Persian-Dutch-French loans in Bangla: An optimality theoretic account

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Borrowing

ABSTRACT

This paper looks at the phonological processes that loanwords undergo and the patterns that emerge when they are adopted from three different languages into Bangla. A constraint-based analysis under the framework of Optimality Theory is used in this work. The source languages examined in this work are: Persian, Dutch and French. In this paper, I observe the phonological processes that take place during Bangla loanword adaptation and find the phonological changes after the processing of the loanwords at the segmental and syllable level. A detailed optimality theoretic analysis is done to account for the syllable level changes; segmental level changes have been accounted briefly. Then, we arrive at a constraint ranking which accounts uniformly for onset as well as coda clusters in the loanwords incorporated into Bangla from Persian, Dutch and French.

1. Introduction

Bangla is a very rich language, because of centuries of borrowing, which has led to the adoption of a wide range of words of Indian and foreign origin. It has borrowed mainly from Sanskrit, Hindi, Chinese, Persian, English, Portuguese, Dutch and French. Therefore, in a language like Bangla, the phenomenon of loanword incorporation is an intriguing object of study.

2. Research Objectives

The paper aims at giving a descriptive and theoretical analysis of the phonological processes that take place during Bangla loanword adaptation and observe the different phonological changes which take place after the processing of the loanwords at the segmental and syllable level. The main objective is to arrive at a constraint ranking which accounts uniformly for onset as well as coda clusters in the

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loanwords incorporated into Bangla from Persian, Dutch and French. This will show that the loanwords are adopted according to the native phonology and not the different languages from which it has been borrowed to the native language.

3. Theoretical background

Loanword adaptation is a common process across languages. And the words which are borrowed into a language, in most of the cases, are not borrowed perfectly, they undergo phonological alterations. During its adaptation, the loanword has to sustain the information of the source language, at the same time it has to suit to the native language phonology (Kenstowicz, 2007). The final result of loanword processes is generally a native form which exhibits nominal changes from its foreign origin, as shown by the findings from various languages (Miao, 2005). According to Silverman (1991), loanword phonology uncovers the processes by which speakers possessing one phonological system perceive, apply native representational constraints on, and ultimately produce forms which have been generated by a different phonological system. The adaptation affects the phonological structure of the borrowing language, and reflects the segmental, phonotactic, suprasegmental and morphophonological restrictions of the borrowing language. In rule-based phonology, loanword adaptations present one oddity: given that foreign words often contain illegal structures that are absent from underlying forms in the native phonology, novel rules should be added to the grammar to deal with their adaptations. This undesirable feature is absent from constraint-based phonology, in which the transformations in loanwords are driven by constraints that are already part of the grammar.

The rise of constraint-based theories has thus given a particularly strong impetus to the study of loanword adaptations, and a steady flow of articles has appeared that analyze loanword adaptations within such output-oriented frameworks (Yip, 1993; Paradis and LaCharité, 2001). Recently, there has been an increasing interest in the study of loanword phonology. One reason for this is that the study of loanwords can provide much insight on phonological systems in general. Loanword phonology involves at least two phonological systems: one in the recipient language and the other in the source language. One benefit from the study of loanword phonology is that hidden language internal constraints in the borrowing language can be uncovered by a unique pattern of loanwords; thus, loanwords can be used as a window for looking at a phonological system of the recipient language (Davis, 1993). Although a number of studies have been carried out on Bangla phonology, very less work has been done in Bangla loanword phonology. The present study is an exclusive and extensive study of loanwords using the Optimality Theory framework.

4. Research Methodology

The data used is mainly from Chatterjee (1926). The phonetic transcriptions is based on the phonological systems of the different languages used for this research.

