

Phonological Behavior of Aspirated Consonants in Urdu

Abstract: Aspirated sounds in Urdu show variation in different contexts, which mainly occur due to some phonological rules. Some of these variations show random behavior, which makes them harder to be generalized into phonological rules. This paper intends to uncover these phonological rules and to explain the phonological behavior of aspirated consonants in Urdu language. The rules described are supported by relevant data from Urdu.

Keywords: auto segmental, aspiration, deletion, assimilation, dissimilation, epenthesis, metathesis, lenition, phonotactic constraint.

1. INTRODUCTION

To achieve the motive of ease of articulation features, which require more effort, are normally dropped. This causes the alteration of some phonemes from phonemic to the phonetic representation. These alterations are described through the phonological rules. The major categories of these rules are assimilation, dissimilation, epenthesis (insertion), deletion and metathesis (reordering).

The ‘aspirated’ feature is never assimilated to neighboring segments. Dissimilation and deletion widely occur with aspirated sounds in Urdu. The phenomenon of epenthesis and metathesis occur, but are not very common. Some controversial phonemes of Urdu (/m^h/, /n^h/, /l^h/, /r^h/, /^h/) (Saleem, et. al. 2002), show distinctive behavior when they are used as aspirated consonants in different words.

2. LITERATURE REVIEW

This section provides a brief overview of the reference material consulted to carry out the study regarding phonological behavior of aspirates in Urdu.

According to Hussain and Nair in (Hussain and Nair, 1995), in *aspirated* stops there is a period of voicelessness after the articulation of stop, during this period a burst of air comes out. In Urdu both aspirated stops and affricates exist as distinct phonemes e.g. /b^h/, /^h/, /d^h/, /d^h/ etc.

Rules that specify how the sounds of a language interact with each other are called *phonological rules*. Examination of these rules shows that a component is shared by most of the rules, which can be crudely or traditionally called ‘ease of articulation’ (Lass, 1995).

Assimilation is the process when a sound changes to become similar to a nearby sound. A subclass of assimilation is change in stricture; it can be weakening

(lenition) or strengthening (fortition). These changes occur due to change in sonority or openness (Napoli, 1996).

In *dissimilation* a sound changes to be unlike sound nearby it (Napoli, 1996). In *deletion* of aspiration, an aspirated consonant changes to unaspirated one.

During *epenthesis* a segment or a feature is inserted within a word or a phone respectively. Since aspiration is a feature so it can be inserted in a consonant i.e. it becomes [+asp] from [-asp]. Bokhari in (Bokhari, 1985) gives example of insertion of aspiration. He states that whenever dative article /e/ or intensifier /i/ is added as a suffix to a word, its last unaspirated consonant is changed to aspirated one. But as it is discussed later that it does not happen all the time. For example, when suffix /i/ is added to the word [s n] it becomes [s ni] and thus no aspiration is inserted.

Metathesis involves linear transposition of whole segments (Lass, 1995), but in case of aspiration it becomes the linear transposition of the ‘aspirated’ feature.

There are two possible ways of representing phonological rules:

1. *Linear Phonology*: The basic assumption of linear phonology is that the phonological representation of sound is a linear slicing of segments into discrete matrices.
(www.coolschool.auf.net/02/abstracts/Jacobs_Introduction_to_Non-linear_Phonology.html).
2. *Auto segmental Phonology*: Autosegmental phonology treats phonological representations as multi-dimensional, having several tiers. Each tier is made up of a linear arrangement of segments (Goldsmith, 1990).

The processes of assimilation can be completely specified in linear phonology, whereas the process of dissimilation is most of the times non-linear, so it cannot be explained through linear phonology. Deletion is sometimes better explained by autosegmental phonology. In case of metathesis it cannot be said which one is a better representation (Napoli, 1996).

3. PROBLEM STATEMENT

What sort of phonological rules are followed by aspirated consonants in Urdu?

4. METHODOLOGY

4.1 Data Collection

At present, a standard dictionary of Urdu is not available in electronic form. So, data was collected from

five dictionaries (Ahmed, 2002), (Feroze-ud-Din), (Haqi, 1995), (Nayyar, 1989), (Platts, 1911). Those words were selected for analysis, which showed some variation with aspiration. Some other words were also selected which contained aspirated consonants but are spoken differently from their pronunciation given in the dictionary. In appendix these words are differentiated with a '*' in superscript (e.g. *word**). We have included only those variations, which were clearly stated in most of the dictionaries. In some cases dictionaries gave contradictory data. For reaching to a decision only those words were included which were present in at least three of the reference dictionaries. To choose the base form from different variations of a word, we used the dictionary by John T. Platts as reference as it was the oldest published from all other dictionaries. All those words, which contained their meanings as well as their other variations, were taken as base form words.

