

SYLLABLE STRUCTURE OF TELUGU

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ABSTRACT

This paper sets out the paradox in Telugu syllable division that is seen in the context of language use. While one set of data demonstrates violation of the Sonority Sequencing Principle, another set of rules suggests strongly an adherence to it. The possibility that the violations of the Sonority Sequencing Principle are the result of a no-coda principle operating in the language is examined. A study of certain phonological processes in the language suggests however, that a coda must be posited in the language. It is suggested that the experimental responses and language game phenomena are conditioned deeply by the orthography of the language. It is also shown that when judgement tasks rather than production tasks are performed, different syllabic divisions, ones conforming to Sonority Sequencing are accepted.

1. THE PARADOX

1.1. Violation of the Sonority Sequencing Principle

1.1.1. Experimental data. The Sonority Sequencing Principle (SSP), for which evidence exists from a wide range of languages, states that from the syllable peak there must be a decline in sonority towards the edges [1]. This suggests that in the demarcation of syllables, a curve must be visible in terms of the sonority of the constituent elements. However, experimental work done on Telugu shows a preference for syllable division that violates the SSP. For example, in a syllable division task that speakers of Telugu only¹ were asked to do, consonants were always placed with the following vowel. Thus, VCV was V-CV and VCCV was V-CCV irrespective of the type of consonant(s) involved. The only exception to this general trend were clusters with the homorganic nasal. The unequivocal response for VNCV was VN-CV [3]. Similarly, in a subsequent study in which subjects were required to transpose syllables, an intervocalic consonant was always associated with the following V as V-CV and intervocalic clusters also with the following V as V-CCV. The homorganic nasal always went with the preceding vowel rather than the following one: VN-CV [4].²

These results were explained in terms of the script of the language. Telugu has a syllabic writing system in which a consonant and the vowel accompanying it are written using one grapheme. All consonant clusters and the vowel following them are also written as one grapheme. The homorganic nasal alone has a separate symbol that is not marked for place of articulation. It was shown that illiterates have difficulty in breaking up words into sub-parts—i.e., syllables [3]. It was suggested that the orthography impinges heavily on the analysis of a word [3, 4]. There was also ample evidence in the responses of the Telugu-

English biliterates who performed the syllable-transposition (and also phoneme deletion) task that they were processing the Telugu script rather than the sounds of the words involved. The divisions that were given were a perfect replication of the way in which sounds are represented in the writing system. It is in the case of the homorganic nasal only that there is some freedom, from the point of view of the script, for it to go either with the preceding vowel, or the consonant and vowel that follow it. In this case, we find that the nasal always goes with the preceding vowel. There was also evidence that English was being processed in the Telugu script. The overall conclusion of these studies is that the writing system plays a very important role in Telugu speakers' responses in the experimental situation.

1.1.2. Language game. Outside the experimental situation, some evidence for the split of words into syllables comes from language games. One language game involves inserting the nonsense syllable [ka] before every 'syllable.' The same split seen in the experimental situations described above is seen here also: VCV is always *ka-V-ka-CV* and VCCV is always *ka-V-ka-CCV* except with the homorganic nasal, where, the split is *ka-VN-ka-CV*. All these instances of language use that involve splitting up a word result in consonant clusters being clubbed together. This results in the violation of the SSP since such sequences as [rdh], [nn], [ll], etc appear in the onset position.

1.2. Adherence to Sonority Sequencing

In this section we present evidence from prosody which shows that knowledge of the sonority principle does exist for speakers of the language. In poetic meters, syllable count is of great importance. Meter in Telugu is stated in terms of the number and weight of the syllables. Syllables are divided into *guru* 'heavy' or *laghu* 'light.' Peculiarly, these rules are stated and taught in terms of the orthography—such as the following statements:

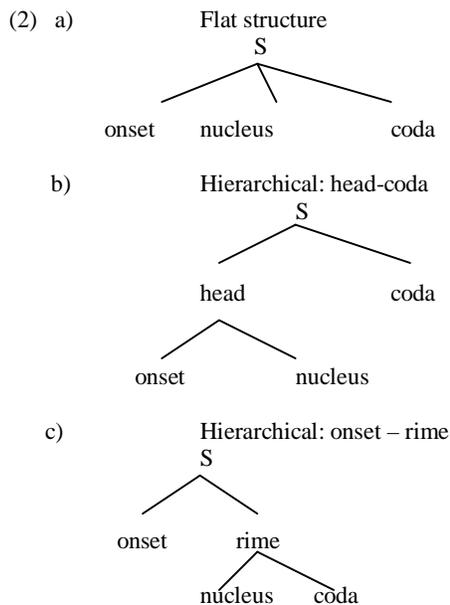
- (1) An *akSaram* (or syllable or grapheme) is heavy if:
 - i) it contains a long vowel: (C)VV--
 - ii) it is followed by a geminate: (C)V--C_iC_jV
 - iii) it is followed by a cluster: (C)V--C_iC_jV
 - iv) it is followed by a homorganic N: (C)V--N--CV
 - v) it is followed by a vowel-less C: CV--C

In other cases, the syllable is light.

