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Bilabial Assimilation in Urdu: An Acoustic Analysis

Zafeer Kiani, M.Phil. Student, Abdul Qadir Khan, Ph.D. Student and Nadeem Haider Bukhari, Ph.D.

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Abstract

There is a difference in the pronunciation and orthographical representation of a word. There are certain phonological processes in languages which govern these variations. This paper gives a brief overview of bilabial assimilation that occurs in Urdu. This phonological process has been identified through an analysis of a set of data from Urdu. It is found that the acoustic properties of the nasal sound before bilabial plosive are more like those of /m/ in VCV context. It shows that Urdu speakers change the alveolar nasal /n/ with bilabial nasal /m/ whenever the alveolar is followed by any of the bilabial plosives, i.e. /p/ and /b/.

1. Introduction

More than 220 million people in the Sub-continent regard Urdu as their mother tongue. Urdu is actively used by 400 million people in India and Pakistan in their daily life at work and home. Outside the Subcontinent, large Urdu speaking communities are found in the United States of America, Unikted Kingdom, Mauritius, South Africa, Yemen, Uganda, Singapore, Nepal, New Zealand and Germany.

Urdu is the national language of Pakistan and an official language of the State of Uttar Pradesh in India. It unites all people and all communities, whatever their mother tongue is. 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).

By the late seventeenth and early eighteenth centuries, Urdu had developed into a highly stylized form written in a Persian-Arabic script. After 1947, Urdu became the national language of Pakistan, though Pakistan inherited no land where this language was a local language. Now in all major cities of Pakistan, people speak Urdu at home and at work.

There may exist some words that are not often pronounced the way they are supposed to Be pronounced. This results in phonetic and phonemic transcriptional contrasts. The environment in which these changes take place can be studied and phonological rules can be developed to explain these changes.

When linguists record words as sequence of basic sounds in that language, the result is termed as phonemic transcription. This is distinguished from phonetic transcription, which goes beyond this to give more details of how it is pronounced (Fromkin, 2000: 489). The spelling system for Urdu is much more consistent than English. Since each letter of Urdu corresponds to one sound, representing each letter by its basic sound can roughly be called phonemic transcription.

There are a few exceptions though, such as in the case of /ŋ/ sound produced by the combination of two letters. This orthographic type phonemic transcription can be used to develop phonological rules in Urdu, by studying how they vary in Phonetic transcription. (Wali, 2003).

The collective set of rules, defined for these languages, are stated next from Fromkin (p. 520-566), Napoli (Napoli, 1996) and Clark & Yallop (p. 99-104).

2. Literature Review

For most languages, their spelling or orthography is irregular and does not represent sounds in a consistent way. They violate the fundamental principle that each letter should represent one sound and each sound should be represented by one symbol. English is one of these languages since it uses only 26 letters to represent its 40 basic sounds (Fromkin, 2000: 483).

There are no standardized documents on the sounds of Urdu language. Different studies at different levels have been published but none has been accepted as a standard.

According to Kachru (1990), there are seven long oral vowels, and three short oral vowels, while Bokhari (1991) claims that there are seven long oral vowels, but seven

short oral vowels. Kachru (1990) claims that the front low cardinal vowel [æ] exists as front middle low vowel [ɛ] in Urdu. As a result the back low cardinal vowel [σ] is shifted to the low center, making it [a]. Alam also agrees with the long and short vowel distribution of Kachru. Bokhari and Alam list ten nasalized vowels including five short and five long nasalized vowels (Bokhari, 1985). Kachru (1990), on the other hand, has not listed any nasalized vowel, but mentions that nasalization is distinctive.

Kachru (1990) lists 37 consonants and has not mentioned any nasal aspirated consonant. Hussain (1997) lists 36 consonants and has missed the nasal consonants. Bokhari (1985; 1991) lists 36 consonants and he has mentioned five nasal sounds, i.e., [n, ŋ, m, m^h, n^h]. Bokhari misses many basic sounds, which are listed by Kachru and Hussain. Alam (1997) lists, most of all, 42 consonants and has missed only one consonantal sound [ŋ]. Overall, the controversial nasal consonantal sounds are [n^h, m^h, ŋ].