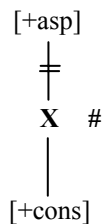
4.2 Analysis of Data

To see which rule applied to a given set of words, the syllable structure and stress in the syllables was analyzed. The context, i.e. the features of neighboring segments, in which aspiration exhibited variation, was also considered. To represent the phonological rules both linear and autosegmental representations were considered and the representation that best explained the data was chosen.

5. RESULTS

5.1 Deletion

Analysis of data showed that deletion of aspiration from aspirated consonants occurs at two different places in words. Rule 5.1(a) describes deletion of aspiration from the consonant at word boundary. For e.g. /t^het^h/ becomes [t^het].

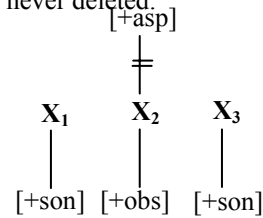


except for /k/

Rule 5.1(a) Deletion of aspiration from aspirated consonants at word boundary in words

In Rule 5.1(a), '#' represents word boundary. The data for this rule is given in the *Appendix A.1*. Deletion of aspiration from consonant occurring medially in the word is given by Rule 5.1(b). For example the word /ob^hi/ becomes [obi]. The data analyzed for Rule 5.1(b) is given in the *Appendix A.2*.

While analyzing the data, it was observed that aspiration from the consonant present at the beginning of the word is never deleted.



except when X₁ = V and X₃ = N

Rule 5.1(b) Deletion of aspiration from aspirated consonants occurring medially in words

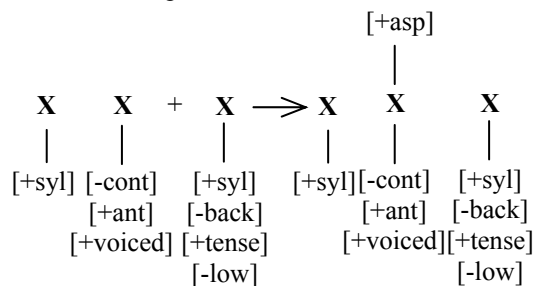
5.2 Metathesis

The words showing metathesis with aspirated consonants were very limited. Due to dependency of rule on a lot of factors, the phonological rule for metathesis could not be formulated, either in linear form or in autosegmental form. For example the word /k^hat^ha/ becomes [k^hat^hta]. Words in which metathesis occurs is given in the *Appendix B*.

It was noticed that aspiration of consonant occurring at the beginning of word is never shifted (e.g. /b^harna/).

5.3 Insertion

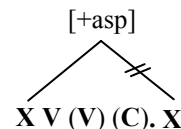
The stem's last consonant becomes aspirated whenever the suffixes /e/ and /i/ are added to the stems of closed class words. For e.g. when suffix /i/ is added to /n/ it becomes [n^hi]. The data corresponding to insertion is given in the *Appendix C*. Rule 5.3 shows the insertion of aspiration.



Rule 5.3 Insertion of aspiration

5.4 Dissimilation

The process of dissimilation of aspiration in Urdu is described in Rule 5.4.



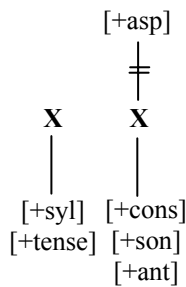
Rule 5.4 Dissimilation of aspiration

In Rule 5.4, ‘V’ represents a single timing slot for a vowel, as long vowel takes two timing slots so it will be represented as ‘VV’ in this case, ‘.’ represents the syllable boundary. The example of dissimilation is /t^h∂t^ht^ha/ which dissimilates to [t^h∂t^ht^ha]. The data in which dissimilation occurs is given in the *Appendix D*.

5.5 Rules for Aspirated Sonorant Consonants

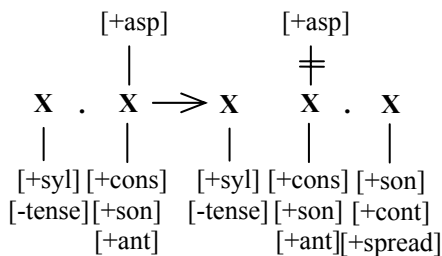
Two different types of behavior are shown by these aspirated consonants (/m^h/, /n^h/, /l^h/, /r^h/, /^h/). First is simple deletion and second is in which aspiration is promoted to /h/ consonant.

