



Paradigm of Vocalic Distribution in Bangla with special Reference to the Quantal Vowel alternations

Dr. Kanak Kanti Bera
Associate Professor
Department of English
Panskura Banamali College (autonomous)
Panskura

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Abstract:

Concentrating chiefly on the intervocalic interaction and collocation in disyllabic domains, this paper critically analyses the distributional paradigm of the monophthongal vowels in Standard Bangla, mainly the quantal vowels. The objective is to offer some fresh insights into the phonotactic restrictions on their restrictions and licensing. Previously much emphasis was put upon distributional pattern of the default vowel i.e. the back low mid-vowel /ɔ/. To account for its alternation and preservation, earlier studies (Dan 1992, Sanyal 2010) resorted to the prosodic factors (its raising in prosodically weak syllables and in word-final open slots) as well as the harmonic impact of high vowel (that raises the preceding /ɔ/ to /o/, but preserves the following one). But little attention was paid to the corner vowel stability or susceptibility. It has been universally observed that, compared to the corner vowels /i/, /u/ and /a/, the mid vowels are more susceptible to the phonological environments and prone to undergo alternations. This applies to Bangla as well. But it does not mean that the three quantal vowels in the language are fully immune to changes. This present study intends to establish the pattern of the quantal vowel alternations in response to different factors like the neighbouring vowel impact, prosodic position, intervocalic collocation, morphology and other contextual and positional determinants. The study explains the way different preservation/alternation strategies work with respect to all the given contexts and positions in the paradigm of vocalic distribution of Bangla monophthongs, especially the quantal vowels.

Key Words:

Bangla, quantal vowels, intervocalic interaction, vowel alternations, context and position, distributional phonotactics.

This article is a critical analysis of the distributional paradigm of the monophthongal vowels in Standard Bangla with special references to the three corner vowels /i/, /u/ and /a/. Concentrating chiefly on their V-to-V interaction and collocation in disyllabic domains, it offers some fresh insights into the phonotactic

restrictions on restrictions upon them and their licensing. Previous studies of Dan (1992) or Sanyal (2010) put much emphasis on the distributional pattern of the back low mid-vowel /ɔ/, the default vowel, but very little attention to the quantal vowels. It has been universally observed that (leading to the emergence of Quantal theory proposed by Stevens (1972, 1989), mid vowels are more susceptible to the phonological environments and more prone to undergo alternations than the corner vowels /i/, /u/ and /a/ are (Stevens 1972, 2004; Beckman et al 1995). This fact, i.e. relative stability of the quantal vowels and greater susceptibility of the mid vowels applies to Bangla as well. However, it never means full immunity of the three quantal vowels in the language to acoustic or phonemic alternations. This present study intends to establish the pattern of the quantal vowel alternations in response to different factors like the neighbouring vowel impact, prosodic position, intervocalic collocation, morphology and other contextual and positional determinants.

In any world language, behind all phonological alternations there is always a complex interaction between context-sensitivity of a segment and phonotactic restrictions inherent in that language. The underlying phoneme is realized as its surface form (two often being phonemically contrastive) as the end-product of this conflict. In standard colloquial Bangla (henceforth SCB), a major South-Asian language, vowel distribution — restrictions upon it and final licensing often at the cost of [ATR] specification — is a strong example of this. Other than /i/, /u/ and /a/, vowels can hardly occur freely in different contexts. As for examples, /pa/, /ba/, /bi/ and /pu/ are grammatical and attested as free lexicons (meaning ‘leg’, ‘or’, ‘twenty’ and ‘east’ respectively), whereas /pɔ/ and /bɛ/ are not. But, on the contrary, the closed monosyllables /pɔth/ ‘road’ and /bes/ ‘diameter’ constitute lexical and semantic validity. Likewise in other localities as well, these two vowels in Bangla rarely allow a word boundary to follow. Consequently this impossibility often entails either complete banning of these Vowel in that locality or featural changes in these [-ATR] vowels in word final open position to surface as a phonemically contrastive vowel with [+ATR].

