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# A PHONOLOGICAL STUDY OF SOME PERSIAN SOUNDS IN BANGLA LOANWORDS

**Dr. TANUSHREE SARKAR**
Assistant Professor (English)
Assistant Professor, Department of English, Koneru Lakshmaiah Education Foundation,
Hyderabad – 500075, Telangana, India
Email: tsarkar81@gmail.com.
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**ABSTRACT**

This paper aims to study the changes that occur in some Persian consonants when borrowed into Bangla. It analyzes both Persian and Bangla phonetics and compares their sound systems. When a foreign word enters a language, some of its sounds may be modified or even deleted to suit the phonology of the borrowing language. This happened with Persian words loaned into Bangla, where some Persian sounds were substituted with similar Bangla sounds or simply deleted. The study used recordings from one native speaker of Persian and one of Bangla. These recordings were analyzed using PRAAT software to examine the articulatory and acoustic features of the target consonants. The analysis found that native Bangla speakers often substitute or delete Persian sounds that are not present in Bangla phonology. This demonstrates how loanword adaptation processes work to make foreign sounds fit within the native sound system.

Keywords: Phonology, Articulation, Loanwords, Bangla, Persian.

## 1. INTRODUCTION

Before the British arrived, Persian ruled the scene: For centuries, Persian held sway as a second language throughout the Indian subcontinent, serving as the cultural and educational bedrock for many Muslim courts. Under the Mughal emperors, it was even crowned the sole official language.

Bengali: A melting pot of linguistic influences: Born in eastern South Asia, Bengali proudly represents the eastern branch of Indo-Aryan languages. Over time, it has embraced a vibrant tapestry of words courtesy of centuries-long encounters with diverse groups like Europeans, Mughals, Arabs, Turks, Persians, and Asians.

Three layers of linguistic borrowing: This rich diversity owes much to three distinct waves of language contact. First, close ties with neighbors led to Bengali adopting words from Hindi, Assamese, and even local Austroasiatic tongues. Then, centuries of invasions from Persia and the Middle East left their mark with an influx of Persian, Arabic, Turkish, and Pashtun vocabulary. Finally, the colonial era painted its own linguistic picture with Portuguese, French, Dutch, and English words joining the Bengali fold.

**1.1 Objectives of the study**

Borrowing words from other languages often leads to adjustments in pronunciation to fit the borrowing language's sound system. This happened with Persian words adopted into Bangla, where some Persian sounds were switched to similar Bangla sounds or simply disappeared.

l explores specific Persian consonants that morphed or vanished when borrowed into Bangla. Using PRAAT software, we'll analyze the acoustic changes these consonants underwent during their journey across languages.

Through this analysis, we aim to understand how sounds adapt and evolve when languages mingle, offering insights into the fascinating process of language borrowing.

**2. PROCEDURE**:

**2.1. Data:** The data consists of 18 words, 9 Persian words in original and their loaned counterparts in Bangla. Some consonants were taken from these words, to account for the changes, acoustically.

**2.2 Speakers:** One native speaker of [i]Persian and one native speaker of Bangla were taken, to produce the words from the data.

**2.3 Instruments used:** For the recordings, the multi-speech and CSL systems, which are windows-based programs, have been used. CSL is a hardware and software system for the acquisition, acoustic analysis,display, and playback of speech signals.

**2.2.4. Analysis:**

The speakers were given handouts of the consonants; Persian speaker was given Persian data, and the Bangla speaker was given Bangla data. The recording was done in the Phonetics Laboratory of The English and Foreign Languages University, using the CSL software.

After the recordings, the recorded sounds were carefully listened, and the words were transcribed. Then the changes were noted.

**3. PERSIAN and BANGLA SOUNDS**

**3.1 Persian sound inventory:**

**3.1.1. Vowels:** In Dari Persian, there are sixteen vowel sounds made up of eight pure vowels and eight vowel glides(dipthongs).

Eight pure vowels are:

1. /i:/-Front close unrounded vowel.

2. /e:/-Front unrounded vowel below half-close position.

3. /ɛ/- Front unrounded vowel above half-open position.

4. /a/- Front unrounded vowel just above open position.

5. /ɒ:/-Back open unrounded vowel.

6. /u/- Back rounded vowel above half-open position.

7. /o:/- Back rounded vowel below half-close position.

8. /u:/- Back rounded vowel close position.

[i] The Persian speaker speaks Dari Persian.

