

LANGUAGE IN INDIA
Strength for Today and Bright Hope for Tomorrow
Volume 10 : 4 April 2010
ISSN 1930-2940

Managing Editor: M. S. Thirumalai, Ph.D.
Editors: B. Mallikarjun, Ph.D.
Sam Mohanlal, Ph.D.
B. A. Sharada, Ph.D.
A. R. Fatihi, Ph.D.
Lakhan Gusain, Ph.D.
K. Karunakaran, Ph.D.
Jennifer Marie Bayer, Ph.D.
S. M. Ravichandran, Ph.D.

**An Acoustic Analysis of Glottal Fricative [h] at Word Medial and Final
Positions: A Comparison between
Regular and Non-regular Urdu Speakers of Pakistan**

Azhar Pervaiz, M.Phil., Ph.D. Candidate
Tahir Ghafoor Malik, M.Phil., Ph.D. Candidate

Abstract

In this paper, the acoustic properties of voiceless glottal fricative [h] in Urdu language are analyzed and compared between regular and non-regular Urdu speakers. Regular Urdu speakers imply those speakers whose L1 is Urdu; whereas non-regular Urdu speakers imply those whose L1 is Pashto and Punjabi.

Data relating to [h] at word medial and word final position are taken in carrier phrases of both regular and non-regular Urdu speakers. Data of ten speakers were taken and analyzed through PRAAT and it was found that the regular Urdu speakers have longer duration while closing an Urdu word at /h/ sound than non-regular Urdu speakers and none of the speakers shows any sign of [h] at word final position. The paper also shows that the duration of [h] sound at word medial position of regular Urdu speakers is longer than the duration of [h] sound of non-regular Urdu speakers.

Language in India www.languageinindia.com

10 : 4 April 2010

Azhar Pervaiz, M.Phil., Ph.D. Scholar and Tahir Ghafoor Malik, M.Phil., Ph.D. Scholar
An Acoustic Analysis of Glottal Fricative [h] at Word Medial and Final Positions: A
Comparison Between Regular and Non-regular Urdu Speakers of Pakistan

1. Introduction

Urdu is the national language of Pakistan and one of the state languages of India and has more than 60 million first language speakers and more than 100 million total speakers in more than 20 countries (Gordon 2005). Urdu Language has only one glottal fricative, i.e. [h] which is voiceless. In a voiced sound the vocal folds are closed together and vibrating but in a voiceless sound they are pulled apart. This position will produce a completely voiceless sound if there is little or no air flow through the glottis as in the case of voiceless fricative. But if there is considerable air flow as in h- like sound, the vocal folds will set vibrating while remaining apart. They can still vibrate but at the same time a great deal of air passes out through the glottis.

In English /h/ is somewhat like the voiceless counterpart of the surrounding sounds. At the beginning of a sentence /h/ is like a voiceless vowel, but /h/ can also occur between vowels in words or phrases like “behind the head”. As you move from one vowel through /h/ to another, the articulatory movement is continuous and the /h/ is signaled by a weakening of the sound which may not even result in a completely voiceless sound (Ladefoged, 2001:56).

According to Gussenhoven and Jacobs (1998), a word is normally not started with [ŋ] and may not end with [h] i.e. it may not occur at the end of a syllable. The two segments are in complementary distribution as [hæŋ] is a word but *[tæŋ] is not a word. However, in Urdu the word may end at [h] sound orthographically like [tənxwah] (wages), [wad̪ah] (promise) etc. This paper acoustically investigates whether or not this is omitted in the speech of regular and non-regular Urdu speakers. This article further investigates the difference of [h] sound at word medial and at word final position in the speech of regular and non-regular Urdu speakers.

2. Literature Review

The place of articulation of /h/ consonant is glottal. This means that the narrowing that produces the friction noise is between the vocal cords. Ladefoged (2001) says that in producing [h] sound the vocal folds are apart between the arytenoid cartilages. Phonetically, /h/ is a voiceless vowel with the quality of the voiced vowel that follows it (Roach, 1983: 6). However, the spectrum of the [h] sound is different because of two reasons.