2.1 Assimilation

Assimilation is one of the most commonly noted phenomenon in many languages of the world: this is a rule that makes two or more neighboring segments more similar by making the segments share some feature. When two consonants occur in a sequence one may be assimilated to the other. That is, one may adopt certain features of the other. For example, /t/ assumes the features of neighboring /k/ in /ðæt kΛp/.

2.2 Sound Change Rules in Urdu

Hussain (2006) suggests the following rules in Urdu language.

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 →Ø / V[long]___#

Capitalized ‘V’ indicates a vowel and ‘.’ indicates a syllable boundary (Hussain, 2006). The aim of the article is to investigate whether or not rule of bilabial assimilation is applicable in Urdu Language.

3. Methodology

3.1 Sample

Three undergraduate and postgraduate level students were (23 to 30 years of age). These speakers whose L1 was Urdu were taken from Muzaffarabad.

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. [kanp] (shiver), [sanp] (snake), [d^hanp] (cover), [konpəl] (bud) were used with /n/ preceding /p/ and [gʊnbəd] (dome), [tʃənbeli] (jasmine), [anbrin] (Proper noun; female name), [kʊnbə] (tribe) were used with /n/ preceding /b/. The speakers were asked to read these words and the words were analyzed using PRAAT. In the utterances of the speakers, extrinsic consonant cues were observed along-with F1[1] and F2[2] of the nasal consonant /n/ and mean of the frequencies was calculated. The average frequency was compared with F1 & F2 of /n/ and /m/ in VCV context.

4. Results

F1 and F2 of nasal consonant /n/ were recorded to be closer to the F1 and F2 of /m/ in VCV context. The extrinsic constant cues were also found similar to those of /m/.

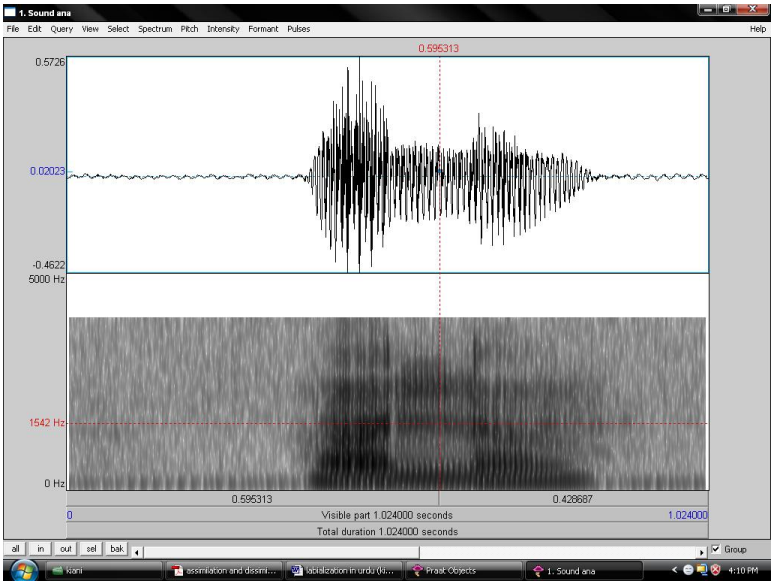
F1 and F2 of /n/ and /m/ in VCV context are given in the table 1.1 below.

4.1 F1 & F2 of /n/ and /m/ Table 1.1

Segment	Context	F1	F2
/n/	[ana]	325	1473
/m/	[ama]	295	1050

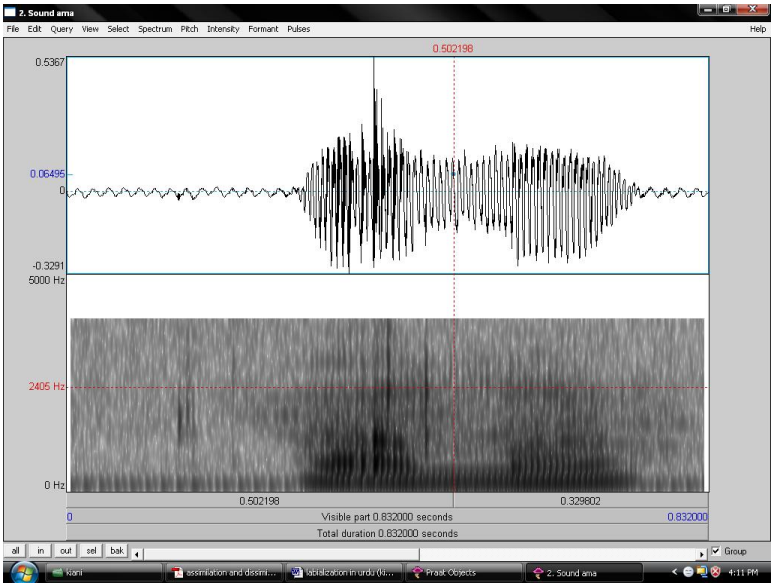
[1] Resonant Frequency one/first formant