The process of deletion of aspiration from sonorant consonant is illustrated in Rule 5.5(a). For e.g. the word /bu^ha/ becomes [bu a].



Rule 5.5(a) Deletion of aspiration from sonorant consonants
(/m^h/, /n^h/, /l^h/, /r^h/, /^h/)

Data for Rule 5.5(a) is given the *Appendix E.1*. The rule showing promotion of the aspiration to form the sonorant /h/ is represented in Rule 5.5(b). The example of this is /ba^h∂i/ which becomes [ba h∂i]. Data representing this phenomenon is given in the *Appendix E.2*.



Rule 5.5(b) Promotion of aspiration from to /h/

The contexts in which these rules are applied are discussed in the discussion section.

5.6 Phonotactic Constraints

Following are the phonotactic constraints, regarding aspiration, found during the analysis of the data:

1. In Urdu, the aspiration never follows the approximant /j/.

2. No word in Urdu can have more than two aspirated consonants.

6. DISCUSSION

6.1 Deletion

The basic motive of deleting aspiration from consonants is ease of articulation. The two cases of aspiration deletion are discussed below.

6.1.1 At Word Boundary

In Urdu aspirated consonant at word boundary becomes unaspirated. The data showed one exception, that aspiration is never deleted if the last consonant was unvoiced velar stop i.e. /k/ (See rows 13 to 16 of *Appendix A.1*).

6.1.2 Medially in Word

Aspiration gets deleted from consonants, which occur somewhere in the middle of the word i.e. not at the start or end of the word. The analysis of data showed that there are some special contexts in which aspirated consonant can or cannot become unaspirated. These contexts were, aspirated consonant occurring in between a vowel and nasal (V__N), vowel and vowel (V__V), nasal and vowel (N__V) and nasal and nasal (N__N). Here ‘V’ covers both short and long vowels. Following observations were made regarding these contexts:

- Aspiration does not get deleted from the consonant, when it comes in between a vowel and nasal i.e. in the V__N context. For examples see the rows 24 to 31 of *Appendix A.2*. There is an exception in this case, the aspiration is deleted from velar nasal ‘^h’ stop in V__N context (See rows 22 and 23 of *Appendix A.2*).
- Aspiration from consonant is always deleted when it comes in the contexts as in V__V, N__N, and N__V (See rows 1 to 12 and 18 to 21 of the *Appendix A.2*). There are some examples that have different context, which has not been discussed explicitly, but aspiration deletion does occur in them (see rows 32 to 34 of *Appendix A.2*).

Due to some conflicting data (See rows 13 to 17 of *Appendix A.2*, we also did the analysis by taking into account the stress and syllabification, but no effect was observed. This data is considered as exception. For example /h∂t^h a/ and /b∂k^he a/, both words have the onset of their stressed syllable aspirated. But in the first word aspiration is deleted and in the second it is not.

6.2 Metathesis

We did not get much data in this regard. Data for metathesis is given in the *Appendix B*. The data showed following properties:

- Metathesis in case of aspiration is only true for stops i.e. no examples involved aspirated affricates.

- The linear transposition of aspiration takes place between stops, which are in two different syllables.
- The aspiration is shifted in the stop of preceding syllable. If the preceding syllable has both coda and onset, it shifts on the onset and if there is no onset it shifts to coda.
- Metathesis does not take place if the first syllable of the word has aspirated stop, in the word base form.
- Metathesis occurs only if the phones of both syllables are either voiced or unvoiced.
- In most of the cases first and second syllables were involved except for one example [kɔt^ht^ha], in which it takes place between second and third syllable.

The data involved one word i.e. /kɔt^ht^ha/, which contained geminate stop that showed metathesis. For the case of geminate stops, we have assumed that the aspiration will be realized in the second segment i.e. in the onset of the proceeding syllable. The data also showed one exception i.e. /kat^ht^ha/.

Insertion

When the suffixes /e/ and /i/ are added to the stems of closed class words aspiration is inserted to the stem's last consonant. Closed class is that class, which does not contain nouns, verbs and adjectives. It does not happen with consonants which are unvoiced, for example /s/ + /e/ gives /se/. The only exception in this rule is [hɔme] (/hɔm+/e/), in which [m] remains un-aspirated.

