The phonology of Iranian-Balochi dialects : description and analysis

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Title: The phonology of Iranian-Balochi dialects : description and analysis
Issue Date: 2017-05-18

Chapter (5)

Phonological Interface in Iranian-Balochi Dialects

The primary stress in IBDs as discussed in the chapter (3) falls on the final heavy syllable of word such as *hændaː́n* 'I laugh', but in the negative form of the verbs the first light syllable attracts the primary stress like in *nǽhændaːn* (for more examples see chapter 3.3). As we can see the attachment of the prefix *næ* has the effect that the location of the main word stress shifts leftwards, to the first light syllable of the negative form of the verb. This suggests that morphological structure may play a role in determining the phonological from of the complex word. In this chapter I will concentrate in on the issue of how morphological structure plays a role in computing the phonological form of a word. It means that phonology is sensitive to the morphological structure of the word. Further, phonological properties of words may also play a role in selecting an affix with which it can combine. In other words, phonological structure of the word conditions the allomorph selection. The Sarawani Balochi prefix *p-* (the imperative marker), for instance, can only be attached to verbs that starts with a voiceless consonant as in *p-tʃaːr* 'look!', but not *p-gu:* 'say!'. These kinds of interaction between phonology and morphology in IBDs like in many other languages show that there must be an interface between the phonology and the morphological structure of words.

This chapter is organized as follows. Section 5.1 will discuss the type of partial reduplication in IBDs which is known as reduplication with fixed segmentism (in IBDs, I call it "m/p reduplication"). First we look into the segmental and prosodic identity of both reduplicant and the base, and then we continue our analysis in the framework of OT. Section 5.2 will focus on the root- affix asymmetries in IBDs; both segmental and suprasegmental (syllable structure) asymmetries of root and affixes will be shown and the relevant tableaux will be given. Finally, section 5.3 will be dedicated to two phenomena, namely the imperative form of the verb and past stem in IBDs, in which the phonology has a role in selecting the affixes.

5.1 Reduplication with fixed-segmentism in IBDs

Augmentative reduplication with fixed segmentism requires copying of the base elements coupled with introducing a fixed segment. The added segment is an affix that is realized simultaneously with the reduplicative copy, and overwrites a portion of the reduplicant (McCarthy and Prince 1986, 1990).

Augmentative reduplication with fixed segmentism in IBDs, as in other languages with this phenomenon, and among various reduplicative patterns (cf.

Moradi, 2012), is an example of rhyming patterns. I refer to this kind of reduplication in IBDs as m/p- reduplication, which illustrates the most productive type of reduplication in these dialects as shown in following data.

(1) IBDs *m*/*p*- Reduplication

	Base		Reduplicative form	
a.i	*bætʃæk*	‘boy’	*bætʃækmætʃæk*	‘boy and so forth’
a.ii	*gʊk*	‘cow’	*gʊkmʊk*	‘cow and so forth’
a.iii	*muːd*	‘hair’	*muːdpuːd*	‘hair and so forth’

Reduplication refers to a word formation process that can result in an identical copy of the base, or not (Urbanczyk, 2007:474). In addition to being composed of segments from the base, reduplication can also contain fixed segments. Following the work of McCarthy and Prince (1986, 1990), Alderete et al. (1999) argue that there are two distinctive types of reduplication with fixed segmentism: default segmentism and melodic overwriting. In the former a default segment is phonologically motivated and it is generally the least marked and also frequently the epenthetic segment of a language.

On the other hand, following McCarthy and Prince (1986, 1990) and Yip (1992), Alderete et al. (1999) have discussed that the overwriting string is an affixal morpheme which is relatively the marked segment that replaces segments from the base, as with the *schm*-reduplication pattern in English: *table*-*schmable*. Moreover, Alderete et al. (1999:357) illustrate the properties of morphological fixed segmentism based on affixation as follows:

a) Faithfulness: fixed segments may form marked structure and be in contrast with other fixed segments.
b) Alignment: fixed segments may be left-aligned, right-aligned or infixed.
c) Context-sensitivity: fixed segments may alternate by suppletion or allomorphy.

Display (2) provides more examples of the augmentative reduplication forms in IBDs, which highlights frequency, size or intensity. In IBDs, the overwriting morpheme is generally *m*-that overwriting morpheme can, however, alternate by suppletion or allomorphy just like other affixes. So, IBDs select the alternant *p*- when the word already starts with *m*- , as in the forms in 2(II):

(2) m/p-augmentative reduplication

(I)	Base		Reduplicative form		
	a.i	*tʃokk*	‘child’	*tʃokkmokk*	‘child and so forth’
	a.ii	*kotʃæk*	‘dog’	*kotʃækmotʃæk*	‘dog and so forth;
	a.iii	*kæt*	‘room’	*kætmæt*	‘room and so forth’
(II)	Base		Reduplicative form		
	a.i	*moʃk*	‘mouse’	*moʃkpoʃk*	‘mouse and so forth’
	a.ii	*muer*	‘ant’	*muerpuer*	‘ant and so forth’
	a.iii	*muːd*	‘hair’	*muːdpuːd*	‘hair and so forth’