[2] Resonant Frequency two/second formant



The spectrogram of /ana/

The F2 of the vowel at onset position is rising while F2 of the vowel at offset position is falling. F2 at onset position rises toward the locus frequency that is around 1800 hz. These consonant cues show that the consonant between the vowels is alveolar i.e. /n/.



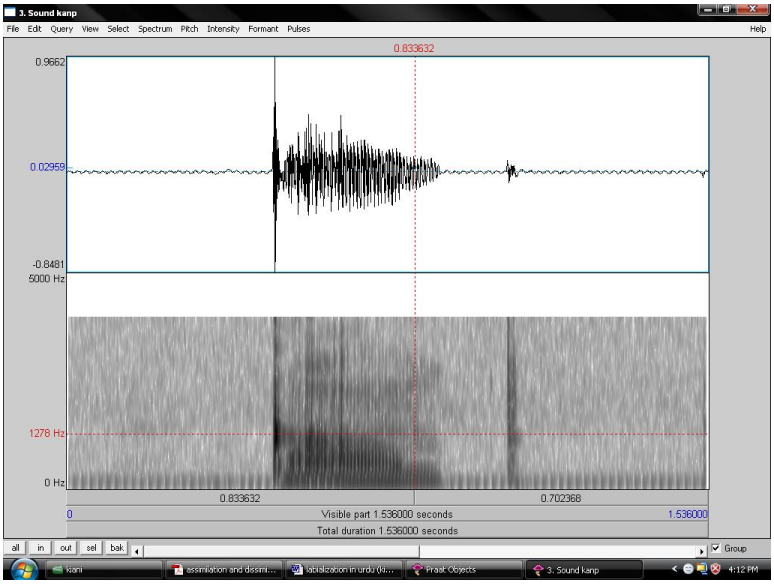
The spectrogram of /ama/

The F2 of the vowel at onset position is falling while F2 of the vowel at offset position is rising. These consonant cues show that the consonant between the vowels is bilabial i.e. /m/.

F1 and F2 of /n/, in different words, preceding /p/ is given in the table 1.2 below.

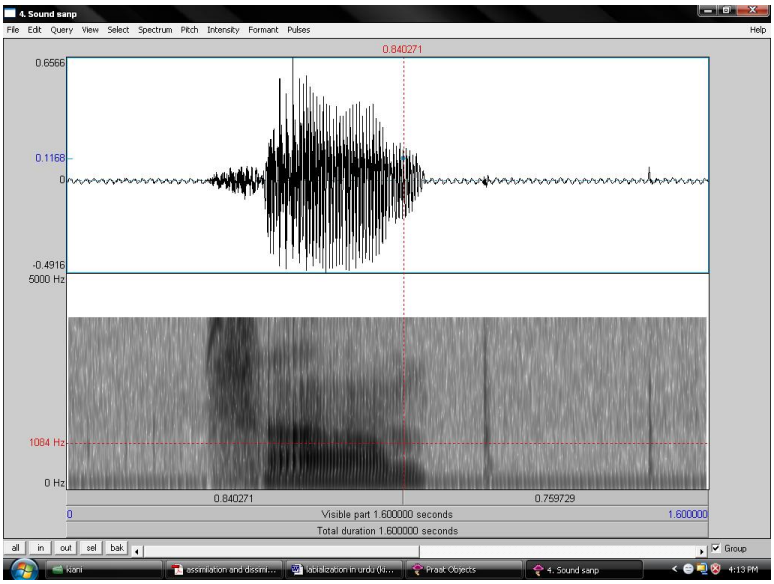
4.2 F1 and F2 of /n/ before /p/ Table 1.2