6.4 Dissimilation

If two adjacent syllables contain the same aspirated consonant in their onsets, dissimilation occurs and aspiration is removed from second consonant. In all cases the two consonants involved should have exactly same features before dissimilation takes place.

Dissimilation does not occur in some words (See rows 14 to 17 in the *Appendix D*). Although they satisfy the dissimilation rule (Rule 4.4), these words share a common feature i.e. they are formed by a process called *reduplication*. In reduplication, morpheme pluralization takes place in the word formation process. For example /p^h s/ + /a/ gives [p^h sp^h sa].

6.5 Rules for Aspirated Sonorant Consonants

These phonemes contain m^h, n^h, l^h, r^h and ^h. The status of these phonemes in Urdu is still controversial that whether they exist or not. They all demonstrate similar kind of behavior with aspiration i.e. aspiration deletion and promotion. The processes are discussed below:

- *Deletion of aspiration*: Whenever aspirated sonorant consonant has a long vowel preceding it, the aspiration gets deleted.

- *Promotion of aspiration*: When aspirated sonorant consonant has a short vowel preceding it, the aspiration is promoted to form a new sonorant /h/. The sonorant consonant becomes the coda of the preceding open syllable and /h/ becomes the onset of the next syllable, which previously had no onset.

The data given in the *Appendix E.2 and E.2* falls in the above-mentioned rules without any exception.

6.6 Other Findings

There is a word /unt/ in which the aspiration is inserted at word boundary i.e. it becomes [unt^h]. No other example was found in the collected data, which could help to elaborate this phenomenon.

We found that lenition (a type of assimilation) occurs only in case of unvoiced aspirated affricate. In this case an aspirated affricate weakens to form a fricative, this happens in a very restricted context e.g. /pɔt^ht^ha/ becomes [pɔ t^ha]. The data found for support of this rule was limited to one word /pɔt^ht^ha/ and its derivatives, which was not enough to form a rule. So it is possible that [pɔ t^ha] is just another pronunciation of /pɔt^ht^ha/.

There are some words that satisfy conditions of more than one rule but only one rule is applicable to it. For example, the word /ɔb^hi/ satisfies the conditions of both deletion and metathesis, but only deletion rule is applicable.

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APPENDIX A (Deletion)

Appendix A.1 Data for Deletion at Word Boundary

Sr. No.	Transcription		Meaning in English
	Phonemic	Phonetic	
1.	d it ^h	d it	Stubborn
2.	t ^h at ^h	t ^h at	Lavish
3.	t ^h et ^h	t ^h et	Pure
4.	b d ^h	b d [*]	Wednesday
5.	d ^h nd ^h	d ^h nd	Fog
6.	dud ^h	dud [*]	Milk
7.	mɔlit ^h	mɔlit	Barbarian
8.	band ^h	band	Barren
9.	hont ^h	hont	Lip
10.	su ^h	su	To smell
11.	u ^h	u	To doze
12.	me ^h	me	A cloud
13.	ak ^h	Remains same	Eye
14.	d k ^h	Remains same	Worries
15.	s k ^h	Remains same	Comfort
16.	pɔnk ^h	Remains same	Wings

Appendix A.2 Data for Deletion of Aspiration Occurring Word Medially

Sr. No.	Transcription		Meaning in English
	Phonemic	Phonetic	
1.	hɔt ti	hɔt ti	Skill of hand
2.	hɔt eli	hɔteli	Palm
3.	op ^h ɔn	opɔn	To hide
4.	sɔt ja	sɔt ja	Surgeon
5.	n hɔt t a	n hɔtta	Unarmed
6.	ob ^h i	obi	Cabbage
7.	ɔb ^h b ^h a	ɔbba	Bedding
8.	s b ^h ita	s bita	Timid woman
9.	runɔk ^h k ^h a	runɔkka	Ready to weep
10.	bak ^h a	baka	Literature
11.	ka ^h i	ka i	Comb
12.	d a ^h a	d a a	Panties
13.	b t ^h ana	Remains same	To spread
14.	b d ^h ana	Remains same	Blow out
15.	ɔt ^h ɔtɔr	Remains same	Seventy eight
16.	bak ^h e a	Remains same	Difficulty
17.	bot ^h a	Remains same	Heavy rain
18.	and a	and a	The hemp-plant