5.1.1 IBDs reduplication in optimality theory

As the data in (2 I-II) show, the overwriting morpheme contains *m*- or *p*- as a prefix. Moreover, the reduplicant is a suffix. Within OT, Generalized Alignment (McCarthy and Prince 1993a, cited in Ussishkin 2007:458) provides a framework for analyzing morpheme position. So, the following two constraints impose alignment restrictions on the affixal morpheme and the reduplicant respectively:

(3) ALIGN-L (*m*/*p*-, RED)
The right edge of *m*/*p*- is aligned to the left edge of a reduplicant.

(4) ALIGN-R (RED, BASE)

The left edge of the reduplicant is aligned to the right edge of a base.

Based on our explanations given so far, it is clear that the prefix m/p- precedes the reduplicant, in other words, it affects the reduplicant and not the base. Therefore, the presence of an overwriting morpheme indicates that faithfulness to overwriting morpheme has taken precedence, through ranking, over base-reduplicant (BR) faithfulness constraint. A constraint forcing the realization of affix material is known as FAITH-AFFIX (Ussishkin 2007:467).

(5) FAITH-AFFIX
Every affixal morpheme in the input has to show up in the output.

(6) MAX-BR
Every element of Base has a correspondent in Reduplicant.
(‘No partial reduplication’)

(7) MAX-IO
Input segment must have output correspondence.
(No deletion)

Tableau (9) shows the effect of high-ranking FAITH-AFFIX in forming the *m*-reduplicant form from the base like in *gʊkmʊk* 'cow and the like'.

(8) FAITH-AFFIX>> MAX-IO>> MAX-BR, ALIGN-L (*m*-, RED), ALIGN-R (RED, BASE)

Tableau (9) Forming *m*-reduplicant from the base

/mm/g/gʊk-m-RED/	FAITH-AFFIX	MAX-IO	MAX-BR	ALIGN-L (*m*,RED)	ALIGN-R (RED,BASE)
a.☞gʊk-mʊk			*		
b. gʊk-gʊk	*W	*W	L	*W	
c. mʊk-gʊk		*W	*		*W
d. mʊk-mʊk		*W	L	*W	

The optimal candidate [gʊk-mʊk], incurs a violation of MAX-BR while it satisfies other constraints. A candidate such as *mʊk-gʊk*, which faithfully realizes the input affix *m*-, is eliminated due to its violation of MAX-IO and MAX-BR, which are against deletion and this candidate does not achieve perfect alignment of the base to the right edge as well.

In the case of *p*-reduplication in examples (2 II), p- is an alternant of the overwriting affix when the word already starts with m-.Therefore; the output like muːd-mmuːd is ungrammatical, since it violates the Obligatory Contour Principle (OCP). But, why is p- an alternate affix and not other segments like b- or even t- (since coronals are universally less marked)? To find an ansir for this kind of question and to make an analysis for p- reduplication in IBDs based on OT, I should introduce the concept of Sonority Sequencing Generalization (SSG) based on Zec (2007).

Zec (2007:187) states the Sonority Sequencing Generalization based on Selkirk (1984a:116) as follows:

(10) *‘Sonority Sequencing Generalization (SSG*)

For every pair of segments *s* and *z* in a syllable, *s* is less sonorous than *z* if
a) (i) *s* < *z*< Nucleus
or (ii) Nucleus > *z* > *s*
or b) (i) *s* < *z* and *z* is the nucleus
or (ii) *z* > *s* and *z* is the nucleus’

Moreover, some restrictions may impose on the rise or fall in sonority that go beyond the minimal requirements of SSG by constraints on sonority distance. Prince and Smolensly‘s (2004) natural hierarchy of margins is based on these constraints on sonority distance. The best margins are obstruent folloid by nasal and liquids. The hierarchy of onsets based on Prince and Smolensky (2004) is as follows (as cited in Zec, 2007:188):

(11) *ONS/L >> *ONS/N >> *ONS/O

This hierarchy illustrates that the preference for onset is the loist sonorous segments, so the least marked onsets are obstruent, and the most marked onsets are liquids.

In addition, the unmarked value for the feature [voice] in obstruent is [-voice], as stated in Voice Obstruent Prohibition (Kager, 1999: 40), which is accompanied with the other two constraints relevant to the p-reduplication pattern.

Now, it will be clear why the optimal reduplicant candidate for the input like *muːd* is *muːdpuːd*. First, as Prince and Smolensky’s (2004) hierarchy of onset yields an obstruent is the least marked segment, and [-voice] is the unmarked value in obstruents. Second, the presence of an alternation overwriting affix *p*- indicates that the labiality faithfulness constraint needs to be in our constraint ranking. In sum, the following relevant constraints should be considered for *p*-reduplication based on OT:

(12) OCP
At the melodic level, adjacent identical elements are not allowed.