Word	Segment	F1 of /n/	F2 of /n/
	[kanp]	295	1171
	**[sanp]**	265	1201
	**[d^hanp]**	265	1141
	**[konpəl]**	295	1111



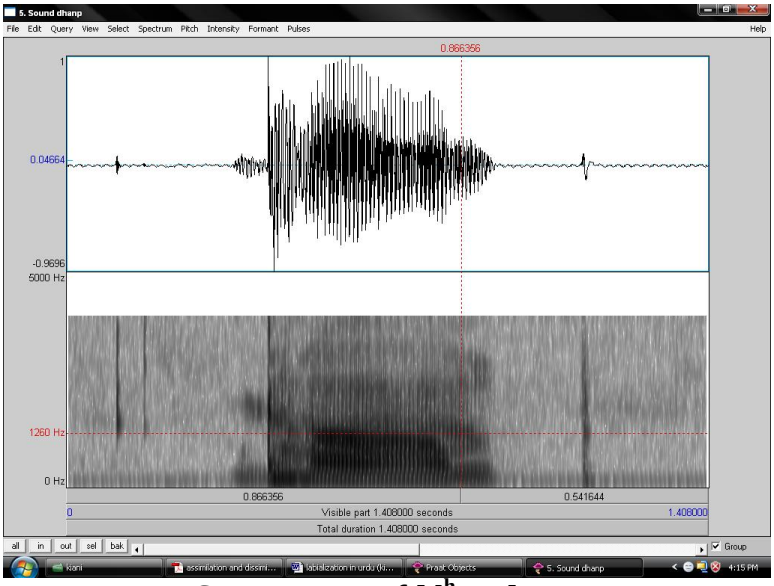
Spectrogram of [kanp]

The F2 of the vowel preceding the nasal consonant is falling which shows that the consonant is bilabial.



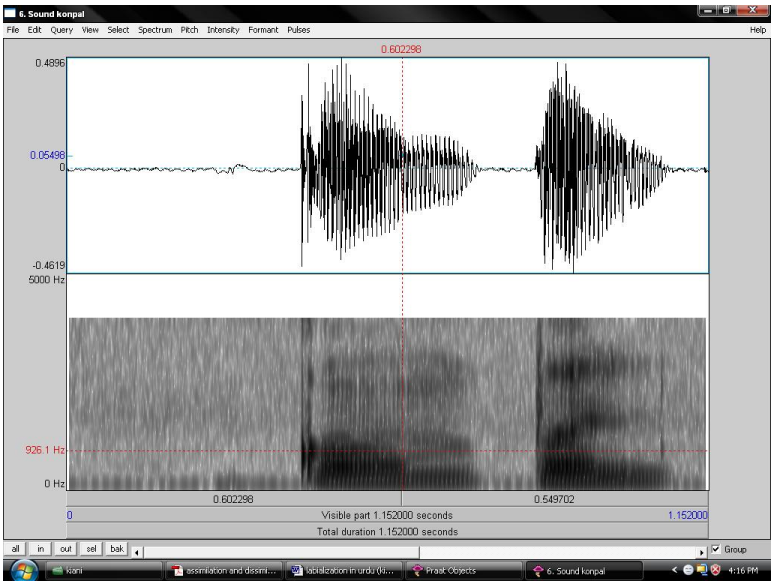
Spectrogram of [sanp]

The fall of F2 of vowel, before nasal consonant, shows that the consonant is bilabial.



Spectrogram of [d^{h}anp]

The F2 of the vowel preceding the nasal consonant is falling which shows that the consonant is bilabial.