First, the vowel shape to the follow the beginning to be formed before the production of the frication; this shape will change for different vowels and thus affect the spectrum of

Language in India www.languageinindia.com

10 : 4 April 2010

Azhar Pervaiz, M.Phil., Ph.D. Scholar and Tahir Ghafoor Malik, M.Phil., Ph.D. Scholar
An Acoustic Analysis of Glottal Fricative [h] at Word Medial and Final Positions: A
Comparison Between Regular and Non-regular Urdu Speakers of Pakistan

the [h]. Second, for the close front vowel the source of the [h] turbulence may be at a velar or upper pharyngeal location rather than low in the pharynx or at the glottis (Pickett, 1999: 137).

Phonologically, h is a consonant. It is usually found before vowels. As well as found in initial positions it is found medially in words such as: ‘ahead’ /əhed/, ‘greenhouse’ /gri:nhaus/ ‘boathook, /bəʊthʊk/. It is noticeable that when h occurs between voiced sounds (as in the words ‘ahead’ and ‘greenhouse), it is pronounced with voicing- not the normal voicing of vowels but a weak slightly fricative sound called breathy voice.

In Urdu [h] sound is different from the other voiceless fricatives [f, s, ʃ, x] because it does not involve a constriction within the oral cavity. This sound is classified as a glottal fricative. Ladefoged and Maddison (1996) say that forms of h, h̥ in which a turbulent air stream is produced at the glottis are also sometimes classed as fricatives. One problem with classifying [h] as an approximant is that voiceless approximants are by definition inaudible. If there’s no friction and no voicing, there’s nothing to hear. Anything you can hear during a voiceless [h] must be some sort of weak friction, resulting from some sort of weak turbulence, which means that [h] is some sort of weak fricative but still a fricative. The tradition in generative phonology is to class [h] as a glide.

2.1 Sound Change Rules in Urdu

| | |
|------------------------------------|--|
| Bilabial assimilation | n → [+bilabial]/___[+bilabial, -nasl] |
| Velar assimilation | n → [+velar]/___ [+stop, +velar, -nasal] |
| Nasal assimilation | V [+long] → [+nasal]/___[+nasal] |
| /h/ deletion and vowel lengthening | V [+short]h → [long]# |
| /h/ deletion | h → ∅ / V[long]___# |

Some sound change rules of Urdu represented in conventional linear for-mat. Capitalized ‘V’ indicates a vowel and ‘.’ indicates a syllable boundary (Hussain, S. 2006). This article investigates whether or not this rule is applicable in Urdu Language in Lahore and people in Lahore omit *h* sound at word final position or not.

3. Methodology

3.1 Population

Ten speakers were selected who were the students of graduation and post-graduation level of 23 to 40 years of age. Five of the speakers were taken from Lahore whose L1

Language in India www.languageinindia.com

10 : 4 April 2010

Azhar Pervaiz, M.Phil., Ph.D. Scholar and Tahir Ghaffoor Malik, M.Phil., Ph.D. Scholar
An Acoustic Analysis of Glottal Fricative [h] at Word Medial and Final Positions: A
Comparison Between Regular and Non-regular Urdu Speakers of Pakistan

was Urdu (regular Urdu speakers) and five from outside Lahore whose L1 was Pashto and Punjabi (non-regular Urdu speakers).

3.2 Procedure

Recordings were taken through PRAAT v.4.1 (Software for Acoustic Analysis of Speech) from the speakers. Four Urdu words i.e. [tənxwəh] (wages), [wəɖəh] (promise), [xəmə gəh] (living place under tent) were used with [h] at word final position, and [vəɖjəh] (reason) two words were selected with [h] word medially i.e. [kəhə] (said) and [ɖ əlhə] (groom). These words were used in carrier sentences spoken in connected speech. (The Urdu passage is given in appendix.)