(13) *ONS/N
Word-initial syllables may not begin with nasal.

(14) VOP
*[+ voice, -son]
No obstruent must be voiced.

(15) IDENT-BR (lab)
Correspondent onsets are identical in their specification for bilabiality.

The FAITH-AFFIX and MAX-BR as stated earlier are accompanied by the other four constraints introduced above; they are ranked in the following way in forming *p*-reduplicant from the base:

(16) OCP>>FAITH-AFFIX>>MAX-IO>>*ONS/N>>MAX-BR>>VOP, IDENT-BR (lab)

Tableau (17) Forming the *p-reduplicant* from the case

/muːd-RED-m/	OCP	FAITH-AFFIX	MAX-IO	*ONS/N	MAX-BR	VOP	IDENT-BR (lab)
☞ a. muːd-puːd			*	*	*		
b. muːd-muːd			*	**W	*		
c. muːd-mmuːd	*W			***W			
d. muːd-buːd			*	*	*	*W	
e. muːd-tuːd			*	*	*		*W

In this tableau, the optimal candidate from input /muːd-RED-m/ is [muːd-puːd], with the same place of articulation to affix *m-*. Although it violates *ONS/N (since the base onset is a bilabial nasal [m]), that candidate is optimal because it avoids the violation of IDENT-BR(lab) , as shown by the comparison with suboptimal candidate [muːd-tuːd] in (17e), and also it avoids violation of VOP, as shown by the comparison with the suboptimal candidate [muːd-buːd] in (17d).

5.2 Root- affix asymmetries in IBDs

Roman Jakobson (1965) observes that affixes and roots show asymmetric patterning; in fact affixes and particularly inflectional affixes have selected and limited set of phonemes in comparing with roots. Moreover, Jakobson believes that more marked segments are absent in affixes (Bybee2005:166). That issue can be explained by the grammaticalization theory as proposed by Hopper & Traugott (2003). Based on this theory, the phonological segments in affixes are more reduced phonologically and they are less marked. Furthermore, Bybee (2005) believes that segments in affixes are less complex and not necessarily less marked.

Moreover, Bybee (2005: 172-173) presents four possible formulations of Jakobson’s hypotheses which concern the number of phonemes, the degree of markedness and notion of complexity and systematic absence of the set of phonemes in affixes comparing as below:

"Hypothesis 1: The number of distinct phonemes used in the inflectional verbal affixes of a language is smaller than the number that could be expected to occur by chance.

Hypothesis 2: The phonemes that occur in affixes tend to be the less marked segments of the phoneme inventory.

Hypothesis 3: The phonemes that occur in affixes tend to be the less complex segments of the phoneme inventory."

Hypothesis 4: The phonemes absent from affixes form systematic sets."

In this section the inflectional and derivation affixes in IBDs will be introduced respectively and these four discussed hypotheses will be attested against the Balochi data.

First consider the inflectional affixes in IBDs as given in table (18):

(18) List of inflectional affixes in IBDs

Form	Label	Dialect	example	
b-	subjective marker	MB, SB, LB	*bgu*	'tell!'
p-	subjective marker	SB, LB	*ptʃaːr*	'look!
mæ-	prohibitive marker	MSB, SB, LB	*mæwaːr*	'Do not eat!'
næ-	negative marker	MSB, SB, LB	*næwaːnton*	'I do not read'
-aːn	plural marker	MSB, SB, LB	*dræhtaːn*	'trees'
-ter	comparative marker	MSB, SB, LB	*wæʃʃter*	'better, nicer'
-terin	superlative marker	SB	*wæʃʃterin*	'best, nicest'
terien	superlative marker	SM	*zænɖterien*	'best'
teriən	superlative marker	LB	*selteriən*	'worst'
-aːn /on	verbal ending 1SG (present and Past tense)	MSB, SB, LB	*ræwaːn* *waːpton*	' I go' 'I slept'
-ej	verbal ending 2SG (presen and past tense)	SB	*ræij* *waːptej*	'you go' 'you slept'
-iːn	verbal ending 1PL (present and past tense)	MSB, SB, LB	*ræwiːn* *waːptiːn*	'I go' 'I slept
-iːt	verbal ending 2PL (present and past tense)	MSB, SB, LB	*ræwiːt* *waːptiːt*	'you go' 'you slept'
-ent	verbal ending 3PL (present and past tense)	MSB, SB, LB	*ræint* *waːptent*	'they go' 'they slept'

As to the inflectional affixes listed above, it seems that IBDs excludes more consonants in inflectional affixes. To see whether this exclusion is random or not, consider the consonant inventory of IBDs as listed in table (19) with the consonants not used in inflectional affixes in parenthesis.