In Bangla phonology, phonotactic restrictions on its vowels, their distributional paradigm in relation to some specific contexts (referring to segmental adjacency/neighbourhood) and positions (referring to prosodic slots) often triggering the mid-vowel neutralization have already been investigated in some details (Dasgupta 2003, Dan 1992, Sanyal 2010). The available literature simply supports the universal claim that, all the vowels available in a language can hardly occur freely in all possible localities or environments, both phonetic and phonological (quantal vowels enjoying more freedom of occurrence though). But a close review of literature also reveals a need for a deeper peep into the pattern of Bangla vowel distribution, since many of the important regulators to determine the paradigm have been left out.

This present study aims at filling up that gap by developing an all-inclusive inventory of the regulators that strive to distribute all the vowels grammatically. The prime objective behind the study here is to formulate a complete guideline about Bangla phonotactics and its interaction with the vowel distribution. Before I proceed to investigate all the vowel-distribution regulating factors, let me have a brief introduction to the Bangla vowels and refer to some general notions about both the contextual and positional factors behind vowel distribution already documented.

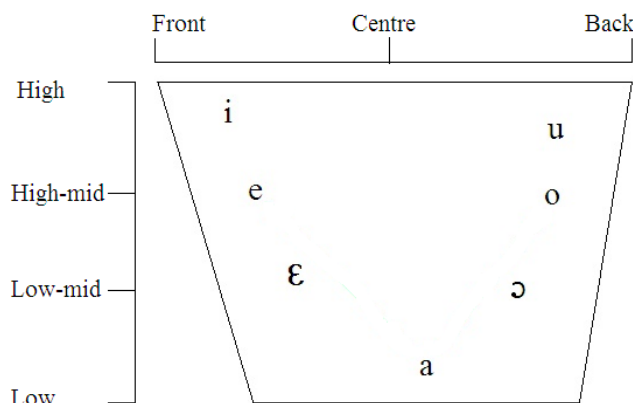
Phonotactics is highly language-specific, not having much to do with its genetic affiliation. Bangla, the sixth largest world language in terms of number of native speakers, according to UNESCO (as reported by BBC), and widely spoken in Bangladesh and Indian states like West Bengal and Tripura (in some parts of Jharkhand and Assam as well), is a member of the Indo-European family of languages. More specifically, it belongs to the eastern branch or Indic group of the Indo-Aryan (IA), and the origin of more than 90% of its lexicons can be traced to their Sanskrit or Prakrit roots (Chatterji 1926, Bhawmik 2003a, 2003b). But Bangla vowel phonology has little to do with all this, since it has its own phonotactics to follow. Neither the inventory nor the phonetic/ phonological structure of Sanskrit vowels has been imported as it were to Bangla. The contrastive/ phonemic length of Sanskrit vowels is never attested in Bangla. In the latter, vowels all being intrinsically short, long Sanskrit vowels /e/ and /o/ (pronounced as /e:/ and /o:/ respectively) have been adopted after shortening. But the back low-mid /ɔ/ and, as predicted by Stevens and his Quantal Theory (1972, 1989),

Paradigm of Vocalic Distribution in Bangla

three short corner vowels /i/, /u/, /a/ have been taken up directly. Later on, the front low-mid vowel /ɛ/ and have been introduced as the latest member in Bangla.

The moderate size vowel inventory of Bangla consists of 7 monophthongs (all short and each having a nasalized allophone), with a sharp preference for the peripheral vowels. From the figure below showing the approximate acoustic targets, this decentralized distribution of the Bangla vowels is quite evident:

Figure 1: Acoustic Distribution of Bangla Monophthongs



Now, a summary of their feature specifications is as follows (Table 1):

Table 1: Bangla Monophthongs with Feature specifications

Features ► (ATR Values) ▼	[-Round]		[+Round]	◀ Features (Height factor) ▼
	[+Coronal]		[+Dorsal]	
	[+Front]	[-Front] [-Back]	[+Back]	
[+ATR]	i		u	[+Low] [-High]
	e		o	
[-ATR]	ɛ		ɔ	
		a		

All three parameters of contrast—high-low, front-back and then the rounded-unrounded—are used here. Significantly, it is only the three back vowels that can be rounded, while the other four are spread vowels. The low-mid vowel /ɔ/ with [-ATR] [-Low] [+Round] values is the default vowel (henceforth DV) in Bangla, since as the syllable peak following the onset it is always unmarked in script.