4.1 Data

<table>
<thead>
<tr>
<th>Loanword</th>
<th>Bangla</th>
<th>‘Gloss’</th>
</tr>
</thead>
<tbody>
<tr>
<td>sæehr</td>
<td>ʃɔhor</td>
<td>‘town’</td>
</tr>
<tr>
<td>resit</td>
<td>rɔʃid</td>
<td>‘receipt’</td>
</tr>
<tr>
<td>xɔɣos</td>
<td>kʰɔɾɡoʃ</td>
<td>‘rabbit’</td>
</tr>
<tr>
<td>zəmin</td>
<td>ʒɔmin</td>
<td>‘land’</td>
</tr>
<tr>
<td>nəzər</td>
<td>nəʒɔr</td>
<td>‘sight’</td>
</tr>
</tbody>
</table>
5. Discussions

5.1. Phonological Changes

Lexical borrowing is a common process across languages. And the words which are borrowed into a language, in most of the cases, are not borrowed perfectly, they undergo phonological alterations. A close look at the borrowed words in Bangla shows both the neutralization processes: namely, adaptation and deletion put forth by Paradis and LaCharite (2001). While some sounds are deleted, others are replaced by sounds that are frequently used in Bangla. The process of epenthesis is very dominant at the syllable level. In order to account for the different phonological changes during loanword adaptation, we will divide the changes into two levels: Segmental Level and Syllable Level.

5.1.1. Segmental Level

At the segmental level we will see the phonological changes that the loaned consonants undergo in the onset and coda positions. There are two types of processes involved in these changes, they are
5.1.1.1 Substitution
1. +Continuant /f, v, x, ɣ/ become –continuant /p, pʰ, kʰ, g/ sounds.
2. –Distributed /s, z, t, d/ become +distributed /ʃ, ʃ, t, d/ sounds.
3. +Anterior /s, z/ become -anterior /ʃ, ʃ/ sounds.
4. In dorsal sounds, -high /q/ becomes +high /k/ sound.
5. –Round /ɻ/ becomes +round /t/ sound.

5.1.1.2. Deletion
1. /h/ gets deleted in the coda.

5.1.2. Syllable level

5.1.2.1. Epenthesis
Vowels are inserted inside, before and after consonant clusters both in onset and coda positions.

5.1.2.2. Deletion
Deletion of /h/ in the coda and /ʔ/ in the onset position.

5.1.2.3. Gemination
Gemination takes place mainly in the coda of the first syllable, which is usually the stressed syllable.

5.2. Optimality - Theoretic Analysis

5.2.1. Optimality Theory
The analysis of loanword adaptation has received substantial attention in the literature of phonology by opening copious avenues in the sphere of linguistic research. Among different approaches applied in this attempt, optimality theory, which was originally proposed by the linguists Prince and Smolensky (1993), and later expanded by Prince and John J. McCarthy, is one of the most important and powerful methodologies in recent years.

5.2.1. Analysis

5.2.1.1. Syllable Level OT Analysis
Nagarajan (2012), has given a detailed OT analysis of the loanwords from Sanskrit, English, Portuguese into Bangla at the syllable level. We will be taking the same constraints along with some other, for our analysis of Persian, Dutch and French loans.

5.2.1.1.1. Onset Consonant Clusters
According to Yavas (2003), Bangla does not allow consonant clusters at the onset position. Let us take the Dutch word, /trol/ which becomes /tu.rup/ in Bangla. The vowel /u/ gets inserted between the consonant cluster /tr/. The monosyllabic word changes to disyllabic. In order to provide an explanation, we require the same constraints.

Explanation through OT Tableau (1)

<table>
<thead>
<tr>
<th></th>
<th>COMPLEXONS</th>
<th>SYL CONTACT LAW</th>
<th>Disyllabic Trochee</th>
<th>CONTIGUITY</th>
<th>MAX-IO</th>
<th>DEP-IO</th>
</tr>
</thead>
<tbody>
<tr>
<td>/trol/</td>
<td>!a. /tu.rup/</td>
<td></td>
<td></td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>b. /trol/</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>c. /tʃ.rup/</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Here we see, because of *COMPLEXONS, candidate (b) is restricted. Candidate (c) violates SYLCONTACT LAW, hence is not allowed in the language. Candidate (a), on violating the lower ranked constraint CONTIGUITY becomes the optimal candidate.