**3.1.2. Consonants:**

Persian has 26 consonants, which are given in a [ii]tabular form below:

| | **Labial** | **Alveolar** | **Palatal o-alveolar** | **Palatal** | **Velar** | **Uvular** | **Glottal** |
|---|---|---|---|---|---|---|---|
| **Nasal** | m | n | | | [ŋ] | | |
| **Plosive** | p b | t d | | | k g | ɢ | [ʔ] |
| **Affr icate** | | | tʃ dʒ | | | | |
| **Fricative** | f v | s z | ʃʒ | | x ɣ | | h |
| **Tap** | | ɾ | | | | | |
| **Trill** | | [r] | | | | | |
| **Approximant** | | l | | j | | | |

**3.2. Bangla sound inventory:**

**3.2.1 Vowels:** Bangla has 8 vowels, which are given in a tabular form:

| Vowels | | | |
|---|---|---|---|
| | Front | Central | Back |
| Close | i | | u |
| Close-mid | e | | o |
| Open-mid | æ | | ɔ |
| Open | | a | ɒ |

**3.2.2: Consonants:** The phonemic inventory of Bangla consists of 29 consonants, which are listed below in a [iii]table:

| **Consonants** | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | **Labial** | **Dental/ Alveolar** | **Retroflex** | **Alveolo -palatal** | **Velar** | **Glottal** |
| **Nasal** | | m | n | | | ŋ | |
| **Plosive/Affricates(**tɕ, tɕʰ,dʑ, dʑʰ) | **voiceless** | p | t̪ | ʈ | tɕ | k | |
| | **aspirated** | pʰ | t̪ʰ | ʈʰ | tɕʰ | kʰ | |
| | **voiced** | b | d̪ | ɖ | dʑ | g | |
| | **aspirated** | bʱ | d̪ʱ | ɖʱ | dʑʱ | gʱ | |
| **Fricative** | | f | | ʂ | ɕ[2] | | ɦ |
| **Approximant** | | | l | | | | |
| **Rhotic** | | | r | ɽ | | | |

**4. LOANWORDS and the TARGET CONSONANTS**

In this paper I will look at some of the consonants of Persian, which changed when incorporated into Bangla vocabulary. These consonants are:

1. /q/ becomes /k/ in the word medial position.

/baqi:/ ->/baki/ ‘remaining’

[ii] The table has been taken from .http://www.wikipaedia.org/.
[iii] The table has been taken from.http://www.wikipaedia.org/, with some changes.

2. ./h/ changes to /ɦ/ in the word initial position.

/hazm/ -> /ɦɒdʑom/'digestion'

3. /x/ becomes /$k^h$/ in the word medial position.

/baxʃɪʃ/ - > /bok$^h$ʃɪʃ/'largesse'

4. /ɣ/becomes /g/ in the word medial position.

/daroɣah/ -> /ɖarogah/ 'police officer'

5. /s/ becomes /ʃ/in the word medial position.

/rɛsi:t/ -> /roʃiɖ/ 'receipt'

6./z/ becomes /dʑ/in the word medial position.

/nɛzar/ -> /nɔdʑor/ 'sight'

7./v/ becomes /b/in the word medial position.

/dʒɛvab/ -> /dʑɒbab/ 'answer'

8. /ʔ/ gets deleted in the word initial position.

/ʔalahi:ɖa/ -> /alaɖa/ 'separate,different'

9./j/ gets deleted in the word medial position.

/dari:ja/ -> /ɖoria/ 'river'

**5. PHONETIC FEATURES:**

In this section we will see the articulatorory and acoustic features of the target consonants.

**5.1 /q/ and /k/**

**5.1.1. /q/- Voiceless uvular plosive**

**a. Ariculatory features:** It is a voiceless sound, which means it is produced without vibrations of the vocal cords and being a plosive, is produced by obstructing airflow in the vocal tract and a sudden release.

In regards to the uvular stop /q/, McCarthy(1994), considers this sound as the emphatic version of /k/. This claim means that /q/ is the only non-coronal emphatic.

**5.1.2. /k/- Voiceless velar plosive**

**Ariculatory features:** It is a voiceless sound, it is produced without vibrations of the vocal cords as the vocal cords are wide apart and being a plosive, is produced by obstructing airflow in the vocal tract and a sudden release. It is articulated when the back of the tongue touches the soft palate.

**5.2. /ʔ/- Glottal stop**

**a. Ariculatory features:** A glottal stop is a speech sound articulated by a momentary, complete closing of the glottis in the back of the throat It is a guttural sound, pronounced rather back in the [iv]buccal cavity.It is termed as a laryngeal sound as it is pronounced in the larynx.