Table (19) inventory of IBDs, with consonants not used in affixes in parenthesis

	labial	alveodental	alveolar	postalveolar	retroflex	velar	uvular	glottal
plosive	p b	(t) (d)			(ʈ) (ɖ)	(k)(g)		(ʔ)
fricative			(s) (z)	(ʃ) (ʒ)		(ɣ)	(χ)	(h)
affricate				(tʃ) (dʒ)				
nasal	m		n					
Central approximant	(w)		r		(ɻ)	(j)		
Lateral approximant			l					

Based on table (19), it seems that IBDs exclude more consonants, and these exclusions appear not random, but patterned (it can be any natural class of sound). This could be defined by manner of articulation, place of articulation, voicing, or airstream mechanism (Bybee, 2002:178). Now consider the patterned exclusion in IBDs:

(a) IBDs have no fricatives and affricates in affixes.

(b) IBDs have no postalveolar, no retroflex, no velar, no uvular and no glottal consonants in affixes.

Thus only a small number of phonemes (6 out of 26) namely coronals [n, r, l] and bilabials [p, b, m] are favored in IBDs inflectional affixes. This fact supports the first, third and fourth hypotheses which have already discussed, but not the second one, as bilabials are more marked than coronals and pharyngeals.

The examination of using vowels in IBDs inflectional affixes yields that five cardinal vowels are used in affixes. All front vowels /i/, /e/, /æ/ and all back vowels /u/, /o/ except /u/ are in affixes, whereas no /ɪ/ or /ʊ/ are found in affixes. Moreover, only long /ɑ/ and /i/ are used in affixes and no other long vowels. In addition there seems to be a slight aversion for diphthongs in affixes, an only /ie/ and /iə/ are not excluded. The following table shows all phonemes which are used and not used in IBDs inflectional affixes:

Table (20) IBDs phonemes used and not used in inflectional affixes

Phonemes	
used in affixes	**not used in affixes**
Consonants	**Consonants**
b[**b**gu], p[**p**tʃɑːr] t[wæʃʃ**t**er], m[**m**æwɑːr] n[dræhtɑː**n**], r[wæʃʃte**r**]	ʈ, ɖ, k, g, ʔ s, z, ʃ, ʒ, χ, ɣ, h w, j, ɻ, l tʃ, dʒ
Vowels	**Vowels**
i[ræw**i**ːn], e [ræint] æ[n**æ**waːnton], o[wɑːpt**o**n] ɑ[dræht**ɑ**ːn] ie[zænɖter**ie**n], iə[selter**iə**n]	ɪ, ʊ, u ue, uə, æu, ou

In addition Urbanczky (2011:2492-2493) discusses the usual type of root-affix asymmetry in languages as a subset relation which is shown in (21):

(21) root affix

a. segmental inventory

root	affix	
{a}	{a}	same segmental inventory
{a}	{a, b}	root is a subset of affix inventory
{a, b}	{a}	affix is a subset of root inventory
{a, b}	{a, b}	same segmental inventory

Thus, segmental contrasts found in IBDs affixes can be an instance of affixes having a subset of a root inventory. Moreover, Urbanczyk (2011) investigates not only segmental contrasts in affix-root asymmetry, but also root-affix shapes. Based on data listed in (18), affix morphemes have only a simple onset, though complex and simplex onsets are allowed in IBDs roots as discussed in section 2. Besides, the onsetless syllables like in V and VC are allowed in affixes and not in roots. Even affixes can shape as a consonant without the nucleus. Once again this is an example of an instance of affixes having a subset of the patterns found in roots. Table (22) represents the affix and root morpheme shapes in IBDs.

Table (22) IBDs morpheme shapes used in inflectional affixes and not used in inflectional affixes

Morpheme shapes	
used in affixes	**not used in affixes**
C[**b**gu]	CCVC
CV[**mæ**wɑːr]	CVCC
VC[dræht**ɑːn**]	CCVCCC
CVC[wæʃʃ**ter**]	
CV.CVC[wæʃʃ**te.rin**]	
VCC[wɑːpt**ent**]	

Derivation affixes in IBDs are given in table (23), as the data show the number of segments used in derivational affixes are more than in inflectional affixes.

