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Observing Frequent Use of Vowels with Symbols /Λ/ and /ə / in Language Acquisition among Children from 18-36 Months Old

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Abstract

At the young age what types of vowels are acquired by children has been matter of thrill and inquisitiveness, not only in Urdu but almost in all languages of the world. It is also significant to understand what acquisition of vowel what additionally contributes to in regard of language acquisition. Few researches have been conducted carrying the same idea but current research used an acoustic analysis to find out the reality. A purposive sample having 4 children was noticed. The age of first child was 18 months, while the second child was 24 months old; the next child was 6 months older than the age of the third child. It was ensured that parents of different participants must use Urdu in their day to day talk rather than English or Punjabi. Almost three minute speech of each child was recorded by software Praat using Android mobile phone. Later, all recorded data of acquired phonemes in L1of each child was segregated from consonants to testify vowels. While acoustic analysis, dark bands were focused as normally this sort of band gave clues of vowels. Voice of each acquired vowel was testified by British Council English Phonemic Chart. Minute observation between acquired vowel of each child and British Council Phonemic Chart helped in organisation of data. In addition to it, F1, F2 and F 3 were also recorded justifying tongue position and lips movement. All data was organised in tables child wise. Results were discussed in detail. Finally, it was suggested that sample used short vowels at all given time span.

Keywords: *Acoustic Analysis, Acquired vowels, praat software, phonemic chart, short vowels.*

1. Introduction

Out of 12 monothongs in British Council phonemic chart, the Symbols / Λ/ and symbol /ə/ were noticed in recorded speech of each child. In quadrilateral diagram of vowels, designed by Daniel Jones, these are located in central horizontal bars. While articulating these symbols, tongue position remains at the intermediate point between front and back vowels, rising towards the roof of the mouth, in the area where hard and soft palate fuse. These are short vowels.

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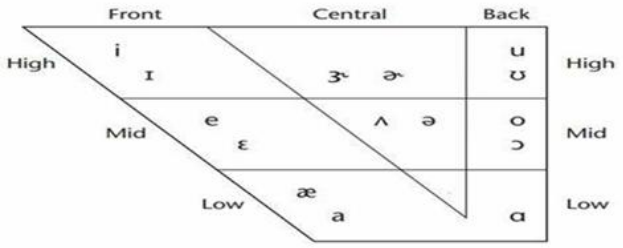
In 19th century, Daniel Jones introduced Cardinal System in order to differentiate vowels according to different tongue positions. In addition, vowels can be listed keeping in view tongue's horizontal position, vertical dimension and lip articulation. In other words, it may be assumed that backness, and height of tongue and associating with it lip's movement elaborate overall vowel category.

Figure:1

Introducing Different Vowel Positions Indicating Tongue Movement



1. Height

Vowel height, depending on the model, theoretically describes the vertical position of the tongue or jaw about the aperture of the jaw or the roof of the mouth. But in reality, it refers to the first formant, or F1, which is the voice's lowest resonance and denotes the height of the tongue.

In high vowels articulation for example, [I] and [u], one can notice tongue position near topalate and jaw opening. This particular position of tongue and jaw together indicates the first formant or F1.Similar to it, while uttering low vowels as[a], tongue position is comparatively low but jaw opening is also visible. Low vowels are also called open vowels.

1.2 Backness

Cardinal front vowels' idealized tongue locations show the highest point.

Vowel backness appears when the location of the tongue during vowel articulation reaches about the horizontal position. Nevertheless, a voice formant reflects its position either it reaches to palate or turns into backness of the mouth, the second, or F2, indicates degree of backness of a vowel rather than the tongue position. . In contrast to back vowels like [u], where the tongue is often come at position towards the back of the mouth, front vowels have a comparatively low frequency of F2, which indicates how much the tongue has forwarded towards mouth.

1.3 Roundness

The degree of pursing the lips during vowel uttering is described as an important feature of phonetics. It affects vowel quality, too. Vowels' place of articulation may be labial. Unrounded vowels work with relaxed lips, while rounded vowels utter a voice with a circular opening of the lips. Back vowels are often noticed to be rounded in many languages and front vowels do not need lips to be rounded.