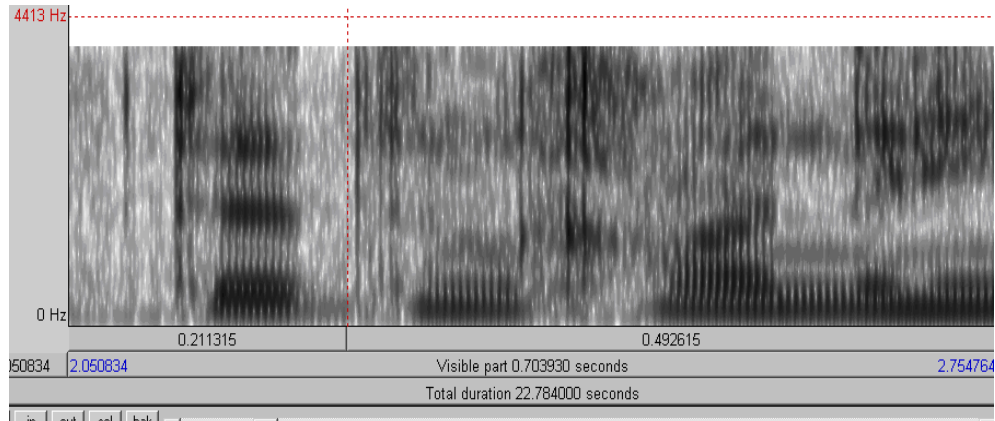
The speakers were asked to read these sentences. So the total number of words was 60 and the words were analyzed using PRAAT. In the process of analysis, SPSS-16 (Statistical Package of Social Sciences) was used for data entry, deriving averages and for standard deviation.

4. Results

The average duration of [h] of regular Urdu speakers is longer than that of the average duration of non-regular Urdu speakers as shown in the tables 1.1 and 1.2 below.

4.1 Speakers with Urdu L1: Table 1.1

| Segment | Avg. Duration (ms) | SD (ms) |
|------------|--------------------|---------|
| [tənxwəh] | 171.4 | 70.47 |
| [wəɖəh] | 157 | 49.70 |
| [xəmə gəh] | 117 | 24.07 |
| [vəɖjəh] | 106.2 | 13.6 |

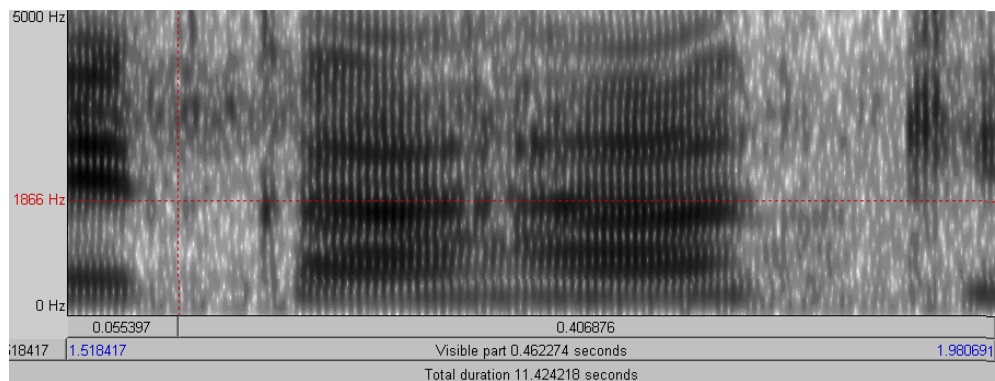


Spectrogram of Urdu word [tənxwəh] (wages)

4.2 Speakers with Pashto and Punjabi L1

Table 1.2

| Segment | Avg. Duration (ms) | SD (ms) |
|-----------|--------------------|---------|
| [tənxwəh] | 96.8 | 14.61 |
| [wəɖəh] | 86 | 20.07 |
| [xəməgəh] | 105.6 | 6.54 |
| [vəɖjəh] | 100.6 | 47.71 |



Spectrogram of Urdu word [kəhə] (said)

The results of table 1.1 show that the average duration of [a] sound is longer of the Urdu L1 speakers as compared to the average duration of [a] sound of the Punjabi and Pashto L1 speakers while deleting the [h] sound at word final position.