(23) List of derivational affixes in IBDs

Form	Label	Dialect	Example	
hæm-	noun marker	MSB, BS, LB	*hæmzaːt*	'family member'
ba-	adjective marker	MSB, SB, LB	*bawæt*	'himself'
ʔer-	compound verb marker	MSB, SB, LB	*ʔer kæpten*	'get off'
bɪ-	adjective marker	SB	*bɪkaːr*	'unemployed'
bie-	adjective marker	MSB	*biewæs*	'poor'
biə-	adjective marker	LB	*biətaːm*	'tasteless'
naː-	adjective marker	MSB, SB,LB	*naːraːh*	'foul'
-æg	noun marker, adjective marker, infinitive marker	MSB, SB, LB	*tʃæmmæg* *ræstæg* *wæræg*	'fountain' 'ripe' 'to eat'
-æk	noun marker	MSB, SB, LB	*sutʃæk*	'burning'
-ok	diminutive marker noun marker	MSB, SB, LB SB	*daːrok* *waːrok*	'small house' 'eating'
-daːn	noun marker	MSB, SB, LB	*sengdaːn*	'gizzard'
-naːk	adjective marker	MSB, SB, LB	*letʃtʃnaːk*	'sticky
-daːr	noun marker	SB	*maːldaːr*	'rich'
-æka	adverb marker	SB	*tʃæppæka*	'wrongly'
-aːr	adjective marker	MSB, SB, LB	*greptaːr*	'busy'
-om	noun marker	MSB, SB, LB	*ʃæʃom*	'sixth'
-aː	adjective marker	MSB, SB, LB	*roʒnaː*	'seeing'
-iː	indefinite marker	MSB, SB, LB	*morgiː*	'a bird'

All phonemes used and not used in IBDs derivational affixes are presented in the following table:

Table (24) IBDs phonemes used and not used in derivational affixes

Phonemes	
used in derivational affixes	**not used in derivational affixes**
consonants	**consonants**
b[bɪkɑːr], d[sengdɑːn],	p, t, ʈ, ɖ
k[letʃtʃnɑːk],	s, z, ʃ, ʒ, χ, ɣ
g[restæg], h[hæmzɑːt]	w, j, ɻ, l
m[ʃæʃom], n[nɑːrɑːh], r[greptɑːr]	tʃ, dʒ
vowels	**vowels**
ɪ[bɪkɑːr], e[*biewæs*],	ʊ, u,
ɑ[*roʒnaː*],	ue, uə, æu, ou
o[*waːrok*], æ[*sutʃæk*],	
ie[*biewæs*], iə[*biətaːm*]	

As table (24) demonstrates, it seems that IBDs exclude the consonants in derivational affixes, as in inflectional affixes discussed already, and not randomly. In fact, IBDs have exclusions that constitute natural classes of consonants:

(a) IBDs have no fricatives except /h/, no affricates and no approximant, and only one out of five approximants in derivational affixes.

(b) IBDs have no postalveolar, no retroflex, no uvular in affixes.

The investigation of using vowels in IBDs derivational affixes proves that four cardinal vowels are used in affixes. All front vowels /i/, /e/, /æ/ and all back vowels /ɑ/, /o/ except /u/ are used in derivational affixes, whereas no /ʊ/ is found in affixes. Moreover, only long /ɑ/ and /i/ are used in affix and no other long vowels. Furthermore, among all diphthongs just /ie/ and /iə/ are preferred.

Moreover, the morpheme shapes used in derivational affixes are given in (25). As it is demonstrated in (25), only simple onset and simple codas are permitted in derivational affixes, in addition to onsetless syllables that are also permitted as in inflectional affixes.

Table (25) IBDs morpheme shapes used in derivational affixes and not used in derivational affixes.

Morpheme shapes

used in affixes	**not used in affixes**
V[roʒn-ɑː]	CCVC
CV[nɑː-rɑːh]	CVCC
VC[ræst-æg]	CCVCC
CVC[seng-dɑːn]	

In summary, based on tables (1) and (23), glides and fricatives, except one out of six are not used in inflectional nor in derivational affixes. The number of coronals and bilabials in both types of affixes is more than other places of articulation. Besides, no retroflex, postalveolar and uvular consonants are involved in affix inventories in IBDs. Additionally, morpheme shapes in IBDs affixes are simpler than in roots, and no complex onset is observed in IBDs affixes; onsetless syllables are only allowed in affixes, but not in IBDs roots.

5.2.1 IBD root-affix asymmetry in optimality theory

Cross-linguistically, root morphemes show a more extensive and more marked inventory of segments, and of prosodic structures, than do affixes morpheme, as in Arabic where pharyngeal consonants are limited only to roots or in Cuzco Quechua, the laryngeal stops only occur in roots and not in affixes (Beckman 1999:191).

As examples in (18) and (23) demonstrate, no retroflex or postalveolar consonants occur in IBD affixes, so the distribution of these consonants is only limited to the roots.

In OT, the following universal ranking is proposed to show that roots tend to have more marked contrasts than affixes (Urbanczyk 2011:2508).

(26) Root-affix faithfulness metaconstraint

FAITH-ROOT >> FATH-AFFIX

So as Urbanczyk (2011:2508) believes, “the location of some markedness constraint with respect to FAITH-ROOT and FAITH-AFFIX can compel alternations resulting in asymmetrical patterns.” For example, the following constraint ranking accounts for the IBDs, where roots have retroflex consonants, but affixes do not.

(27) FAITH-ROOT >> *RETROFLEX>> FAITH-AFFIX

The following tableau represents above ranking for the input *ʈuːh-ter* ‘bigger’. The optimal candidate is (a), though it has a violation which is not fatal comparing to other candidates. Candidate (b) violates the anti-retroflex constraint twice and FAITH-AFFIX. Thus it is the loser. Both candidates (c) and (d) are eliminated as well, since they violate the higher ranked constraint FAITH-ROOT.