An environment in which the vowel is to surface refers to the adjacency factor (context) and the weight of the respective prosodic slot (position). Mid-vowels are very context-sensitive as well as position-sensitive. Very often the contextual mid-vowel neutralization comes into being (as exemplified in (1)a.), consequent upon the triggering impact of any of the quantal vowels. More frequently it takes place when the syllable nucleus alternates under the impact of the neighbouring high vowel, illustrated in Figure (2a) and supported by examples in (1) a., less frequently under the low vowel impact, as illustrated in Figure (2b) and supported by examples in (2). But without any such segmental trigger, the positional mid-vowel neutralization occurs predominantly in the non-prominent syllables (*i.e.* even-numbered syllables by default), where the underlying vowel (more often than not the DV) fails to surface, as shown in (1) b.

(1)	Environment	Word	Gloss	Word	Gloss
a.	Contextual Effect (Vowel Height Harmony)	/dek ^h /	'to see'	→ /dek ^h i/	'(I) see'
		/εk/	'one'	→ /ektu/	'a bit'
		/sot/	'honest'	→ /soti/	'chaste woman'
		/col/	'to move'	→ /colti/	'current'
		/lomba/	'tall'	→ /lombu/	'tall guy'
b.	Positional Effect (Vowel Raising)	/εk/	'one'	→ /arek/	'one more'
		/εk/	'one'	→ /ord ^h ek/	'half'
		/p ^h ol/	'fruit'	→ /sop ^h ol/	'successful'
		/k ^h on/	'moment'	→ /kək ^h on/	'when'

While (1b) exhibits, in fact, the effect of prosodic or supra-segmental properties of Bangla, like stress, syllable and mora count on vowel distribution, the former (1a) has been widely discussed and described as ATR harmony (through vowel raising) triggered mostly by regressive vowel harmony (henceforth VH) impact of high vowels according to the following rules:

$$(R1) \quad \varepsilon \rightarrow e / \text{ ___ } CV_{[+High]}$$

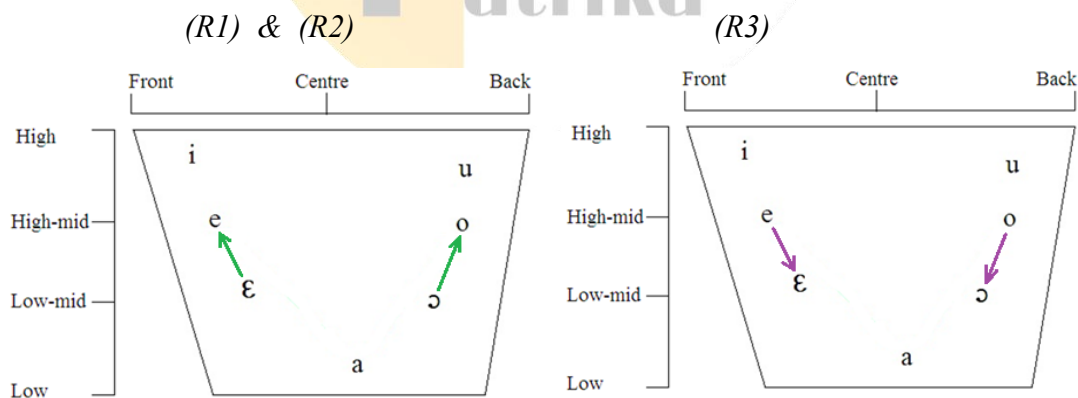
$$(R2) \quad \text{ɔ} \rightarrow o / \text{ ___ } CV_{[+High]}$$

ATR vowel harmony takes place within the phonological word itself, but hardly beyond it. When a high vowel follows, the underlying [-ATR] mid-vowel in the verbal base and also in the monomorphemic word like /ɔdi/ (→/jodi/) or /k^hoti/ (→/k^hoti/) rises one notch to share the [+ATR] feature of the trigger vowel (Figure 2(a) below). Most of the phonologists considered this to be prime source of mid-vowel neutralization. But, as mentioned above, this ATR harmony can be an outcome of vowel lowering too when impacted by the following low /a/ following (R3), illustrated in Figure 2(b) supported by the examples in (2):

$$(R3) \quad e \rightarrow \varepsilon / \text{ ___ } CV_{[+Low]}$$

Figure 2(a): Mid-Vowel Raising:

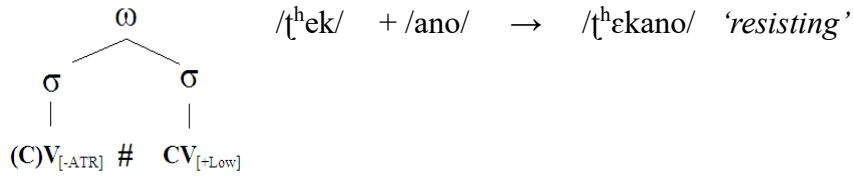
Figure 2(b): Mid-Vowel Lowering:



Let's find some practical supports to this claim with real examples.

(2)	Environment	Word	Suffix	Word	Gloss
Contextual (VH)		/p ^h en/	+ /a/	→ /p ^h ena/	'foam'
		/t ^h el/	+ /a/	→ /t ^h ela/	'pushing'
		/lep/	+ /a/	→ /lepa/	'anointing'
		/sēk/	+ /a/	→ /sēka/	'roasting'
		/bel/	+ /a/	→ /bela/	'rolling'

Paradigm of Vocalic Distribution in Bangla



As already mentioned, each of them never enjoys equal freedom of occurrence in diverse contexts or positions. Now the table below makes it evident how in constituting semantically valid Bangla monosyllables these vocalic members are restricted to certain environments only:

Table 2: Open Monosyllabic word templates in Bangla

	No Coda			
	#V#	#C ₁ V#	#C ₁ C ₂ V #	#C ₁ C ₂ C ₃ V#
/i/		✓	✓	✓
/e/	✓	✓		
/ɛ/		✓ (2)		
/u/		✓	✓	
/o/	✓	✓		
/ɔ/		✓		
/a/		✓		

In Bangla, /ɛ/ occurs only twice in the monosyllabic open context #C₁V# (i.e. /ɟɛ/ 'chord' and /hɛ̃/ 'yes'), and only once in #VC₁# context where there is no onset (i.e. /ɛk/ 'one').

Table 3: Closed Monosyllabic word templates in Bangla

	Simple Coda			Complex Coda ¹
	#VC ₁ #	#C ₁ VC ₂ #	#C ₁ C ₂ VC ₃ #	#{C _n }VC ₁ C ₂ #
/i/	✓	✓	✓	
/e/		✓	✓	
/ɛ/	✓ (1)	✓		
/u/	✓	✓	✓	
/o/	✓	✓	✓	
/ɔ/		✓	✓	✓ (2?)
/a/	✓	✓	✓	

It is also worth mentioning that /gɔŋj/ 'village', /bɔnd^h/ 'strike' and /marg/ 'road' are only loans, and that Bangla attests no complex coda (Kar 2008, Sircar & Nag 2012). Therefore, it comes to the point that low-mid vowels are most constrained in forming peaks in monosyllables with diverse phonological contexts: truly /ɛ/

is, to make a fair comparison, even more so than /ɔ/. But, /i/ is the least context-sensitive, /u/ and /o/ less, /a/ little.

In perfect proportion with the increase in the number of syllables in a word, and with the greater diversities of contexts, the phonological complexities also intensify. Though a monosyllabic domain offers less scope for phonological alternations of vowels, a disyllabic or polysyllabic context does so by virtue of its inherent property of intervocalic interaction across morpheme boundary and somewhat shifting nature of stress depending on syllable weight. A minimal VCV context creating diverse prosodic domains for two syllable peaks necessarily yields scope for intervocalic interaction (that is often phonologized through featural changes) across consonant(s) and contributes to the paradigm of vowel distribution to a great deal.

In Bangla collocative vocalic combination has not been addressed in detail, as Mahanta (2007, 2011) did in Assamese. For disyllables, Bangla strictly adheres to this as its phonotactics, as follows (where (d) stands for ‘derived words only’, and C# for ‘closed second syllable’):

Table 4: Collocative Vowel Combinations in Disyllables

		Second Syllable peak						
		/i/	/e/	/ɛ/	/u/	/o/	/ɔ/	/a/
First Syllable Peak	/i/	✓	✓	✓ (d)	✓	✓	✓	✓
	/e/	✓	✓		✓	✓		✓
	/ɛ/	✓	✓ (d)		✓ (d)	✓		✓
	/u/	✓	✓		✓	✓	✓	✓
	/o/	✓	✓	✓ C#	✓	✓		✓
	/ɔ/	✓	✓ (d)	✓ (d)	✓ (d)	✓		✓
	/a/	✓	✓		✓	✓		✓

The table 4 or 5 shows that, in lexical (pre-affixation form) disyllables low mid-vowels /ɛ/ and /ɔ/ are comparatively stable when surfacing in the first syllable. They are generally absent in the word-final open disyllables, but are available conditionally (*cf.* (10) and § 4.2.2.) in the closed ones (boxed-up symbols indicate this conditionality).