19.	d ɔlɔnd ^h ɔr	d ɔlɔnd ɔr	Dropsy
20.	band ^h na	bandna	To tie
21.	ant ^h na	antna	To tie
22.	u ^h na	u na	Dozing
23.	su ^h na	su na	Smelling
24.	b d ^h na	Remains same	To extinguish
25.	rɔk ^h na	Remains same	To keep
26.	nɔt na	Remains same	Nostril
27.	t ɔk ^h na	Remains same	To Taste
28.	rut ^h na	Remains same	To be irritated
29.	sud ^h na	Remains same	To be visible
30.	s lɔd ^h na	Remains same	To be solved
31.	b t ^h na	Remains same	Spread

Special cases

32.	dɔd ^h jal	dɔdjal	Paternal grandfather's house
33.	od ^h i	od i	Intestine
34.	bɔrk ^h a	Remains same	Rain

APPENDIX B (Metathesis)

Data for Metathesis

Sr. No.	Transcription		Meaning in English
	Phonemic	Phonetic	
1.	kɔt ^h t ^h a	k ^h ɔtta	United
2.	ɔtk ^h el a	ɔt ^h kel a	Playful activities
3.	pɔt ^h t ^h ɔr	p ^h ɔttɔr	Stone
4.	amb ^h ir	^h ambir	Serious
5.	kɔt ^h t ^h a	Remains same	A vegetable extract

APPENDIX C (Insertion)

Data of Insertion of Aspiration

Sr. No.	Transcription		Meaning in English
	Phonemic (before Insertion)	Phonemic (after insertion)	
1.	n	n ^h i	This, these
2.	n	n ^h e	These
3.	un	un ^h i	Them, those
4.	d in	d in ^h e	Whom, whose
5.	un	un ^h e	Them, those
6.	k n	k n ^h e	Whom
7.	kɔb	kɔb ^h i	When
8.	tum	tum ^h e	You
9.	d ɔb	d ɔb ^h i	When
10.	hɔm	hɔm ^h e	We

APPENDIX D (Dissimilation)

Data for Dissimilation

Sr. No.	Transcription		Meaning in English
	Phonemic	Phonetic	
1.	^h a ^h ɔra	^h a ɔra	Petticoat
2.	p ^h p ^h a	p ^h pa	Uncle
3.	b ^h ɔb ^h oka	b ^h ɔboka	Blazing
4.	k ^h ɔk ^h e	k ^h ɔke	Difficulty
5.	t ^h ɔt ^h t ^h a	t ^h ɔtta	Laughter
6.	b ^h ab ^h ɔk	b ^h abɔk	Burst of laughter
7.	t ^h o ^h i	t ^h o i	Chin
8.	d ^h d ^h ɔk	d ^h d ɔk	Shyness
9.	d ^h und ^h la	d ^h undla	Foggy
10.	t ^h t ^h ɔkna	t ^h tɔkna	Drawback in amazement
11.	b ^h ɔmb ^h o na	b ^h ɔmbo na	To tear
12.	b ^h k ^h ari	b ^h kari	Beggar
13.	k ^h uk ^h k ^h ɔl	k ^h ukkɔl	Hollow
14.	p ^h ld ^h ɔ i	p ^h ld ɔ i	Firework
15.	p ^h ep ^h a	p ^h ep a	Lung
16.	p ^h ɔp ^h undi	p ^h ɔpundi	Fungus
17.	p ^h sp ^h sa	p ^h sp ^h sa	Spongy
18.	d ^h nd ^h n a	d ^h nd ^h n na	Child's rattle
19.	b ^h rb ^h ra	b ^h rb ^h ra	Crisp
20.	b ^h sb ^h sa	b ^h sb ^h sa	Soft

APPENDIX E (Data for Aspirated Sonorant Consonants)

Appendix E.1 Data for Deletion of Aspiration

Sr. No.	Transcription		Meaning in English
	Phonemic	Phonetic	
1.	si ^h i	si i	Ladder
2.	sol ^h wa	solwa	Sixteenth
3.	bu ^h a	bu a	Aged
4.	t ul ^h a	t ula	Stove
5.	te ^h a	te a	Bent
6.	o ^h na	o na	Put on

Appendix E.2 Data for Promotion of Aspiration

Sr. No.	Transcription		Meaning in English
	Phonemic	Phonetic	
7.	ba ^h ɔi	ba hɔi	Carpenter
8.	b ^h apa	b hapa	Old age
9.	t ɔ ^h ana	t ɔ hana	To mount
10.	d r ^h ɔm	d rhɔm	A currency
11.	d l ^h a	d lha	Bridegroom
12.	d n ^h e	d nhe	When
13.	t m ^h e	t mhe	You