5.2.1.1.2. Coda Consonant Clusters

Kar (2010), says that native Bangla lexicon does not contain any word having a consonant cluster. Masica (1991) claims that even borrowed words in Bangla do not allow consonant clusters at the word final position. But Kar argues that “…..a few of that sort are indeed present in the B-lexicon. The only cases of such clusters are found in OB cases

5.2.1.1.2.1. Vowel Epenthesis (Inside the cluster)

When there is rise in sonority, insertion takes place inside the consonant cluster.

Now take the Persian word /xəbr/ which becomes /kʰɔ.bor/ in Bangla. There is vowel insertion between /br/. The vowel /ɘ/ is added between the consonant clusters, breaking the monosyllabic word into disyllabic word. In order to give an explanation for this we will be using the same constraints which we used earlier.

Explanations through OT Tableau (2)

<table>
<thead>
<tr>
<th>/xəbr/</th>
<th>*COMPLEXCODA</th>
<th>SYLCONTACT LAW</th>
<th>Disyllabic Trochee</th>
<th>MAX-IO</th>
<th>DEP-IO</th>
</tr>
</thead>
<tbody>
<tr>
<td>¬a. /kʰɔ.bor/</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. /xəbr/</td>
<td>*!</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. /kʰɔb.ro/</td>
<td>*!</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Here, the constraint *COMPLEXCOD ban candidate (b) from becoming the optimal candidate. Candidate (c) is not allowed as it violates a high ranked constraint SYLCONTACT LAW (/r/ is more sonorous than /b/). Therefore, candidate (a), wins and becomes the optimal candidate.

So, far we have seen that when there is a rise in sonority, insertion takes place between the consonants. But there is an exception, /mury/ → /morog/. The Persian word /mury/ becomes /morog/ in Bangla. There is vowel insertion between /ry/. The vowel /ɔ/ is added between the consonant clusters, breaking the monosyllabic word into a disyllabic word. We know that /r/ is more sonorous than /ɣ/, still insertion takes place inside the CC. There is no violation of SYLCONTACT LAW as /r/ in the coda is more sonorous than /g/ in the onset of the following syllable. So, what forces epenthesis in between /r and /g/? In order to give an explanation for this we will establish the constraint ALIGN-R, apart from the earlier constraints.

Explanations through OT Tableau (3)

<table>
<thead>
<tr>
<th>/mury/</th>
<th>*COMPLEXCODA</th>
<th>SYLCONTACT LAW</th>
<th>ALIGN-R</th>
<th>Disyllabic Trochee</th>
<th>MAX-IO</th>
<th>DEP-IO</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. /mury/</td>
<td>*!</td>
<td></td>
<td>*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>¬b. /mo.rog/</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. /mor.go/</td>
<td>*!</td>
<td></td>
<td>*</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Here, the constraint *COMPLEXCOD restricts candidate (a) from becoming the optimal candidate. We see that both candidate (a) and (c), do not violate the constraint SYLCONTACT LAW. In order to avoid (c), from becoming the optimal candidate, ALIGN-R is introduced, and is ranked before Disyllabic Trochee. Candidate (c) violates ALIGN-R, which leads to the emergence of candidate (b) as
the optimal one (it violates lower ranked constraint DEP-IO only).

To sum up, we note that the following constraint ranking which we have proposed, will account uniformly for onset as well as coda clusters in the loanwords incorporated into Bangla.

\[ *\text{COMPLEXCODA} >> *\text{COMPLEXONS} >> \text{SYLCONTACT LAW} >> \text{ALIGN-R} >> \text{Disyllabic Trochee} >> \text{CONTIGUITY} >> \text{MAX-IO} >> \text{DEP-IO} \]

5.2.1.3. Other phonological changes

5.2.1.3.1. Gemination

Consider the Persian word, /ʔɘ.ql/ which changes to /akkel/. We can see that the sound in the coda /q/ becomes /k/ and is geminated with the addition of another /k/. A vowel /e/ is also inserted between the second /k/ and /l/. To account for this, we need the *COMPLEXCODA constraints, as it comes under coda consonant cluster. Sonority is a key factor for the process of gemination, therefore we have SYLCONTACT LAW, along with Disyllabic Trochee, MAX-IO and DEP-IO.