Language acquisition is that child learns what he hears in his environment. It is its unique aspect and the order of language acquisition follows a hierarchy of phonology, morphology, syntax, semantics, and pragmatics. Almost all children acquire language almost in the same period and with the same astounding speed regardless of their social, cultural, and economic status. Words, Phonemes, and syllabi, infants do not learn randomly but it is fully structured.

Only certain phonemes, he acquires in a specific period, as defined by Andriana, Brooks, and Hedge (2000). This fully structured language system leads to a hierarchical system that consists of place and manner of articulation. This journey starts with Vowels. Then, infants combine vowels with consonants. Later, the syllable pattern becomes the center of attention as described by O'Grady, Dobrovolsky, and Katamba (1996). After acquiring CV, infants move towards acquiring canonical and variegated babbling.

So far as a place of articulation is concerned, across the globe, there is a hierarchical structure that first follows Labials, followed (by some variations) by alveolar, velars, and alveoli palatals. At last, the infant acquires interdentals in the end as described by O Grady et al (1996).

Stops tend to occur first, O Grady (1996) details in Contemporary Linguistics discussing the further sequence of order of articulation. /la/ and /ra/ are acquired late by the infant, Eimas (2010) Voiced consonants are developed first in this sequence of the manner of articulation. Richtsmeier (2010) that firstly children convert all devoiced initials of words to voiced initials. Secondly, all last voiced consonants change into devoiced though these are part of normal speech. Smith (1979) also agrees with this process of devoicing. Thirdly, children devoice velar more than alveolar and labials.

1.4 Statement of the Problem

The Urdu language has been the language of centuries but unfortunately, less research was conducted regardless of its rich history and amalgamation of many living languages of the world. Like renowned languages of the world, Urdu language too has its phonology. The manner of articulation in language acquisition or the sequence of order in language acquisition is global, and this language also comes across almost with the same phenomenon.

In the present research,4 babies aged from 18 to 36 months were taken as the sample of research to record order of acquisition of vowels of their first language Urdu and later, through acoustic analysis, it was recorded which type of vowels were spoken. It was also focused on recording to be made possible according to requirements with available data.

1.5 Research Objectives

i. To record through an acoustic analysis the types of acquired vowels.
ii. To record the most shared acquired vowels in all four children.

1.6 Research Questions

i. What is the order of acquisition of L1 Urdu vowels?
ii. Which vowels were shared by all four children?

2. Literature Review

Around 90 million people speak Urdu as their mother tongue and 80 million more as a second language globally. There are 230 million speakers of this language worldwide, making it the tenth most spoken language overall. Most native speakers of Urdu are found in Pakistan and India and have strong cultural ties**.** All four provinces of Pakistan regard Urdu as an official language. Unlike English, it is written from right to left using Persian-Arabic script. Being a tonal language, it allows a word's meaning to vary depending on the pitch of the voice. Words from Persian, Arabic, Hindi, and other languages are included into its extensive lexicon.

Numerous well-known authors, musicians, and poets are Urdu

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speakers**.** According to Swan and Smith (2011), the Arabic alphabet is expanded into the Persian alphabet, which is expanded into Urdu. With the exception of numerals, which are written from left to right, Urdu is written from left to right. Writing is done in cursive, with no use of capital letters. The majority of the letters are available in the following alternative shapes; Independent, Final, Medial, and Initial. Certain letters have the same fundamental form, but they can be identified by additional signs or dots placed above, below, or inside the basic form. English language has 21 consonants 5 vowels while Urdu language has 28 consonants and 10 vowels. Urdu alphabet's sounds do not precisely match with any letter of English sound. Pronouncing some letters correctly might be challenging for Urdu speakers as they make distinct sounds. (For example, the letter "c" makes the sounds "cat" and "circus," which are /k/ and /s/.) There are many English words that contain silent letters, which causes speakers of Urdu to mispronounce the words because they are not aware of it. (For instance, "knowledge" has a silent "k.") Compared to Urdu, a far greater variety of consonant clusters can be found at the start and finish of words in English. Speakers of Urdu make those clusters simpler. (For example, "filam" for "film," "faree" for "free," and "istation" for "station. English is a stress-timed language, meaning that word stress is frequently irregular and strongly indicated.