[Note: The divisions given above indicate the sounds represented by a single grapheme.]

This statement of heavy and light syllables is indicative of the intuition that operates here. Clearly, the first consonant in a

cluster is thought to be part of the preceding syllable rather than the following. And, when there is more than one element following the onset, whether it is two vowels (long vowel) or a vowel and a consonant, the syllable is assumed to be heavy. This suggests that a branching rime is required for a syllable to be considered heavy. It does not matter how many consonants occur in the onset position. In the word [pratibha] ‘fame’ for example, the first syllable is light. This in turn suggests that the syllable structure is not a flat structure but a hierarchical one and that this hierarchical structure is onset-rime, not head-coda. The possible structures are given in (2). Stating the rule of the ‘heaviness’ of a syllable by means of (2a) or (2b) becomes complicated. Assuming structure (2c) for the syllables yields the simplest statement. A heavy syllable is one with a branching rime. In this kind of organization, the SSP is not violated.



1.3. The No-Coda Hypothesis

Although the facts in 1.1. were described in terms of the orthography, it is entirely possible that another equally plausible principle—one that prohibits codas is operational in the language. Telugu does not permit consonants in the final position except [m, y, w]. Of these, it may be assumed that only [m] is a genuine coda and that [y] and [w] are the result of a phonetic rule of final vowel deletion. Also, borrowings into the language always require a final vowel epenthesis ([i] in the case of final palatal consonants and [u] in all other cases: *bench* → [benči], *ball* → [baalu] etc). It is possible therefore to claim that the results seen in the preceding section are due to a general principle operating in the language which disallows all consonants in the coda position. Since [m] is allowed in the word-final position, it is also permitted in the syllable-final position. Although the articulation of the nasal depends upon the following obstruent in that it is assimilated to the place of articulation, (for eg., [paṇḍi, raṅgu] etc), when the word is split, it may be assumed that the nasal is realized by default as [m].

This hypothesis relies on the general assumption that those consonants that are permitted word-finally can be considered to be legitimate syllable-final consonants. This also implies that

those consonants that are not permitted in the final position of words are unacceptable as codas inside syllables.

Another point in favour of the no-coda hypothesis is that the definitions of heavy and light syllables in (1) are drawn from Sanskrit and are not originally Dravidian rules. Most clusters in the language are seen in words that are of Sanskrit origin. In fact it is claimed that the Dravidian syllable is CV [2].

Whether or not the no-coda principle is applicable in Telugu, it is obvious that the responses in the experimental situation and the language game data violate some principle or other. If the no-coda hypothesis is correct, it implies that Telugu permits consonant clusters in onset positions that violate the sonority sequencing. On the other hand, if Telugu has codas in the syllable, then there is no evidence for it in the word-final positions. It is therefore necessary to go beyond mere word edges to determine whether Telugu permits codas. A few phonological phenomena are detailed in the following section.

2. ROOT STRUCTURE CONDITIONS

Verb roots in Telugu are bound morphemes. There are some verb roots in Telugu that have alternate forms with and without a final geminate [yy]. When the final consonant is not geminate, the vowel preceding it is lengthened.

- | | | | | |
|--------|-------|---|-------|---------|
| (3) i) | weyy- | ~ | weey- | ‘put’ |
| ii) | čeyy- | ~ | čeey- | ‘do’ |
| iii) | muyy- | ~ | muuy- | ‘close’ |
| iv) | koyy- | ~ | kooy- | ‘cut’ |

These can be explained if we assume that the roots constitute two moras. The first of the geminate occupies the coda position and is moraic. When this is deleted optionally, compensatory lengthening of the preceding vowel fills the empty slot. The weight of the syllable remains constant when there is a branching rime, whether there is a long vowel or a short vowel and a coda. Notice that this matches the principles of syllable weight in prosody set out in (1). This also suggests that the syllable structure should be the one in (2c). The final consonant that remains unsyllabified in the root is syllabified when a suffix attaches.

Another piece of evidence also involving compensatory lengthening comes from [m]-final nouns. When nouns ending with [m] are pluralized, the final consonant is deleted and the preceding vowel lengthened.³ The deletion is triggered when an inflectional affix attaches. Although this is a morphological process, the lengthening is still within the root.