Table 5: Attested Vowel Inventory in Disyllables

In 1 st Syllable of a Disyllable		In 2 nd Syllable of a Disyllable	
Open: (C)V ₁ .σ	Closed: (C)V ₁ C.σ	Open: σ.CV ₁	Closed: σ.CV ₁ C
i u	i u	i u	i u
e o	e o	e o	e o

ε ɔ	ε ɔ		ε ɔ
a	a	a	a

But in the derived disyllables, the underlying low mid-vowels in the root (more specifically the verbal roots) are highly susceptible to the suffix vowel. Then, the context-sensitive vowels /ε/ and /ɔ/ undergo phonological alternation to surface as /e/ and /o/ respectively when followed by a high vowel or even without that (*cf.* § 4)

In fact, vowels participate more in phonological alternations (either as trigger or as target) than the consonants because of their global-local binarity of gestures. But vowels vary greatly in exercising triggering effects or their proneness to such alternations. In fact, apart from some linguistic universals (like the relative stability of corner vowels or vocalic sensitivity to morphology), vowel distribution and licensing restrictions in Bangla depend on, as in any other languages, a set of language-specific rules. Two important typological factors of Bangla relevant here are: (i) it shares the attributes of both syllable-timing and mora-timing languages, and (ii) that it is a VH language (harmony mostly regressive in direction). This amounts to the fact that Bangla vowels are inevitably to behave quite differently, strongly arguing for its own phonotactics.

The strategy to distribute vowels and licensing restrictions are highly language specific. In Bangla, this vocalic distribution strategy depends on different determining factors that can be classified into three — phonetic and phonological (further divided into prosodic and segmental), morphological and lexical. They are as follows:

(3) Phonetic and Phonological Determinant

(a) Prosodic/Supra-segmental:

- (i) Word-stress;
- (ii) Syllable structure and moraic count;
- (iii) Word boundary;

(b) Segmental:

- (iv) Vowel Harmony impact of
[+High] and [+Low] vowels;
- (v) Intervocalic collocation;
- (vi) Quality of onset and coda;

Morphological Determinant

- (vii) Verbal inflection;
- (viii) Morpheme boundary effect;