Urdu is a syllable-timed language. It means that there is a consistent gap in time between every syllable. Since word- stress in Urdu is typically placed on the first syllable, it is typically poorly realized and predictable. Word emphasis is not as important as rhythm. Urdu speakers have trouble with intonation because they emphasize words with a significantly higher pitch without using more forceful articulation.

In Urdu language, expressions of astonishment are reserved for the rising intonation of queries. These variations may result in implications that are not properly conveyed to the listener. (e.g. The words 'ne'cessity' and 'ne'cessary,' 'pho'tograph' and 'pho'to'grapher' are stressed). Tones – "She has a brother?" in place of "Does she have a brother?" Some distinctions between Urdu and English could be challenging as every noun has a masculine or feminine gender. Pronouns do not differentiate based on gender, and demonstratives, which also signify that or this, are used to indicate third person singular pronouns, which are the same as he, she, and it. For example, "I know this car and its problems," may be changed to "I know this car and hisproblems." Subject-Object-Verb is the word order; in English, it is Subject-Verb-Object. There are no markers for the comparative and superlative forms of adjectives. There is no equivalent of the definite article in Urdu. Students frequently leave off the articles, particularly "the", or replace the indefinite article with "one". In Urdu, postpositions are used in place of prepositions following nouns or pronouns. One common mistake made by Urdu speakers is to use the wrong preposition. (e.g. "I was angry on him". for "I was angry with him). There are loanwords from English into Urdu, however due of changes in pronunciation; they might not be easily translated back into English as in "a'gast" for "August" for "October," use "ak'toober. Compared to English, Urdu punctuation seems to be written upside down. Instead of using a period to indicate a full stop, use a dash (-). Instead of using a comma, an inverted comma is utilized. In questions, the question mark is inverted (ʕ). When written, semicolons are inverted (؛).Due to English's rising stature as an international language and its connotation with the upper class, many schools have adopted it as a medium of teaching that has not only maintained UNESCO's resolution separate from that, it also transgressed Pakistan's 1973 Constitution's Article 251, which declared categorically that English will be used till Urdu takes its place. That obviously demonstrates that English was not intended to be a permanent language. Nevertheless, the paradox is that Urdu is being replaced, and most schools, especially the more prestigious ones, are emphasizing focuses more on teaching English, and children are required to utilize it in home domain as well, so that a young can learn it at expense of mother tongue and such environment leads to subtractive bilingualism. Furthermore, children and adults may develop different attitudes toward their L1 without realizing that, as stated by Cummins (2001), a solid foundation in their mother tongue can be achieved if parents limit the transmission of their mother tongue and encourage English. Their mother tongue will enable them to improve their reading skills. Additionally, refusing to speak in one's mother tongue can harm one's mental and pupils' foundation (Ozfidan, 2014), and if they don't have exposure to L1 through their Parents might not be able to transfer it to their offspring (Lewis & Simons, 2010), and the pattern continues.

Pakistan has been the part of British imperialism and colonialism for many years. The impact of slavery still persists in mind of its inhabitants. They normally prefer to speak English when there is show case of language ability. In this context, research in Urdu language couldn't flourish what it deserved. The few research work was seen on the site of Higher Education Commission and these precious research data was being quoted to strengthen ones' point of view. Neither fresh ideas were taken, nor were conscious efforts planned to give further lively status to Urdu language by researchers. It also has been evaluated that modern and more valuable research tools were scanty in previous researches. Through acoustic analysis, data is being adjudged so that results could be made more authentic in current research.

Pakistanis write Urdu in Perso Arabic script in the Nastalique style, with an enlarged Arabic character set that includes diacritical markings, while India writes Urdu in Devangari script and the Nastalique style is extremely intricate because it is cursive and it lacks spaces between words and context. It is also called sensitive. Context sensitivity refers to how the characters' forms vary according on the context's syntactic and semantic elements. Using the diacritical marks, symbolize the vocalic content, or vowels; nonetheless, diacritical marks are typically not so necessary because it is easy to infer the content from the context. Over many years of usage in the academic, administrative, judicial, commercial, and diplomatic domains of Pakistani national life, the educated variety of Pakistani English has developed. Although there were established pronunciation conventions, they were never made clear and they were unwritten and indistinct. Typically, this information came to light during the selection and interview processes, where adherence to locally accepted norms rather than RP standards was expected. People who didn't fit "the norms" were shunned. According to Baumgardner (1989), Pakistani English has evolved into its own Language and cultural distinctiveness that does not detract from British Standard in English.