- | | | | |
|--------|-------------------------|---------------------------|----------------|
| (4) i) | kaSTam | kaSTalu | ‘difficulties’ |
| ii) | naSTam | naSTAalu | ‘losses’ |
| iii) | jiiivi ₁ tam | jiiivi ₁ taalu | ‘lives’ |
| iv) | kannam | kannaalu | ‘holes’ |

This process can also be explained if it is assumed that [m] occupies the coda position and as a result of deletion of this moraic coda, the other element in the rime lengthens and fills the empty slot.⁴ It is seen that borrowings into Telugu from English also exhibit the same phenomenon: [faaram] ~ [faaraalu] ‘forms.’

The third piece of evidence also comes from a root structure regularity that seems to be common to all Dravidian languages. Some words in Malayalam require an epenthetic vowel and it is noticed that such words either have a long vowel or a geminate consonant. This is reflected in borrowings from English as well

[2]. In Telugu, the determination of words for which a final epenthetic vowel is required is not absolutely clear. Nevertheless, all monosyllabic words that are borrowed into the language require an epenthetic vowel finally. In the process of borrowing, if the original word contains a long vowel, the final consonant remains single or ungeminated. On the other hand, if the borrowing contains a short vowel, the final consonant is geminated:

- (5) a) i. pennu 'pen'
 ii. jaggi 'jug'
 iii. bellu 'bell'
 iv. kappu 'cup'

- b) i. Teepu 'tape'
 ii. glaasu 'glass'
 iii. blauzu 'blouse'
 iv. baalu 'ball'

This rule obviously comes from Dravidian, and can be explained only if it is assumed that consonants belong in the coda position. They are also moraic contributing to the weight of a syllable. On the basis of these phonological phenomena I now claim that the hypothesis that there is no coda in Telugu is untenable.

3. SYLLABIC SEGMENTATION: JUDGEMENT TASK

If it is indeed true that there are codas in Telugu, the no-coda hypothesis cannot be made use of to account for the language game and the experimental data. This in turn suggests that the orthography was playing a very important role in determining the responses as stated earlier. However, it so happens that all the experiments performed on Telugu earlier involved only production. This did not give the subjects the choice of other possibilities. That is, if the task of syllabic segmentation was understood only as one that required them to manipulate the written word, then they were left with only one choice. In the experiment reported below the subjects were asked to judge the segmentations given of individual words rather than perform the syllabic segmentation themselves.

3.1. The Experiment

Twenty-four disyllabic nouns were given to ten adult speakers of Telugu. The words were divided into four groups, each group consisting of six words. The first group contained words that had open syllables, the second group contained geminates medially, the third contained other consonant clusters medially, while the last group contained a homorganic nasal followed by an obstruent. Three divisions were made of each word and the subjects were asked to choose the most natural division. The word *akSaram* was once again avoided since it refers normally to the grapheme and there is no appropriate word for 'syllable' in the language. The words were given in a random order. In the case of all the clusters the words were split in the following three ways:

- (6) a) CVC-CV
 b) CVCC-V
 c) CV-CCV

Some examples of the words used and the divisions offered are given below:

- (7) a) Geminates: karra 'stick' kar.ra; karr.a; ka.rra
 ceppu 'slipper' cep.pu; cepp.u; ce.ppu
 b) Clusters: bhakṭi 'devotion' bhakṭ.i; bhakṭ.i; bha.kṭi
 iDLi 'an eatable' iD.Li; iDL.i; i.DLi
 c) N+C gampa 'basket' gam.pa; gamp.a; ga.mpa
 baṅṅi 'ball' baṅṅ.i; baṅṅ.t.i; ba.ṅṅi

The words with open syllables were split in the following ways:

- (8) a) CV(V)-CV
 b) CV(V)C-V
 c) C-V(V)CV

Some examples are given below:

- (9) a) maNi 'gem' ma.Ni; maN.i; ma.ni
 b) pani 'work' pa.ni; pan.i; p.ni
 c) t̪eene 'honey' t̪e.e.ne; teen.e; t̪.e.ne

The last option, although it does not reflect syllabic division, served two functions. First, it was required so that an equal number of divisions could be provided for all the types of words. Second, it was a foil ensuring that at least at some level, the syllable was the item that was perceived. That is, if anyone chose that division, it would be a clear indication that they were not thinking in terms of syllables. While explaining the task to the subjects in the initial stages words with clusters were used. The various divisions were not given in a set order but were varied across the words while performing the experiment.

3.2. The Results

The responses of the subjects were classified according to the type of syllabic division that was preferred. VCV structures were predominantly V-CV (85%). There were some who preferred VC-V (15%). Nobody chose to place the two vowels together (the option stated in (8c) above). It is seen that the preference is for open syllables.