Lexical Determinant

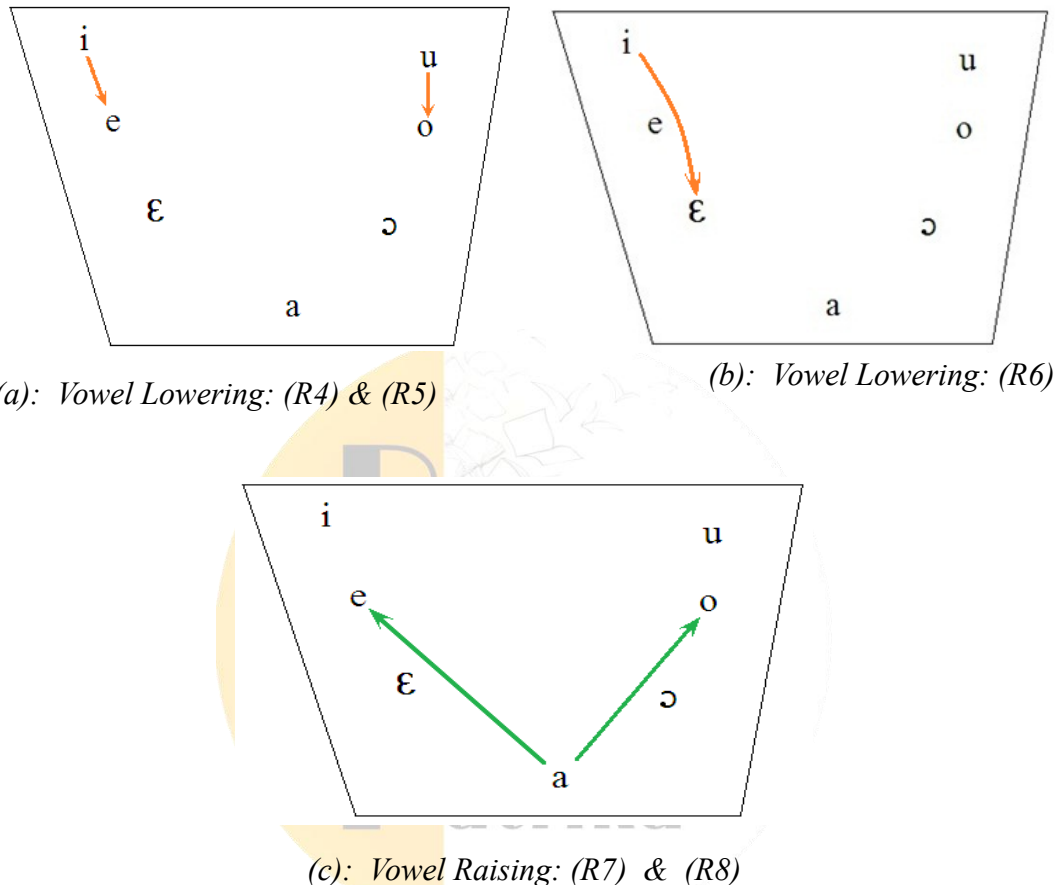
- (ix) Sanskrit borrowings.

The greater stability of quantal vowels makes them sensitive only to the VH impact, and even that was not absolute. But the distributional restrictions on mid-vowels, especially the [-ATR] vowels, result from their high degree of context- and position-sensitivity, as mentioned in (4). However, available literature has concentrated much on the prosodic factors and VH impact, the others being neglected badly.

Bangla vowel alternation pattern validates the claims of Quantal Theory (Stevens 1972, 1989) that, the corner vowels /i/, /u/ and /a/, cross-linguistically very common, have relative acoustic stability. As a result, they are less sensitive to change, and eventually tend to refuse to undergo any kind of phonological alternation. However, on some occasions, they also become the targets and undergo changes, especially when the articulatory gestures for the neighbouring vowels are maximally contrasted (in the minimal $V_1C_nV_2$ context) with the tongue passing from the highest to the lowest, *i.e.* in such environment as $(C)V_{[+High]}C_nV_{[+Low]}$. Either the V_1 comes down (one notch, as in R4 and R5, or rarely two notches, as in R6) or the V_2 is raised one notch (R7 and R8) as a contrast-minimization strategy. It happens according to the rules below illustrated by the Figure 3, and then supported by examples in (4):

- (R4) $i \rightarrow e / \text{ ___ } CV_{[+Low]}$
 (R5) $u \rightarrow o / \text{ ___ } CV_{[+Low]}$
 (R6) $i \rightarrow \varepsilon / \text{ ___ } CV_{[+Low]}$
 (R7) $a \rightarrow e / V_{[+High][+Front]} C \text{ ___ }$
 (R8) $a \rightarrow o / V_{[+High][+Back]} C \text{ ___ }$

Figure 3: Phonological alternation of [+High] and [+Low] Vowels



In (R4), (R5) and (R6) high vowels are lowered mostly regressively in the word.

(4)	<u>Rule</u>	<u>Word/Root</u>	<u>Gloss</u>	<u>Suffix</u>	<u>SF</u>	<u>Gloss</u>
(R4)	/lik ^h /	<i>‘to write’</i>	/-a/	/lek ^h a/	<i>‘writing’</i>	
	/kin/	<i>‘to buy’</i>	/-a/	/kena/	<i>‘buying’</i>	
(R5)	/b ^h ul/	<i>‘to forget’</i>	/-a/	/b ^h ola/	<i>‘forgetting’</i>	
	/bun/	<i>‘to sow’</i>	/-a/	/bona/	<i>‘sowing’</i>	
(R6)	/mil/	<i>‘to meet’</i>	/-a/	/mɛla/	<i>‘fair’</i>	
	/c ^h idrɔ/	<i>‘hole’</i>	/-a/	/c ^h ɛda/	<i>‘hole’</i>	
	/d ^h il/	<i>‘small clod’</i>	/-a/	/d ^h ɛla/	<i>‘clod’</i>	
	/k ^h iptɔ/	<i>‘angry’</i>	/-a/	/k ^h ɛpa/	<i>‘being angry’</i>	