2.1 Pakistani Children and their First Language

The middle class in Pakistan prefers to speak within family and with children Urdu language. Even in Punjab, the Urdu language is given priority over the mother tongue (Parekh, 2013). "The world's sweetest and most refined language is Urdu." (Ahmad, 2015) and it enjoys the status of the majority of Pakistani children's first language (Parekh, 2013).Children understand it as the medium of communication as they observe it in the bazaars of many big cities (Mustafa, 2017). Print and electronic media also employ Urdu

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language. Furthermore, many weekly and monthly children's magazines are published in Urdu and many programs are broadcasted in the same language. Until primary classes, at government schools especially, the medium of instruction for children is Urdu language. Children are not formally taught in their parents' original tongue. While they could attempt to encourage their child's speech in various ways, such as by smiling, or by bridging the gap between their advanced language skills and the child's early use of 'baby talk'. However, there's no specific reason to think that Children can increase their language skills by playing games with other kids, which is one way to acquire a language. This ability manifests when the child eventually becomes a native speaker of the language spoken by his parents. The particular environmental conditions facilitate language acquisition, although the main component seems to be just enough exposure to language use in a social setting. Kids appear to pick up language easily. They like to learn how to walk. Similarly, they appear to pick up language. They pick up thousands of words as well as intricate grammatical and phonological structures, semantic relationships, and pragmatics. Man does not enter the world before he is able to stand and walk; typically, children start doing so at a similar age. Nobody instructs them on how to walk. There is a clear distinction between 'learning to read' and 'learning to ride a bicycle' and 'learning to walk' or 'learning to speak.'

2.2 Linguistic Features of Urdu Language

The Urdu language has 28 consonants, which are all distinguished in writing. It consists of 10 vowels. Out of these vowels, 5 are long, 3 are short and 2 are diphthongs. So as long vowels are concerned, several sounds may be written with the same symbol. In Urdu language, short vowels are usually insignificant, but if a word may be misread, then they indicate symbols written above or below the letter, these are associated with them.

2.3 Transcription of Urdu alphabet

2.2.1.1Consonant ب/b/, پ /p/,ت /t̪/, ٹ /ʈ/, ث /s/, ج / ʤ /, چ /ʧ/, ح /h/, خ /x/, د /d̪/, ڈ / ɖ /, ذ /z/, ر /r/, ڑ /ɽ/, ز /z/, ژ /ʒ/, س/s/, ش/ʃ/, ص /S/ , ض /z/, ط /t̪/, ظ /z/, ع /ʔ/, غ /ɣ/, ف /f/, ق /q/, ک /k/, گ /g/, ل /l/ , م /m/, ن /n/, ہ /h/, ھ, ۃ t̪ (S,S., Hussain, 2004)

2.2.1.2 Vowels ◌ َ /ə/ , ا Alif /A/, آ /a:/ (final), ◌ ِ /I/ (short) ,ای /i:/ ◌ ے,ایـ/e:/,اَیـ/ɛ:/, اُو /u:/, (short),او / o:/, اَو/ɔ:/.

Scanty information literature gives about the Urdu language and Urdu phonology. Until 2017, no authentic data about Urdu inventory was available. For instance, for consonants, it was claimed 41, (Bokhari, 1985; Bokhari, 1991; Hussain, 1997; Raza, 2009); and Saleem et al., 2002) 44. Collectively, Hussain (1997), Khan (1997), and Bukhari (1985, 1991) have listed 28 out of 43 consonants. It is also important to list the total number of vowels in the Urdu language.

Saleem et al (2002) describe them as 17. It is also important to note that there is no vivid difference in /v/ and /w/. Both work the same in different cases in the native language of their speakers.