(28) *ʈuːh-ter* [ʈuːh-ter] big- comparative marker ‘bigger’

Input:/ ʈuːh-ter/	FAITH-ROOT	*RETROFLEX	FAITH-AFFIX
a. ☞ ʈuːh-ter		*	
b. ʈuːh-ʈer		**W	*W
c. tuːh-ter	*W		
d. tuːh- ʈer	*W	*	*W

5.3 Phonologically conditioned allomorph selection in IBDs

Cross-linguistically, there are a number of examples of allomorph choice which depend on the phonological rules. Nevins (2011) introduces six phonological conditions forcing allomorph choice in terms of segmental- level phenomena, syllable-level phenomena, and prosodic-level phenomena as follows:

(1) segmental dissimilation, (2) segmental phonotactics, (3) syllable structure, (4) morphological alignment, (5) stressedness and vowel quality and (6) foot structure.

In this section, two examples of IBDs allomorph choice namely imperative marker and past stem marker which can be predicted on the basis of phonological conditions on the phonological configuration will be investigated. Furthermore, the six phonological conditions proposed by Nevins (2011) will be considered in Balochi data analyses.

5.3.1 Imperative from in IBDs

In Sarhaddi and Lashari Balochi, the imperative form of the verbs is expressed by adding prefix, *b-* as in (29a), or *be-* such as (29b) which has already the bilabial segment in the word initial position of the present stem, and finally a zero allomorph is chosen, *ø-*, as (29c), which has already /b/ in the onset position of present stem. In compound verbs, the verbal element gets a zero allomorph, ø-, as shown in (29d).

(29) Imperative forms in Sarhaddi and Lashari Balochi

a.i	*b-za:n*	
	imperative marker- present stem	'Know!'
a.ii	*b-dʒæn*	
	imperative marker- present stem	'Hit!'
a.iii	*b-hænd*	
	imperative marker- present stem	'Laugh!'
a.iv	*b-trakin*	
	imperative marker- present stem	'Explore '
b.i	*be-wæps*	
	imperative marker- present stem	'Sleep!'
b.ii	*be-mi:r*	
	imperative marker- present stem	'Die!'
b.iii	*be-pætʃ*	
	imperative marker- present stem	'Cook!'
c.i	*ø-bondej*	
	imperative marker- present stem	'Make fire!'
d.i	*pætʃ ø-kæn*	
	open- imperative marker	'Open!'
d.ii	*gæ:ʈ ø-kæn*	
	bite-imperative marker	'Bite!'

However, in Sarawani Balochi the imperative form of the verb can be indicated by four separate allomorphs: b-, the most unmarked allomorph as in Sarhaddi and Lashari Balochi, it is used for verbs such as (30a), that have a voiced consonant in the word-initial position of the present stem. The second-choice allomorphs, [bu] or [be], are found with verbs such as (30bi) and (30bii) respectively, in both examples, the voiced bilabial consonant is in an onset position of the present stem. The third-choice allomorph, [p-], occurs in verbs as (30c), which have a voiceless consonant in the word-initial position. The fourth-choice allomorph, [m-] is used for verbs such as (30d), which have a nasal segment in an onset position. Besides, the imperative form of compound verbs is formed by adding allomorph [b] to the verbal element of the present stem with voiced segment in an onset position as (30e), and an allomorph [p] with a verbal element, and with a voiceless consonant in a word-initial position.

(30) Imperative forms in Sarawani Balochi

a.i	*b-guː*	
	imperative marker- present stem	'Tell!'
a.ii	*b-lekk*	
	imperative marker- present stem	'Write!'
a.iii	*b-dʒæŋg*	
	imperative marker- present stem	'Fight!'
b.i	*bu-waːn*	
	imperative marker- present stem	' Read!'
b.ii	*be-bær*	
	imperative marker- present stem	'Take!'
c.i	*p-suːtʃ*	
	imperative marker- present stem	'Burn!'
c.ii	*p-tʃaːr*	
	imperative marker- present stem	'Look!'
c.iii	*p-koʈʈ*	
	imperative marker- present stem	'Knock!'
d.i	*m-nened*	
	imperative marker- present stem	'Sit down!'
e.i	*naːtʃ p-kæn*	
	dance- imperative marker- to do	'Dance!'
e.ii	*dour b-de*	
	turn- imperative marker- give	'Turn!'