**5.3./h/ and /ɦ/**

**5.3.1. /h/ - Voiceless glottal fricative**

[iv] It marks the beginning of the digestive system. Starting at the lips, it consists of the oral cavity, tongue, jaw, and throat. While digestion is its primary function, it also plays an equally important role in communication, through the development of sounds and speech.

**a. Ariculatory features:** It is a laryngeal sound. Al-Ani (1970) described this sound as an oral voiceless fricative.It has oral configurations, when co-articulated with the neighbouring vowels.

**5.3.2. /ɦ/ - Voiced glottal fricative**

**a) Ariculatory features:** Its ariculatory features are almost same as /h/, except that it is voiced (vocal cords are held closely, air passes with vibrations), unlike /h/.

**5.4. /x/ and /kʰ/**

**5.4.1. /x/ - Voiceless velar fricative**

**a. Ariculatory features:** It is produced by constriction of air flow through a narrow channel at the place of articulation, causing turbulence, without vibration of the vocal cords. It is articulated with the back of the tongue at the soft palate.

**5.4.2. /kʰ/ – Aspirated voiceless velar plosive:**

It has the same articulatory and acoustic features like /k/, but being an aspirated consonant, strong burst of air that accompanies during the release. Aspiration occurs when the vocal cords remain open after a consonant is released.

**5.5 /ɣ/ and /g/**

**5.5.1. [ɣ]- Voiced velar fricative**

**a. Ariculatory features:** It is the voiced conterpart of /x/. Being a voiced sound, there is vibration of the vocal cords, during its production.

**5.5.2. /g/ – Voiced velar plosive.**

**a. Ariculatory features:**

Its ariculatory features are almost same as /k/ (see section 5.4.1.), except that it is voiced (vocal cords are held closely, air passes with vibrations), unlike /k/.

**5.6. /s/ and /ʃ/**

**5.6.1 /s/ – Voiceless alveolar fricative.**

**a. Ariculatory features:** It is articulated with either the tip or the blade of the tongue against the alveolar ridge. It is produced by constriction of air flow through a narrow channel at the place of articulation, causing turbulence, without vibration of the vocal cords.

**5.6.2. /ʃ/ – Voiceless palato-alveolar fricative**

a. Ariculatory features: The tongue touches the palate in producing the sound/ʃ/. It is produced by directing air flow through a groove in the tongue at the place of articulation and directing it over the sharp edge of the teeth, causing high-frequency turbulence.

**5.7. ʒ/ and /dʒ/**

**5.7.1. /z/ - Voiced alveolar fricative**

**a. Ariculatory features:** Its articulation is same like that of /s/, only as it is a voiced sound, therefore the vocal cords vibrate during the articulation.

**5.7.2. /dʒ/ - Voiced alveolo-palatal affricate**

**a. Ariculatory features:** According to D.B. Fry, (1979), "The articulation of an affricate consists in making a complete closure of the vocal tract at some point,and the production of a friction noise at the point where the release occurs".

**5.8. /v/ and /b/**

**5.8.1./v/ - Voiced labiodental fricative**

**a. Ariculatory features:** It is produced by constricting air flow through a narrow channel at the place of articulation, causing turbulence. It is articulated with the lower lips and the upper teeth. There is vibration of the vocal cords.

**5.8.2. /b/ – Voiceless bilabial plosive**

**a. Ariculatory features:** It is produced by obstruction of the airflow in the vocal tract and sudden release. It is articulated with both lips, produced without vibrations of the vocal cords**.**

**5.9./j/ - Voiced palatal approximant**

**Ariculatory features:** It is produced by narrowing the vocal tract at the place of articulation, without turbulence.It is it is articulated with the middle or back part of the tongue raised towards the hard palate. It is produced without vibrations of the vocal cords.

**6. FINDINGS AND CONCLUSION**

The recorded sounds were acoustically analysed with the help of PRAAT (Boersm & Weenink, 2009.The changes that take place in some consonants of Persian, while borrowed into Bangla, were examined.