Indeed, Urdu word itself is a Turkish language word, which means an army‖. Urdu has a very rich phonetic inventory, a combination of Urdu letters and diacritics realizes 44 consonants,

28 non-aspirated & 16 aspirated. (Saleem et al.,2002). Furthermore, it has 22 stops, 8 fricatives, 5 nasals, and 6 liquids and glides. Moreover, it has 11 vowels short and long oral and nasal. It is lively language because people use it maximum in Asia. Not only they use it giving it language of first language but also love their grandchildren do use them especially where they are living as second citizen. It is the same language which was one of the causes that resulted in emergence of new country. As it is one of the most popular and biggest languages of the world. The number of researches as being conducted in English, for example, one couldn't see in Urdu throughout the world.

2.4 Monophthongs, Diphthongs, and Triphthongs

A vowel sound that has a consistent character throughout is called a monophthong. Some people refer to monophthongs as having "pure" or "steady" vowels. A triphthong is a vowel sound that glides successively through three qualities, while a diphthong is a vowel sound that glides from one quality to another. If the vowel sound can be broken down into individual phonemes, diphthongs, and triphthongs are distinguished from sequences of monophthongs in phonology. For instance, the word flower (/flaʊər/) is pronounced with two vowel sounds.

Phonetically, they are a sequence of a diphthong (represented by the letters ow) and a monophthong (represented by the letters ({er}), but phonologically, they are a disyllabic triphthong. Only in this phonemic meaning are the terms diphthong and triphthong used by some linguists.

2.5 Central Vowels

As their name implies, the central vowels are uttered in the middle of the mouth. The tongue is lifted to mid-height in the middle, and the lips are loose and unrounded. For the most part, it is difficult to distinguish between /ə/ and /ʌ/. Try the classic word above, which has both: /əbʌv/. They are simply used to determine whether the phoneme or syllable is stressed or not, but the pronunciation is the same. In actuality, unless they are especially interested in the usage of stress in the recorded language, many linguists and even some transcribers only utilise the phoneme /ə/.

/ə/ **a**bout hav**e**n't hon**o**ur

/ʌ/ **u**tter m**u**d d**ou**ble.

Additionally, it might be assumed that infants till the age of three years had stress in their spoken or words normally they spoke, (W. Grahamsons, 2015). The same stance was also repeated by as The middle of the mouth, with the tongue body lifted to mid-height, is where the American English central vowels, /ə/ and /ʌ/, are produced. The majority of the tongue should be relaxed. The sounds /ə/ and /ʌ/ are almost identical. / ə /, sometimes referred to as "schwa," appears in unstressed syllables, while /ʌ/ appears in stressed syllables.(Introduction to Vowels, University of New York).

Pakistani English Vowel Sounds

/ɪ/ Recognised as a centralized, front, half-close unrounded vowel in RP such as 'sit': / sɪt/.

/e/ It is a short, front and unrounded vowel between half-close and half-open. Urdu speakers, sometimes, replace [e] sound by the long vowel [æ] e.g. 'education' is pronounced as /æʤʊkɪeʃn/.

/æ/ is recognized as a front, unrounded vowel just below the half-open position in RP as in 'bad': /bæd. In Middle English, it was normally called as 'short A' but in modern English it is /æ/. **a:** / is also realized as a centralized, back rounded vowel in RP e.g., 'calm': / kɑm/.

/ɒ/In RP, this is a back, rounded vowel just above the open position. e.g. 'rod'/rɒd /. Half of the total number of subjects (in her research) i.e. 50% pronounced this sound correctly, 48% had a variation in error by producing the /r/ sound at the end of the word,

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'record' while 2% substituted the /ɒ / with a /a: / sound. (Sheikh, Q., 2012).

/ɔ: / It is taken as a back and rounded vowel. It persists between half-open and half-close. It is normally observed in the word, 'watch'. But in Urdu language, the pronunciation of the open back vowel /ɔ: / is observed only 66 %produced the vowel sound correctly while 34% are unable to pronounce it correctly. Pakistanis replaced it with back open /a: / vowel and sometimes, it is replaced by /a: / as in 'walk': /wɑ:k/, (Sheikh, Q., 2012).