Based on data (29) and (30), the force to allomorph selection in imperative from in IBDs can be derived from the segmental phonotactics. It means the allomorph selection indeed leads to avoidance of particular allomorphs when they would incur violations of combinatorial phonotactics (Nevins 2011:2361). So in all of the above examples, [b-] is the default imperative marker, and [be-] is chosen when it precedes a bilabial voiced segment, in order to avoid adjacent of co-articulated segments in an onset position. Whereas in 30(c) and (e.i), [p-] is used, since it precedes a voiceless segment, and indeed it is an example of assimilation: a voiced bilabial stop that immediately precedes a voiceless consonant can be replaced by the corresponding voiceless stop, and [m-], is found when it precedes the nasal segment which is an instance of nasal assimilation as discussed in the previous sections of the present study as 30(d).

5.3.1 IBDs imperative allomorph selection in OT

In the section that follows, the existence of phonological condition in IBDs will be investigated based on OT as a constrained-based model.

Let us begin by considering cases such as 29(b) and 30(b). In those examples the allomorph [be-] and [bu-] are used with the present stem and have a bilabial voiced segment in their word-initial position, so the epenthesis vowel [e] or [u]; avoids, the occurrence of adjacent identical element in an onset cluster. Indeed, this allomorph selection satisfies the 'Obligatory Counter Principle' (OCP) constraint, which should be higher ranked than other faithfulness constraints; furthermore the quality of epenthesis vowel depends on the following vowel in the stem as shown in (30). The constraint rankings deal with imperative from of verbs as *wa:nten* 'to read' or *morten*' 'to die' are given respectively in (31):

(31)

I. OCP, *[- back] >> MAX-C >> DEP- IO

II. OCP, *[+ back] >> MAX-C >> DEP-IO

The following tableaux represent the above rankings.

(32) *b-wa:n* [bu-wɑ:n] 'Read!'

Input: /b-wɑ:n/	OCP	*[- back]	MAX-C	DEP-IO
a.☞ bu-wɑ:n				*
b. be-wɑ:n		*W		*
c. b-ɑ:n			*W	L
d. b-wɑ:n	*W			L

(33) b-mi:r [be-mi:r]'Die!'

Input: /b-mi:r/	OCP	*[+back]	MAX-C	DEP-IO
a.☞ be-mi:r				*
b. bu-mi:r		*W		*
c. b-i:r			*W	L
d. b-mi:r	*W			L

As tableaux (32) and (33) illustrate, the optimal candidate in both tableaux is candidate (a), since it satisfies the higher ranked constraints and has a non-fatal violation. Both candidates (b) and (c) satisfy the OCP constraint, but they have a fatal violation which leads them to be a loser. Candidate (d) is eliminated as it incurs the fatal violation.

The choice of allomorph [p-] in Sarawani Balochi as data 30(c) and (e.i) show can be analyzed as local assimilation. In fact the imperative marker agrees in voicing with the following consonant to satisfy the AGREE constraint; two more constraints namely FAITH-AFFIX and FAITH-ROOT are needed in the analysis as ranked in (34).

(34) AGREE (voicing), FAITH-ROOT>> MAX-C >> IDENT-IO>> FAITH-AFFIX

As ranking (34) indicates, the AGREE and FAITH-ROOT are ranked higher than two famous faithfulness constraints DEP- IO and IDENT-IO and FAITH-AFFIX is lower ranked.

Tableau (35) demonstrates the ranking in (34). As it is shown the winner candidate is candidate (a), the imperative marker agrees in voicing with the word-initial consonant of a present stem, so it satisfies both higher ranked constraints; however, it violates lower ranked constraints non-fatally. Candidate (b) is eliminated, it violates the higher ranked constraint AGREE. Both constraints (c) and (d) are losers, since they have at least one fatal violation.

(35) *b-tʃa:r* [p-tʃɑːr] 'Look!'

Input:/b-tʃɑːr/	AGREE	FAITH-ROOT	MAX-C	IDENT-IO(voice)	FAITH-AFFIX
a.☞ p-tʃɑːr				*	*
b. b-tʃɑːr	*W				L
c. b-dʒɑːr		*W		*	L
d. tʃɑːr			*W	L	*

Data 30(d) is an example of nasal assimilation. In this case, segments agree in nasality. So again like in ranking (34), the constraint which deals with assimilation namely AGREE outrankes other relevant constraint as in ranking (36):

(36) AGREE (nasality), FAITH-ROOT>> MAX-C >> IDENT-IO>> FAITH-AFFIX

The above ranking is represented in tableau (37) which evaluates the optimal candidate for input /b-nend/. As it is illustrated the optimal output is candidate (a), in which the imperative marker assimilates to the following nasal segments and it is replaced by a bilabial nasal. Candidate (b) satisfies all the constraints by being faithful to FAITH-ROOT and FAITH-AFFIX constraints; however, it has a fatal violation which leads it to be eliminated. Candidate (c) is a loser as well, since it has two violations. Both candidates (d) and (e) are not optimal as no nasality agreement occurs in them, and candidate (e) agrees in orality and not nasality.

(37) *b-nened* [m-nend] ‘Sit down!’