**Explanation through OT Tableau (4)**

<table>
<thead>
<tr>
<th>/ʔəql/</th>
<th>*COMPLEXCODA</th>
<th>SYLCONTACT LAW</th>
<th>Disyllabic Trochee</th>
<th>MAX-IO</th>
<th>DEP-IO</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. /ʔəql/</td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. /ak.kel/</td>
<td></td>
<td></td>
<td></td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>c. /a.ke.le/</td>
<td></td>
<td>*!</td>
<td></td>
<td>*</td>
<td>**</td>
</tr>
<tr>
<td>d. /a.kel/</td>
<td></td>
<td></td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. /ak.le/</td>
<td></td>
<td>*!</td>
<td></td>
<td>**</td>
<td>*</td>
</tr>
</tbody>
</table>

We see that *COMPLEXCODA restricts candidate (a), Disyllabic Trochee bans candidate (c) and SYLCONTACT LAW prohibits candidate (e). MAX-IO is violated by candidates (b) and (d) once, so both emerge as optimal candidates. But, (d) is not allowed in the native language. So, candidate (b) becomes the optimal one.

5.2.1.3.2. Absence of /h/ in the coda

If we observe the data carefully, we can see that the native language doesn’t allow /h/ in the coda position. /h/ is very much present in the onset position but not in the coda. When any word having /h/, is borrowed from foreign source into native Bangla, either it is simply dropped or insertion takes place, which forces /h/ to shift from the coda position to the onset position of the following syllable.

Now take the Persian word /meh.ʃu:l/ which becomes /ma.ʃu:l/ when borrowed into Bangla. We see that /h/ gets deleted in the coda. In order to account for this, we will take the following constraints:

**Explanation through OT Tableau (5)**

| /meh.ʃu:l/ | *h|σ | SYLCONTACT LAW | Disyllabic Trochee | MAX-IO | DEP-IO |
|-------------|----------------|----------------|--------------------|--------|--------|
| a. /meh.ʃu:l/ | *! | | | |
| b. /ma.ʃu:l/ | | | | * |
| c. /ma.ʃi.ʃu:l/ | | *! | | |

It is observed that the very high ranked constraint *h|σ bans candidate (a) from becoming the optimal candidate. Candidate (c) violates the constraint Disyllabic Trochee, hence is not allowed. Candidate (b), on violating a lower ranked constraint MAX-IO, becomes the optimal candidate.
5.2.1.2. Segmental Level OT Analysis

It appears to be like the emergence of the unmarked as more marked sounds change to less marked ones. Such changes have been noted in language acquisition as well.

Take the Persian word /nirx/ which changes to /nirikʰ/. We see that /x/ (+cont) → /kʰ/ (-cont).

In native Bangla, the only +continuant sounds are /ʃ/, /r/, /l/ and /h/. It doesn’t have the above mentioned [+continuant] sounds, so it substitutes them with closest sound. Here, we can see that the place of articulation remains the same (velar), the manner of articulation changes. In this example, the becomes stop. So, we require the constraints *+cont, IDENT-PLACE and IDENT-MANNER.

Explanation through OT Tableau (6)

<table>
<thead>
<tr>
<th>/nirx/</th>
<th>*+cont</th>
<th>IDENT-PLACE</th>
<th>IDENT-MANNER</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. /nirikʰ/</td>
<td></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>b. /nirx/</td>
<td>*!</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

We can see that candidate (b) violates a very high ranked constraint, *+cont. Therefore, it is not allowed in the native language. Candidate (a), on violating lower ranked constraint IDENT-MANNER, becomes the optimal one.

Take the Dutch word /trof/ which becomes /t urup/. We observe that /t/ (-distr) → /f/ (+distr).

In native Bangla, there are few [–distributed] sounds, but the above mentioned sounds are not present. Therefore, it substitutes them with the closest sound. Here, we can see that the place of articulation remains the same (alveolar), the manner of articulation changes. In this example, the alveolar becomes dental. So, we require the constraints *-distr, IDENT-PLACE and IDENT-MANNER.

