prerequisite for rounding harmony is not met. Then, the general grammatical requirement of input vowel faith for the preservation of underlying vowels (in this case, high vowels /i/ in noun stems) prevails. As rounding harmony does not occur, the perceptually weak quality of [round] on an unstressed (epenthetic) vowel is avoided, since there would be a risk of low perceptibility. Therefore, the epenthetic vowel emerges without [round] as /i/. Borrowing the notion of non-licensing of [round] from Ringen and Vago's (1998) analysis of Hungarian, I describe this vowel agreement in the case forms in Telugu as an instance of non-licensing of [round] on an unstressed epenthetic vowel. Further, this cannot be considered a progressive [-round] harmony because, as [round] is privative, [-round] feature is non-existent, and a non-existent feature cannot spread (Steriade 1995, Ringen and Vago 1998).

Conclusion. The most important outcome of this study is an understanding of the significance of roundness in Telugu phonology. It is reflected in restrictions on the distribution of vowels and in the phonological motivation for /u/ to trigger harmony. Further, contrasts in roundness and backness in Telugu are “mutually enhancing”, unlike, for example, in Turkic languages, Hungarian, Finnish, etc. (Kaun 1995: 82-83). As a result, unlike these languages, Telugu does not have a backness harmony in addition to rounding harmony.

Selective references. Kaun, A. 1995. *The typology of rounding harmony: an Optimality Theoretic approach*. PhD dissertation, UCLA. Kissock, M. and Dworak, C. 2009. Telugu vowel assimilation: harmony, umlaut, or neither? *Proceedings of the Seventeenth Manchester Phonology Meeting*. Kolachina, S. 2016. *Stress and vowel harmony in Telugu*. Masters dissertation, MIT. Pingali, S. 1985. *Some aspects of the vowel phonology of Telugu and Telugu-English*. M.Litt. dissertation, EFLU. Ramanarasimham, P. 1998. Old Telugu. In S. Steever, ed., *The Dravidian languages*, 239-259. London: Routledge. Sastri, K.M. 1969. *Historical Grammar of Telugu*. Anantapur: Sri Venkateswara University Post-Graduate Centre. Sastry, J.V. 1987. *A study of Telugu regional and social dialects: a prosodic analysis*. PhD dissertation, SOAS, University of London.