Input:/b-nend/	AGREE	FAITH-ROOT	MAX-C	IDENT-IO(nasality)	FAITH-AFFIX
a.☞ m-nend				*	*
b. b-nend	*W			L	L
c. nend			*W	L	*
d. b-end		*W	*W	L	L
e. b- tend		*W		*	L

5.3.2 Past stem in IBDs

The choice of phonologically related allomorphs in IBDs can also be found in the pattern of allomorphy with the IBDs past stem suffix, in which there are two past stem markers as shown in 36(b). These two allomorphs are [-t], [-it].

(38) Past stem suffix allomorphy in IBDs

	Present stem	Past stem	
a.i	*kuʃ*	*kuʃ-t*	‘ die’
a.ii	*gwar*	*gwar-t*	‘rain’
a.iii	*zaːn*	*zaː*n-*t*	‘ know’
a.iv	*waːr*	*waː*r-*t*	‘eat’
a.v	*kæp*	*kæp-t*	‘fall’
b.i	*lekk*	*lekk-it*	‘write’
b.ii	*loʈʈ*	*loʈʈ-it*	‘want’
b.iii	*hænd*	*hænd-it*	‘laugh’
b.iv	*dozz*	*dozz-it*	‘steal’
b.v	*dærr*	*dærr-it*	‘tear’
b.vi	*purs*	*purs-it*	‘ask’
b.vii	*kæʃʃ*	*kæʃʃ-it*	‘strengthen’

As 38(a) shows, in IBDs the past stem suffix [-t] is used when the roots have CVC structure otherwise, the allomorph [-it] is chosen with the roots that have CVCC structure as in 38(b).

The IBDs past stem suffix allomorphy can be an instance of phonologically conditioned allomorphy in the domain of syllable structure (Nevins, 2011:2362): “When there are two or more allomorphs, the choice among them often is based on yielding the syllable structure that avoids codas, avoids hiatus, or avoids complex codas without a sufficient sonority drop."

The IBDs past stem -t/-it is a case of three consonantal coda cluster avoidance, in which choosing it in coda cluster contexts allows one to avoid a sequence of three consonants in word-final cluster (CVCCC), which is not allowed in IBDs syllable structure.

Moreover, there are number of past stems in IBDs that do not follow the regular and synchronic pattern as described already. In (39) we can find some examples:

(39) Past stem in IBDs (exceptional forms)

Present stem		Past stem	
a.i	*duːtʃ*	*duːht*	'sew'
a.ii	*ruːp*	*ruːpt*	'siep'
a.iii	*pætʃ*	*pætk*	'cook'
a.iv	*dʒæn*	*dʒæt*	'hit'
a.v	*gind*	*dist*	'see'
a.vi	*ʃuːd*	*ʃost*	'wash'
a.vii	*bænd*	*bæst*	'wrap, close'
a.viii	*bær*	*bort*	'take'
a.ix	*nend*	*nest*	'sit'
a.x	*ræw*	*ʃot*	'go'
a.xi	*waːps*	*waːpt*	'sleep'

5.3.2.1 IBDs past stem allomorphy suffix in OT

As (38a) illustrates, [-t] is the allomorph ordinarily chosen with CVC root template, while *–it* is chosen with CVCC root template. To investigate data 38(a) based on OT, both FAITH-ROOT and FAITH-AFFIX constraints are undominated and the faithfulness constraint DEP-IO and markedness constraint *COMPLEX ^{COD} are lower ranked as given in (40):

(40) FAITH-AFFIX, FAITH-ROOT>> DEP-IO >> *COMPLEX^{COD}

The following tableau evaluates the optimal candidate for input *koʃ-t* "die". The optimal candidate is (a). It satisfies undominated constraints and it has non-fatal violation. Candidate (b) is a loser, since it has two fatal violations.

(41) *koʃ-t* [koʃ-t] 'die'

Input: /koʃ-t/	FAITH-ROOT	FAITH-AFFIX	DEP-IO	*COMPLEX^{COD}
1.☞ koʃ-t				*
2. koʃ-it		*W	*W	L

Ranking (42) deals with the data 38(b), in which the allomorph [-it] is used to avoid the sequences of three consonants in the coda position, so the constraint *CCC#] $_\sigma$ outranked the faithfulness constraints which are relevant in our analysis.

(42) *CCC#] $_\sigma$, FAITH-ROOT >> MAX-C >> DEO-IO, FAITH-AFFIX

As illustrated in tableau (43), the optimal candidate for input *lekk-t* is candidate (a), since it satisfies the undominated constraints namely *CCC#] $_\sigma$, and FAITH-ROOT. Candidate (b) and (c) are both eliminated as they violate the higher ranked constraints.

(43) *lekk-t* [lekk-it] 'write'

Input:/lekk-t/	*CCC#] $_\sigma$	FAITH-ROOT	MAX-C	DEP-IO	FAITH-AFFIX
a.☞ lekk-it				*	*
b. lekk-t	*W			L	L
c. lek-t		*W	*W	L	L