Prosodically conditioned harmony in Bangla

Paroma Sanyal
Indian Institute of Technology Delhi

This paper uses the vowel sonority hierarchy (Kenstowicz 1997, de Lacy 2004, 2006, Gordon 2006) in order to support the following descriptive claims about the Bangla.

- The [+High, +ATR] vowels [i] and [u] are the least sonorous and therefore least desirable in stressed syllables.
- The [-High, -ATR] vowels [ɔ], [ɑ], [æ] are the most sonorous and therefore most desirable in stressed syllables.
- Prosodic manipulation in the relative sonority of the nucleus of syllables within a feet result in both progressive as well as regressive harmony in the language.

0. Introduction

Bangla is a major South Asian language spoken in Bangladesh and the eastern part of India. It forms a contiguous linguistic area where the phonology varies from the west to east with respect to vowel harmony. While the entire linguistic area shares the same vowel repertoire, the vowels have a stricter distributional restriction along the western dialects. The argument here is that since the language spoken in these parts actively associates the vowel sonority hierarchy with foot prosody and this results in a range of vowel harmonic process[1].

The paper is divided into three sections. The first section presents a descriptive account of the vowel harmonic processes and their morpho-phonological contexts. The following section presents independent phonological evidence, not pertaining to vowel harmony, to support the idea that Bangla^{SH} has a strong preference for syllabic trochee. The third and final section is the analysis that explains how the prosodic well-formedness preference of the language interacts with sonority hierarchy in order to produce a range of different processes that appear to be similar to progressive and regressive vowel harmonies.

1. Descriptive account

Non-verbs in Bangla^{SH} show a different kind of harmony than verbs. The following statements describe the distributional restrictions of vowels in non-verbs and verbs.

Statement	Example
a. The vowel [ɔ] can only appear in odd numbered syllables, unless it is preceded by a [+High] vowel [i] or [u] in the preceding syllable in disyllables. In most of these contexts, the words have an alternative pronunciation where either the [ɔ] has been raised to [o] or the high vowel has been lowered to mid.	**odd syllable [ɔ], even [o]** letters in script: /kml/ 'lotus' and /koml/ 'soft' in speech: [kɔmol] and [komol] **Disyllables: [i]/[u] preceding [ɔ]** [b^{h}itɔr]~[b^{h}etor] 'inside' [b^{h}iʃɔn]~ [b^{h}iʃon] 'extremely'
b. All [ɔ] change to [o] when followed by the vowels [i] or [u] in the following syllable.	[dʒɔj] 'victory' [dʒoji] 'victorious'
c. Although [ɑ] and [æ] share the feature [-High, -ATR] with [ɔ], these vowels show no change when followed by the [+High] vowels [i] or [u] in non-verbs.	[mɑti] 'soil' *[meti] [k^{h}æti] 'fame' *[k^{h}eti]
d. But, in verbs [ɔ] and [æ] change to their corresponding mid counterparts [o] and [e] in identical morpho-phonological environments.	imperative: [kɔr] 'do' [dæk^h] 'see' hab.past.1p: [kortɑm] [dek^{h}tɑm]
e. The vowel [ɑ] though phonologically inert for the most part, shows similar behavior to [ɔ] when placed in the second syllable of a disyllable and	Disyllables: [i]/[u] preceding [ɑ] [p^{h}itɑ]~[p^{h}ite] 'string'[ʃutɑ]~[ʃuto] 'thread' [birɑl]~[berɑl] 'cat'

[1] Henceforth I will be using the word Bangla^{SH} to refer to this language in order to distinguish it from the larger linguistic continuum of Bangla, which doesn't share this specific characteristic.

	preceded by [i] or [u]. It changes to either [e] or [o] depending on the preceding vowel.	[bikɑl]~[bikel] 'evening' [dukɑn]~[dokɑn] 'shop'
f.	The mid vowels [e] and [o] occur freely and do not show any harmony in non-verbs. However, in verbs they change to [i] and [u] in the morpho-phonological environments where the [ɔ] and [æ] change to [o] and [e] respectively[2].	imperative: [ʃon] 'listen' [lek^h] 'write' hab.past.1p: [ʃuntɑm] [lik^{h}tɑm]
g.	The high vowels [i] and [u] usually form the phonological environment that triggers harmony, rather than undergoing change. Nevertheless, when followed by [ɔ] or [ɑ] in disyllables, they can undergo lowering. Similarly, they are absent in verb roots unless appearing in alternation with the mid vowels [e] and [o].	

2. Evidence for syllabic trochee

The preferred foot structure in Bangla^{SH} is a disyllabic trochee, evidence for which can be seen in the following phonological contexts.

The genitive suffix in Bangla^{SH} is vowel-initial and loses it's vowel for hiatus resolution when it attaches to vowel-final nouns. It thus appears as two phonologically conditioned allomorphs [-er] and [-r]. However, when the noun is monosyllabic, the hiatus resolution is not with vowel deletion, but rather with glide insertion, so as to produce a disyllable.

A.	Noun	Genitive	Gloss
	[kɔlom]	[kɔlomer]	'pen'
	[kɔlɑ]	[kɔlɑr]	'banana'
	[cɑ]	[cɑjer]	'tea'

Coda clusters are simplified in Bangla^{SH} by adding the vowel [o] finally. Such words can by easily identified since they typically show two alternative pronunciations in the genitive form: one with the epenthetic [o] and another with the suffixal vowel [e].

B.	Noun	Genitive	Gloss
	[posto]	[postor], [poster]	'poppy seeds'
	[gɔlpo]	[gɔlpor], [gɔlper]	'story'

The addition of the epenthetic vowel, after the cluster produces a Heavy-Light syllable sequence, while adding the vowel between the clusters, would have produced a Light-Heavy sequence. The former strategy shows the clear preference for disyllabic trochee.

3. Analysis

The analysis uses positional faithfulness constraints (Beckman 1997, 2004, Smith 2004) to show why there is a preference to not alter vowels in stressed syllables. This preference is in turn compromised when the vowel in the stressed syllable is a [ɔ] followed by either [i] or [u]. The account presented here would be an underspecification account. I propose that in non-verbs, Bangla^{SH} has a six vowel repertoire with the seventh vowel underspecified for manner. This underspecified vocalic segment appears as [ɔ] in stressed positions and [o] elsewhere. Since it is underspecified, it does not incur violation of the positional faithfulness constraint and as a consequence appears to be the only vowel participating in regressive harmony.

Cited References

Beckman, Jill. 2004 "Positional Faithfulness," in *Optimality Theory in Phonology: A Reader*, ed. by J. McCarthy, pp. 310-342.

Beckman, Jill. 1997. Positional faithfulness, positional neutralization and Shona vowel harmony. *Phonology* 14: l--46.

de Lacy, Paul 2004. Markedness conflation in optimality theory. *Phonology* 21, 145–199.

de Lacy, Paul 2006. *Markedness: Reduction and Preservation in phonology*. Cambridge University Press.

Gordon, Matthew. 2006. *Syllable Weight: Phonetics, Phonology, Typology*. New York: Routledge.

[2] It has been suggested to me by Jill Beckman in a review that this could be analyzed as a case of chain shift, and in my analysis I do take this into consideration.

Kenstowicz, Michael. 1997. Quality-sensitive stress. *Rivista di Linguistica* 9, 157–188.
Smith, Jennifer. 2004. Making constraints positional: Toward a compositional model of CON. *Lingua* ll4(12): 1433-1464.