4.3 Speakers with Urdu L1

Table 1.3

| Segment | Avg. Duration (ms) | SD (ms) |
|----------|--------------------|---------|
| [kəha] | 67 | 14.46 |
| [d̪ʊlha] | 96 | 36.74 |

4.4 Speakers with Pashto and Punjabi L1

Table 1.4

| Segment | Avg. Duration (ms) | SD (ms) |
|----------|--------------------|---------|
| [kəha] | 58 | 10.45 |
| [d̪ʊlha] | 55 | 17.79 |

Likewise, the duration of [h] sound is also measured at word medial position of both regular and non-regular speakers. The results in table 1.3 show that the average duration of [h] sound of Urdu L1 speakers is longer even at word medial position i.e. [kəha] 67ms and [d̪ʊlha] 96ms than the duration of [h] of non-regular Urdu speakers as shown in table 1.4.

5. Discussion

The results of the data of both regular and non-regular Urdu speakers show that neither of the speakers is producing [h] sound at word final position and [h] is deleted, making the vowel i.e. [a] a longer vowel which is in accordance with the rule i.e.

/h/ deletion rule in Urdu $h \rightarrow \emptyset / V[\text{long}] __\#$

The duration of [h] sound at word medial position is longer of Urdu L1 speakers than the duration of [h] sound of the Urdu L2 speakers (with L1 Punjabi and Pashto) when [a] sound precedes [h] sound. The standard deviation of the words with /h/ at final position of the Urdu L1 speakers is more than that of Urdu L2 speakers. Same is the case with the words with [h] at medial position.

6. Conclusion

To conclude, after the acoustic analysis of glottal fricative [h] in Urdu at word medial and final position, it was observed that there is a difference of production of the words spoken by the regular and non-regular Urdu speakers. Regular Urdu speakers take longer duration while producing [h] sound both at word medial and word final position than that of non-regular Urdu speakers. Finally, the duration of [h] sound at word medial position of regular Urdu speakers is longer than the duration of [h] sound of non-regular Urdu speakers.

References

Chomsky, N. and Halle, M. (1968). *The Sound Patterns of English*. New York: Harper & Row.

Hussain, S. (2007). Phonological Processing for Urdu Text to Speech System.

Hussain, S.: Letter to Sound Rules for Urdu Text to Speech System. Proceedings of Workshop on “Computational Approaches to Arabic Script-based Languages,” COLING 2004, Geneva, Switzerland (2004).

Gussenhove C. & Jacobs H. (1998). *Understanding Phonology*, Arnold Publishers.

Clark, J., Yallop, C. and Fletcher, J. (2007). *An Introduction to Phonetics and Phonology*. New York: Blackwell Publishing.

Language in India www.languageinindia.com

10 : 4 April 2010

Azhar Pervaiz, M.Phil., Ph.D. Scholar and Tahir Ghafoor Malik, M.Phil., Ph.D. Scholar
An Acoustic Analysis of Glottal Fricative [h] at Word Medial and Final Positions: A
Comparison Between Regular and Non-regular Urdu Speakers of Pakistan

Kellogg, S. H. (1893). *A Grammar of the Hindi Language*. 2nd ed. London: Routledge & Kegan Paul.

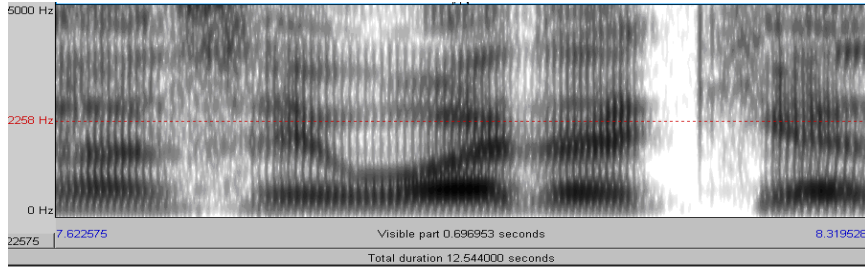
Ladafoged, P. (2001) *A Course in Phonetics*, 4th ed. New York: Harcourt College Publishers.

Pickett, J.M.(1999). *The Acoustics of Speech Communication: Fundamentals, Speech Perception Theory, and Technology*, Allan & Bacon.