But in (R7) and (R8), low vowel has been raised progressively:

(5)	<u>Rule</u>	<u>Word/Root</u>	<u>Gloss</u>	<u>Suffix</u>	<u>SF</u>	<u>Gloss</u>
	(R7)	/bikal/	'afternoon'	—	/bikel/	(no change)

	/hira/	'diamond'	—	/hire/	(no change)
	/tin/	'three'	/-ʈa/	/tinʈe/	(no change)
(R8)	/tula/	'cotton'	—	/tulo/	(no change)
	/murad/	'guts'	—	/murod/	(no change)
	/dui/	'two'	/-ʈa/	/duʈo/	(no change)

Interestingly in a few verbal derivatives functioning as participle, it can happen either way, e.g. /b^{hi}j/ 'to get drenched' +/-a/ → /b^{he}ja/ (regressive) or (progressively) /b^{hi}je/ 'drenched'. Thus, sometimes, in (C)V₁C_nV₂ context, VH effect disallows certain transconsonantal vowel combination (like [+High]+C_n[+Low]) in disyllables. But I never agree with Sanyal's observation that such combinations can occur only in uncommon words which are only 'lexical exceptions' and mainly proper names (2010: 27). In fact, while in SCB verbal derivatives (as per R4-R5) the rule is near absolute, in nouns (R7-R8) it is not. There are plenty of cases when in the given context harmonized forms are ungrammatical as in (6a.):

(6) a. **Words** **Gloss** **Rule Violated**

/ʃila/	→	*/ʃile/	'rock'	(R7)
/ʃira/	→	*/ʃire/	'vein'	
/nila/	→	*/nile/	'sapphire'	
/bina/	→	*/bine/	'harp'	
/sura/	→	*/suro/	'wine'	(R8)
/tup ^h an/	→	*/tup ^h on/	'storm'	
/gundʌ/	→	*/gundʌ/	'hooligan'	
/kuʈ ^h ar/	→	*/kuʈ ^h or/	'axe'	

Of course, /iC_na/ combination is too commonly attested (obviously more than /u/ + /a/) in disyllables to be called exceptions. It is licensed very systematically when there is an intersyllabic morpheme boundary denoting gender-specificity (6b.), negativity (6c.), portmanteau word/compound formation (6d.) or on condition that the first syllable in the lexicon has a complex onset or coda (6e.) or the second syllable only or both the syllables are heavy (6f.):

- (6)b. /bridd^ha/ → */bridd^he/ 'old lady'
 /mrita/ → */mrite/ 'dead woman'
 /ʃiʃʃa/ → */ʃiʃʃe/ 'female devotee'
 /rikta/ → */rikte/ 'destitute'
- (6)c. /niraʃ/ → */nireʃ/ 'disappointed'
 /birag/ → */bireg/ 'trouble'
 /nik^had/ → */nik^hed/ 'pure'
 /nipaʈ/ → */nipet/ 'simple'
- (6)d. /citkar/ → */citker/ 'shout'
 /dikpal/ → */dikpel/ 'stalwart'
 /nipat/ → */nipet/ 'ruin'
 /ʃriman/ → */ʃrimen/ 'Mr.'
 /d^hikkar/ → */d^hikker/ 'odium'

(6)e.	/spriha/	→	*/sprihe/	'greediness'
	/brit ^h a/	→	*/brit ^h e/	'futile'
	/pliha/	→	*/plihe/	'spleen'
	/kripa/	→	*/kripe/	'kindness'
	/g ^h rina/	→	*/g ^h rine/	'hatred'
	/triḥna/	→	*/triḥne/	'thirst'
	/hikka/	→	*/hikke/	'hick-up'
	/niṣṭ ^h a/	→	*/niṣṭ ^h e/	'devotion'
	/cinta/	→	*/cinte/	'worry'
	/k ^h ilan/	→	*/k ^h ilen/	'arch'

(6)f.	/ṣikar/	→	*/ṣiker/	'hunting'
	/bilap/	→	*/bilep/	'lamentation'
	/bid ^h an/	→	*/bid ^h en/	'law'
	/nistar/	→	*/citker/	'respite'
	/bistar/	→	*/bister/	'expansion'
	/biṣṣas/	→	*/biṣṣes/	'faith'
	/bindas/	→	*/bindes/	'carefree'

However, these three corner vowels are more productive as triggers than as targets, as discussed in the following sections.