6.1. /h / becomes /ɦ/ in the word medial position. Acoustic difference between the two sounds has been shown below:

| /hazm/ and /ɦɔdʑom/ | |
|---|---|
| Persian: | Bangla: |
| • Absence of voice bar. | Presence of faint voice bar. |
| • [h] appears as aperiodic noise. | • [ɦ] appears as aperiodic noise. |
| • Very less energy. | • Very less energy. |
| • [h] release from a very low frequency,850 and above. | • release from a very low frequency,850 and above. |

6.2. /x/ becomes /$k^h$/ in the word medial position. Acoustic difference between the two sounds has been shown below:

| /baxʃɪʃ/ and /bok$^h$ʃɪʃ/ | |
|---|---|
| Persian: | Bangla: |
| • Burst of noise, below 850 Hz. | • Burst of noise, 850 Hz and above. |
| • It has a spectral peak that decreases in frequency as the place of articulation approaches from the alveolar region to the glottis, and we can also see additional peaks in the higher part of the spectrum. | • There is a common locus for both F2 and F3 in the preceeding vowel. |
| • More energy is required for the production of [x], than [$k^h$], darker patterns for [x]. | • Less energy is required for the production of [$k^h$], than [x], lighter patterns for [$k^h$]. |

| /daroɣah/ and /ɖarogah/ | |
|---|---|
| Persian: | Bangla: |
| • /ɣ/ release from 550 Hz and above; higher than the /g/ release | • /g/ release from below 550 Hz; much lower than the /ɣ / release |
| • It has a spectral peak that decreases in frequency as the place of articulation approaches from the alveolar region to the glottis, and we can also see additional peaks in the higher part of the spectrum. | • Common locus for F2 & F3 in the following vowel |
| • Presence of a vice bar. | • Presence of a vice bar. |
| | • Less energy is required for the production of /g/ , than [ɣ], lighter patterns for /g/. |

6.4. /s/ becomes /ʃ/ in the word medial position. Acoustic difference between the two sounds has been shown below:

| /rɛsi:t/ and /roʃiɖ/ | |
|---|---|
| Persian: | Bangla: |
| • Noise is centred at a high frequency, 4000Hz and above. | • Noise is centred at a low frequency, extending down to about 2500 Hz. |
| • Gradually, there is an increase in the aperiodic pattern of the sound. | • Gradually, there is an increase in the aperiodic pattern of the sound. |
| • Intense friction. | • Intense friction. |

6.5. /z/ becomes /dʓ/in the word medial position. Acoustic difference between the two sounds has been shown below:

| /nɛzar/ and /nɔdʓor/ | |
|---|---|
| Persian: | Bangla: |
| • Noise is centred at a high frequency, between 4,000 and 5,000 Hz. | • Burst 3500 Hz and above. |
| • Mixture of aperiodicity and priodicity. | • After the burst of noise, we can see that there is gap in pattern of the formants,.Aperiodic sound pattern. |
| • Weak aspiration phase. | • Strong aspiration phase. |
| • Presence of faint voice bar. | • Presence of a voice bar. |

6.6. /v/ becomes /b/in the word medial position. Acoustic difference between the two sounds has been shown below:

| /dʒɛvab/ and /dʓɒbab/ | |
|---|---|
| Persian: | Bangla: |
| • The locus of the second formant transition increases at the beginning,then it goes down into the following vowel. | • Lowering of all the formants in the preceeding and the following vowels. |
| • The third formant in the preceeding and the following vowel show almost steady formant transitions. | • Intensity of [b] burst is low, hardly any evidence of sharp spike. |
| • Faint patterns show less acoustic enrgy. | • Presence of a voice bar. |
| • Presence of a voice bar. | |

6.7./ʔ/ gets deleted in the word initial position. Acoustic difference between the two sounds has been shown below:

| Persian: | Bangla: |
|---|---|
| • Absence of voice bar. | • Deletion of /ʔ/, the word begins with clear formants for /a/. |
| • /ʔ/ appears as glottal pulses, wider than the vowels. | |
| • Very less energy. | |
| • /ʔ/ release from 764 Hz and above. | |

6.8.[j] gets deleted in the word initial position. Acoustic difference between the two sounds has been shown below:

| /dari:ja/ and /d̪oria/ | |
|---|---|
| Persian: | Bangla: |
| There is a glide from the formant disposition for the vowel /i/, towards the formant disposition for a following vowel /a/. | Deletion of /j/. |
| Presence of a faint voice bar. | There are formants for /i/ and /a/, there is no glide. |
| Very low acoustic energy shown by the lighter patterns. | |

**CONCLUSION**

This paper delves into the fascinating sonic transformations that occur when Persian words cross paths with Bangla. Using the powerful tool PRAAT, I unveil how the articulatory and acoustic features of Persian consonants morph to fit the mold of Bangla phonology. PRAAT not only helps capture these acoustic shifts, but also paints a vivid picture of their evolution through graphs and illustrations. Explanations breathing life into these transformations complete the story. While I've shed light on many sound swaps, this linguistic odyssey holds more secrets to be uncovered. Further research promises to unlock a deeper understanding of this captivating dance between languages.

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