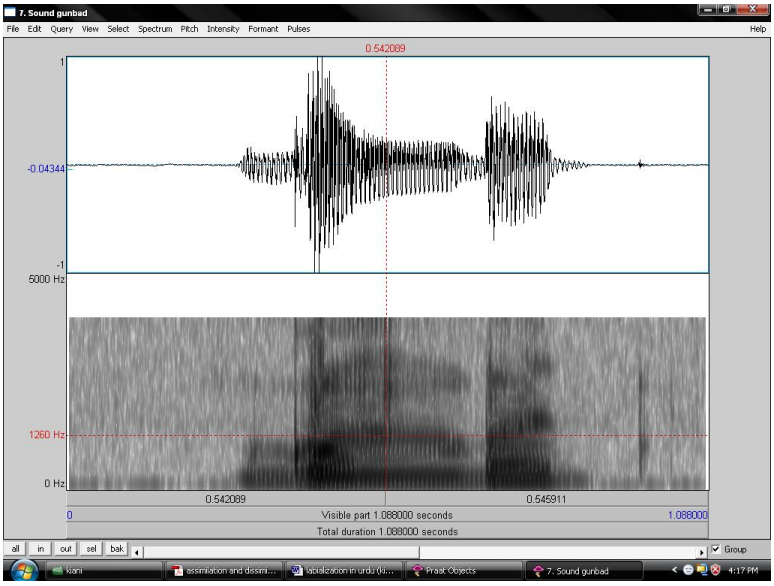
Spectrogram of [konpəl]

The F2 of the vowel preceding the nasal consonant is falling which shows that the consonant is bilabial.

F1 and F2 of /n/, in different words, preceding /b/ is given in the table 1.3 below.

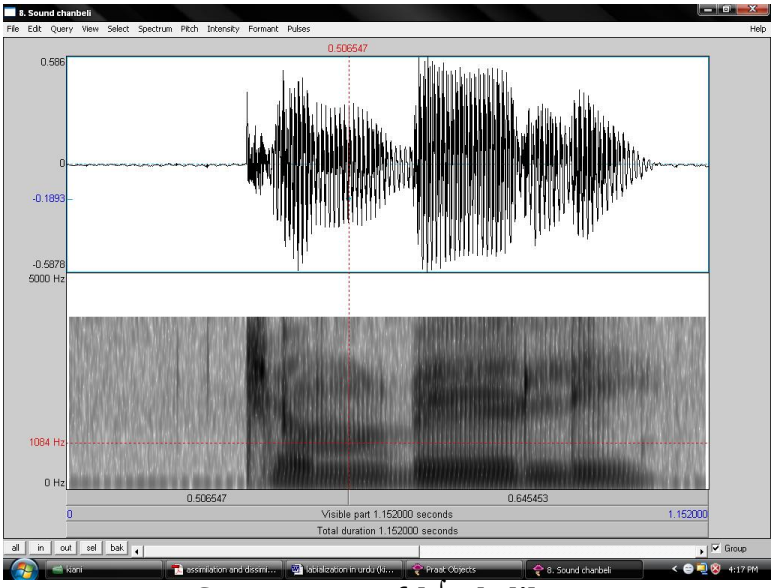
4.3 F1 and F2 of /n/ before /b/ Table 1.3

Word	Segment	F1 of /n/	F2 of /n/
	[gʊnbəd]	295	1201
	[tʃənbeli]	265	1261
	[anbrin]	295	1201
	[kʊnbə]	295	1080



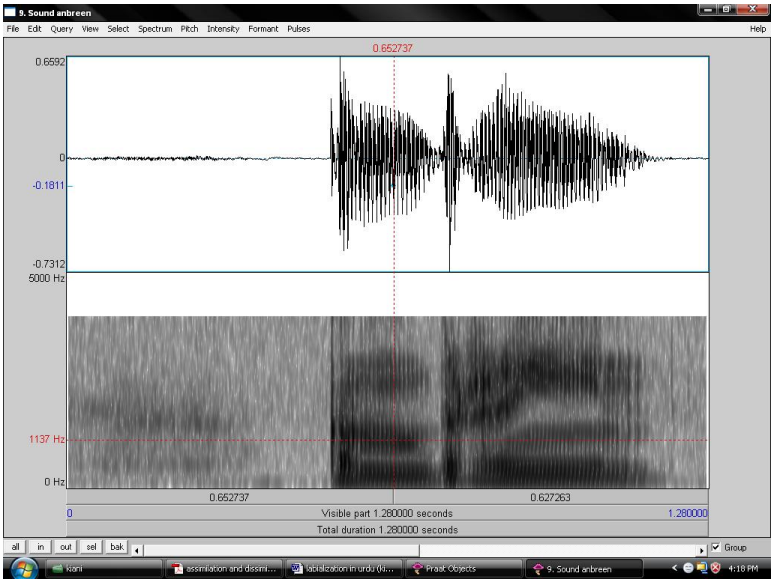
Spectrogram of [gʊnbəd]

The F2 of the vowel preceding the nasal consonant is falling which shows that the consonant is bilabial.