The vocalic distribution in Bangla does not follow any straightforward rule other than that, low mid-vowels compared to the other vowels are more constrained and now and then undergo processes of alternation/raising depending on contexts and positions. Many of the complication relate to the facts that (i) SCB is not a tone language (in this case tonal association lines are very weak), and (ii) Bangla shares the attributes of both mora-timed (Faenhdreich 2005) and syllable-timed (Dan 1992, Ghosh 1996) languages.

Mora count is often a decisive factor, e.g. low-mid vowels are attested as the second peak in disyllables only when the syllable is heavy. Bangla words following a trochaic rhythm make the even syllables weaker prosodically. And this weakness is compensated for by this extra mora to accommodate /ε/ and /ɔ/. /ε/ being the longest vowel in Bangla is highly sensitive to the syllable weight, context and positions. It prefers to occur either as the trochaic head without coda, or as the tail with coda, hardly beyond the second syllable in non-derived words. As the head, it is rarely followed by a geminate (/bekk^ha/ 'explanation' being the only instance), since geminates shorten the preceding vowel in Bangla (Lahiri & Hankamer 1988, Bera 2012), or seldom by a coda (except /bes.to/ 'busy').

In the word-initial or other odd syllable the default vowel /ɔ/ would surface as /o/ under the impact of raising effect on compliance with at least one of these three conditions in the disyllabic contexts:

(i) when the following syllable peak is a [+High] vowel (Sanyal 2010). But first vowel /ɔ/ should not be a prefixal element or a prefix itself; and the IC-element is not tri-segmental when the second peak is /i/ or /u/.

(ii) The first vowel, that is underlyingly /ɔ/, is followed by a geminate originating from the Sanskrit word-medial /Cj/ or /Cs/ clusters through gesture simplification. The process involving /Cj/ is so strong that ɔ→o alternation rule overpowers both the syllable boundary effect or the probable lowering impact of the following /a/, e.g. /ɔn.nae/→/on.nae/ 'immorality'.

(iii) The odd syllable must have a complex onset with the liquid /r/ as the second member (e.g. /pro.nam/ 'regards', /pro.t^hom/ 'first', /ṣro.bon/ 'hearing', /ṣroḥ.ta/ 'creator', /b^hroḥ.to/ 'deviated', /droḥ.ta/ 'seer' etc.). The presence of /t/ (even if followed by /r/) in this complex onset of the first syllable deactivates this raising effect (e.g. /troḥ.to/ 'horrified').

Thus, all the seven Bangla monophthongs do not enjoy a uniform liberty to surface anywhere they like. In open or closed monosyllables each and every one of them can figure, but in disyllables or polysyllables many restrictions are put on them, since syllable multiplicity necessarily involves more phonological complications. These result from various constraints, both segmental and supra-segmental.

As a result, in a given situation, a sound can often enjoy a context-induced preference to the other and has thus the license to surface, whereas they may not be attested there. As for examples, the quantal vowels /i/, /u/ and /a/ enjoy more favour than the mid-vowels in Bangla, two front /e/, /ɛ/ and two other back /o/ and /ɔ/.

Both the low-mid vowels occur more freely in the first syllables than in the second, where they are too sensitive to the context or position but for different reasons. While as the second syllable peak sensitivity of /ɛ/ to word-boundary results from its urgency to retain phonetic length (coda is potentially to block any vocalic assimilation or reduction), that of /ɔ/ from its close association with prosody that requires it as the trochaic head.

Thus, with an in-depth analysis and illustrations the discussion above explains how different preservation or alternation strategies work in responses to different contexts and positions in the paradigm of vocalic distribution in Bangla, especially the quantal vowels.

WORD NOTE

1. Phonemic symbols have been used from the IPA chart revised to 2005.

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