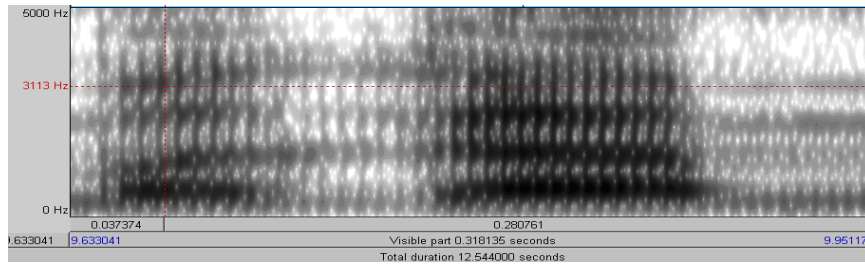
APPENDICES

Appendix I

Spectrograms of [waɖah] & [xæma gah] of Regular And Non-Regular Urdu Speakers Non-Regular Urdu Speakers

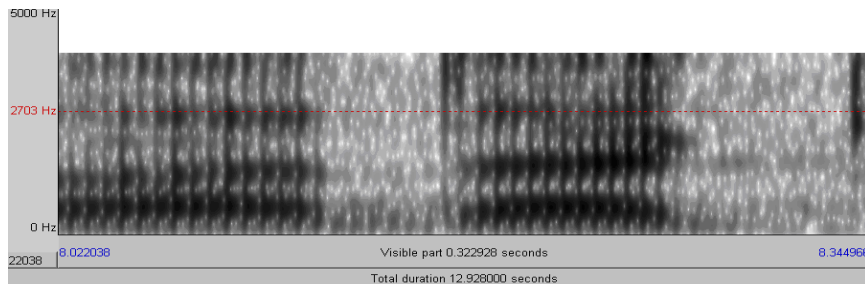


[waɖah]

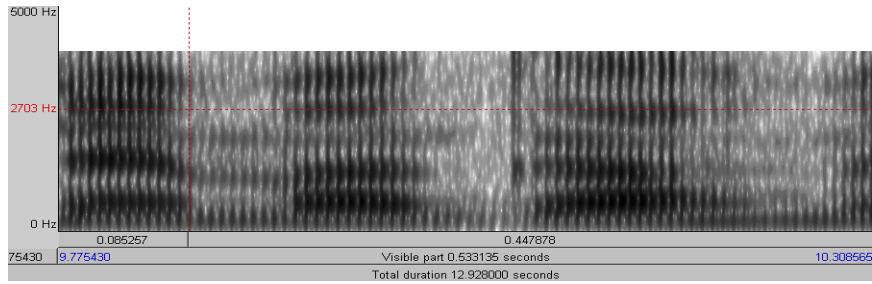


[xæma gah]

Regular Urdu Speakers



[waɖah]



[xæma gah]

Appendix II

میرے دوست نے مجھے کہا کہ مجھے اس ہفتے تنخواہ نہیں ملی اور اسکی وجہ مجھے معلوم

نہیں۔ میں نے تو دلہا سے وعدہ کیا تھا۔ اب مجھے خیمہ گاہ میں رکنا پڑے گا۔

Original text of the speech used for recording of words like [tənxwah], [wad,ah], [xæma
gah], [vədjəh] etc.

Azhar Pervaiz, M.Phil., Ph.D. Scholar
Department of English (SS&H)
University of Management & Technology Lahore (UMT)
C-II, Johar Town, P.O. Box 54770
Lahore
Punjab, Pakistan
Sargodhian67@yahoo.com

Tahir GhafoorMalik, M.Phil., Ph.D. Scholar
Department of English (SS&H)
University of Management & Technology Lahore (UMT)
C-II, Johar Town, P.O. Box 54770. Lahore, Punjab, Pakistan
tahirmalik@hotmail.com

Language in India www.languageinindia.com

10 : 4 April 2010

Azhar Pervaiz, M.Phil., Ph.D. Scholar and Tahir Ghafoor Malik, M.Phil., Ph.D. Scholar
An Acoustic Analysis of Glottal Fricative [h] at Word Medial and Final Positions: A
Comparison Between Regular and Non-regular Urdu Speakers of Pakistan