Explanation through OT Tableau (7)

<table>
<thead>
<tr>
<th>/trof/</th>
<th>*-distr</th>
<th>IDENT-PLACE</th>
<th>IDENT-MANNER</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. /t urup/</td>
<td></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>b. /trof/</td>
<td>*!</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

We can see that candidate (b) violates a very high ranked constraint, *-distr. Therefore, it is not allowed in the native language. Candidate (a), on violating lower ranked constraint IDENT-MANNER, becomes the optimal one.

Take the Persian word /sæhr/ which changes to /ʃɔhɔr/. We see that /s/ (+ant) → /ʃ/ (-ant).

In native Bangla, the only [+anterior] sounds are /p/, /b/, /m/, /n/ and /l/. It doesn’t have the above mentioned +anterior sounds, so it substitutes them with closest sound. Here, we can see that the manner of articulation remains the same (fricative), the place of articulation changes from alveolar to post-alveolar. So, we require the constraints *+ant, IDENT-MANNER and IDENT-PLACE.

Explanation through OT Tableau (8)

<table>
<thead>
<tr>
<th>/sæhr/</th>
<th>*+ant</th>
<th>IDENT-MANNER</th>
<th>IDENT-PLACE</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. /ʃɔhɔr/</td>
<td></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>b. /sæhr/</td>
<td>*!</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
We can see that candidate (b) violates a very high ranked constraint, *+ant. Therefore, it is restricted in the native language. Candidate (a), on violating lower ranked constraint IDENT-PLACE, becomes the optimal one.

Take the Persian word /baqi/ which becomes /baki/. We observe that /q/ (+dorsal -high) \(\rightarrow\) /k/(+dorsal+high).

In native Bangla, /q/ is not present. Therefore, it substitutes the /q/ sound with the closest sound /k/.

Here, we can see that the place of articulation changes (uvular \(\rightarrow\) velar), the manner of articulation remains the same (stop). So, we require the constraints *+dorsal-high, IDENT-PLACE and IDENT-MANNER.

**Explanation through OT Tableau (9)**

<table>
<thead>
<tr>
<th>/baqi/</th>
<th>*+dorsal-high</th>
<th>IDENT-PLACE</th>
<th>IDENT-MANNER</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. /baki/</td>
<td></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>b. /baqi/</td>
<td>*!</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

We can see that candidate (b) violates a very high ranked constraint, *+dorsal-high. Therefore, it is not allowed in the native language. Candidate (a), on violating lower ranked constraint IDENT-MANNER, becomes the optimal one.

Apart from the above mentioned segmental changes, we also see that –Round /u/ becomes +round /r/ sound in French loans, as this sound is not there in the native Bangla sound inventory. Here also Markedness principles operate. Native Bangla substitute this sound with closest replacement /r/.

**6. Conclusion**

A study of loanwords from languages like Persian, Dutch and French into native Bangla shows the influence of native phonology at the segmental and syllable level. The phonological changes are summarized as follows:

1. Epenthesis is the favoured option to avoid onset clusters. The site of epenthesis is however, determined by the interplay of the constraints SYLCONTACT LAW and CONTIGUITY.

2. Coda clusters, which are disallowed in the Native Bangla, are again repaired by a rule of epenthesis.

3. Apart from epenthesis, the other repair strategies used in Bangla are a) deletion, b) deletion leading to gemination.

4. Intolerance of /h/ in the coda position of the syllable and repair strategies to avoid this.

5. At the segmental level, sounds which are not found in native phonology are avoided. For example, +continuant /f, v, x, y/ become –continuant /p, pʰ, kʰ, g/ sounds, –distributed /s, z, zᵢt, d/ become +distributed /ʃ, ɹ, c, t, d/ sounds, +anterior /s, z/ become -anterior /ʃ, ɹ/ sounds, and -round /u/ becomes +round /r/ sound. Instead of an isolated set of rules, this paper has attempted to bring all these phonological changes (syllable and segmental level) under the broad canvas of Optimality Theory using universal constraints, which are ranked according to Bangla native phonology.

**Bibliography**