For the geminates, the VC-CV responses were 38.33%, V-CCV responses were 51.66%. 10% of the responses were VCC-V. The preference is to keep geminate clusters together.

For the other clusters, VC-CV responses constituted 58.33%, V-CCV responses were 36.66% while VCC-V responses were only 5%. The preference is to split the consonants across syllables and consequently accept a coda.

Finally, homorganic nasal and obstruent clusters were predominantly split across syllables. The VN-C division constitutes 93.33% of the total responses. V-NCV and VNC-V each constitute 3.33% of the total responses.

4. DISCUSSION AND CONCLUSION

The results presented above suggest that there is a difference in the kind of responses given based on whether a task is a production task or a judgement task. When we compare these results with those of the production task we see that there were 100% responses in favour of open syllables and also 100% responses in favour of placing all consonant clusters together in the following syllable (barring of course, the homorganic nasal).

What is of significance here is that the preferred option for the clusters is to divide them across syllables. There is approximately a 22% preference for this division over placing

them together in one syllable. The preferred option for the geminates however seems to be to retain them together in one place. While the results in and of themselves may not be very conclusive regarding which is the preference for clusters, they attain significance in comparison with earlier studies. Even though the subjects were all bi-literates there was a significant difference in their performance between Telugu and English [4]. Here, the large number of responses that favoured a split in the clusters indicates that other possibilities do exist for native speakers of the language—possibilities that adhere more to the sonority sequencing. This difference in performance could indicate that the task was not understood very well in the experiments requiring production. This is a distinct possibility given the difficulty in explaining what is required only by means of examples and without using any words that suggest a ‘syllable.’

The preference for the homorganic nasal is still to place it with the preceding syllable indicating that separating the other clusters across syllables was not a mere arbitrary choice.

The issue that still needs to be debated is why native speakers place clusters together when asked to separate words into syllables in experimental situations. There are still responses here that do not split clusters, and, in fact, the preference for the geminates is to place them together. From the phonological point of view, it might be that this preference is due to a greater tolerance of plateaus within a syllable. In any case, as stated in previous studies, the orthography seems to play an important role in this matter [3, 4]. Notice that the principles of syllable weight stated in (1) are all stated in terms of orthography. The influence of the orthography is so strong that the phonological principles behind these statements have been lost sight of. In fact, a phonological description is not forthcoming from teachers of the language either.⁵ I conclude therefore that the writing system has a deep influence on the responses provided in the experimental situations.

One of the implications of this study is that the presence or absence of word-final consonants need not be a direct reflection of syllable-final consonants. This is of course a controversial statement. But notice that if this view is strictly adopted, then it should apply to word-initial consonants and clusters as well. It is seen in Telugu that many of the clusters that appear in initial positions after the division of a word into sub-parts, are unacceptable word-initial clusters, apart from being violations of the SSP. If the no-coda principle is adopted to account for the language game and the experimental data, a counter argument in the opposite direction can also be provided. Since Telugu does not permit many clusters in the initial position, the divisions made under the special situations are not reflective of the syllable structure of the language. Language games and experimental situations are unique.

NOTES

1. This response was true of those who knew only Telugu. Those who knew both English and Telugu showed mixed responses.
2. In this study, the subjects were all biliterates—they knew both Telugu and English. Yet their responses matched those of the Telugu-only group of the first experiment.
3. The details are deliberately stated informally here. Several issues regarding syllabification in Telugu must be examined in great detail. For instance, issues such as whether mora assignment and syllabification are independent of each other and whether roots are syllabified exhaustively require examination.
4. It might be argued that [m]-final words also are the result of a final vowel deletion. That is, [sukham] ‘happiness’ is derived by vowel

deletion from [sukhamu]. Consequently, when pluralization takes place, the entire final syllable is replaced by the plural [-lu] to give [sukhaalulu]. However, notice that this analysis also requires a rule of compensatory lengthening. Besides it does not explain the alternate plural that exists [sukhamulu]. I assume therefore that there are two forms of the same word, one that is used in informal situations ([m]-final) and the other used in formal situations ([u]-final).

5. There is a debate with regard to the cluster [ḍr] (where [r] is not syllabic), as to whether the preceding syllable should be considered heavy or light. This implies that in a word like [aḍrucu] the syllable division is either [aḍ-ru-cu] or [a-ḍru-cu]. Now, as far as the sonority goes, both are perfectly acceptable divisions and the controversy understandable. One of the solutions provided for this controversy is that if [ḍ] is articulated lightly, then the preceding syllable is light, if [ḍ] is articulated heavily then the preceding syllable is heavy. This is the only phonetic/phonological explanation provided by Telugu scholars. Otherwise, most people who are taught prosody, which is almost everyone, since it is taught at the secondary level, are unable to state why the rules should be what they are.

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