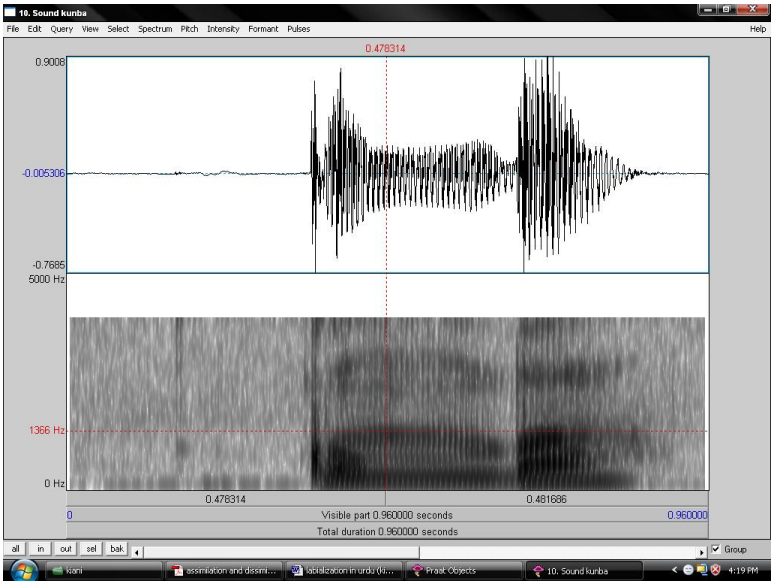
Spectrogram of [tʃənbeli]

The fall of F2 of vowel, before nasal consonant, shows that the consonant is bilabial.



Spectrogram of [anbrin]

The F2 of the vowel preceding the nasal consonant is falling which shows that the consonant is bilabial.



Spectrogram of [kʊnbə]

The F2 of the vowel preceding the nasal consonant is falling which shows that the consonant is bilabial.

5. Discussion

The F1 of /n/ in /ana/ is 325 and F2 is 1473 whereas F1 of /m/ is 295 with F2 1050. F1 of /m/ in VCV context was recorded as 295 while the F1 of the nasal sound before /p/ in different words was marked in the range 265-295. Similarly, F1 of the nasal sound before /b/ in different words was found to be in the range of 265-295. F2 of /n/ was recorded 1473 and F2 of /m/ was 1050 in VCV context. F2 of the nasal constant before either of the bilabial plosive was found greater than F2 of /n/ in VCV context. It was recorded in the range of 1080-1261. But, its inclination was found toward the F2 of /m/ rather than that of /n/. This shows that acoustic properties of the nasal sound preceding any of the bilabial plosive are similar to those of /m/.The consonant cues of nasal sound before bilabial plosive were also found similar to those of bilabial nasal /m/.

These results of the data show that all the speakers are producing bilabial nasal /m/ before bilabial plosive, /p/ or /b/, which is in accordance with the following rule:

$$/\mathbf{n}/ \rightarrow [+\,bilabial] \,/\, - \begin{bmatrix} +\,bilabila \\ -\,nasal \\ +\,stop \end{bmatrix}$$

Conclusion

To conclude, after the acoustic analysis of /m/ and /n/ in Urdu in VCV context and before bilabial plosive, it was found that acoustic properties of the nasal sound before bilabial plosive are more like to those of /m/ in VCV context. It shows that Urdu speakers change the alveolar nasal /n/ with bilabial nasal /m/ whenever it is followed by any of the bilabial plosive i.e. /p/ & /b/.

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Zafeer Kiani, M.Phil. Student
Department of English
University of AJK
Muzaffarabad
Pakistan

Abdul Qadir Khan, Ph.D. Student
Department of English
University of AJK
Muzaffarabad
Pakistan
qadirabbasi@yahoo.com

Nadeem Haider Bukhari, Ph.D.
Department of English
University of AJK
Muzaffarabad
Pakistan
Nhb67@hotmail.com