/ʊ/ Just above half-close, there is a back, centralized rounded vowel. 56 % of the subjects pronounced this correctly. It is generally recognised as in RP but sometimes, it is replaced by /ʊ/ as in 'wool' which is pronounced /wu:l/ instead of / wʊl /. Another example is of 'sugar' which is pronounced as / su:gə/.

/u/ is a back, close, rounded vowel e.g. 'moot' is pronounced as /mut/.

/ʌ/is recognized as in RP as a central, unrounded vowel between open and half open. It is sometimes replaced by /ɒ/ in words like 'company': / kɒmpənɪ / and 'atmosphere': /ætmɒsfɪə/. **/ɜ:** / generally, pronounced correctly but sometimes substituted by /ɜr/ as in/ chɜrt/ for /chɜt. **/ə/** In the initial position, this sound is sometimes replaced by /æ / as in 'aenemic': /ænimɪk / and in the final position by /ɑ/ as in 'data': /deɪtɑ/ instead of /deɪtə/. 54% Urdu speakers pronounced this sound in the word, 'apparent' for example as task was given for examination. 38% replace the schwa with /æ/ and 8% speakers pronounced it incorrectly. Previous researches may had been dealing with acquired number of vowels, either less are short or more are long but current research after noticing repeated occurrence of the same vowel with symbol /ʌ/ and vowel with symbol /ə/ in all children's recorded data gave new approach to study.

3. Methodology

Four infants were participants in the current research, having different age periods. The first baby was only 18 months old. The second one was 24 months old, and the second last one was 30 months old. Working on parameters of a six-month gap to the next baby, the fourth baby was 36 months old. The condition for choosing suitable sampling was that participants in the research should be native speakers of Urdu. Making the situation clearer, it was given priority that parents of selected babies must speak Urdu to their children. Different four babies' houses were visited as parents were requested almost one week earlier to participate in the data collection process of their infants. Android phone was used for recording the speech sounds of different six infants. Their age ranges from 18 months to 36 months. A wave file was used for recording data.

Table 2

Formant frequencies of 24 old month old Baby

Vowels	F1 (Hz)	F2 (Hz)	F3 (Hz)
/ʌ/	1035	1874	1972
/ ə /	888	1375	2599
/a: /	1097	1512	2074
/i: /	601	1832	3389
/ɔ: /	1153	1751	3578
/ɜ: /	1075	1532	2198
/u: /	685	939	2020

Table 3

Formant Frequencies of 30-months-old Baby

Vowels	F1	F2	F3
/ɘ/	1289	2110	2326
/i: /	648	1878	3300
/ʌ/	1183	1458	2418
/ʊ/	1072	1320	3408
/u: /	450	1826	2716
/e/	116	1129	2228
/æ/	1419	2024	2655
/a:/	1139	1890	2320

Table 4

Formant Frequencies of 36 old Baby

Vowels	F1 (Hz)	F2 (Hz)	F3 (Hz)
/e/	731	1892	3208
/ʌ/	1186	1195	2359
/ a:/	1278	1733	2720
/ə/	640	2191	475
/ɒ/	1023	1861	2682
/ ɔ:/	813	1400	2687
/ ʊ/	858	1488	2117
/i:/	907	2293	3443
/æ/	842	1385	2273

Table 6

Vowels of the Urdu language (Monophthongs and Diphthongs) acquired by infants from 18 months to 36 months being its natives

Sampling	No. of vowels (mono- thongs) Acquired	Front Vowels	Central Vowels	Back Vowels	No. of Diphthongs acquired
18 months	7	/e/	/ɜ: /,/ ʌ/	/u:/, /ʊ,//ɔ:/,/ɒ/	1
24 months	7	/ i/	/ə/, /ʌ/, /ɜ: /	/ɔ:/, /u:/,/ɒ/	2
30 months	8	/ i/, /æ/,/e/	/ʌ/, /ə/	/ʊ/, /u:/	3

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		/a: /			
36 months	9	/i/, /e/,æ/ /a: /	/Λ/, /ə/, /ɜ: /	, /ʊ/, /ɔ: /	2

4. Results

As the results indicate that all children used mid short and low vowel with symbol Λ (as in h***u***t). Out of four, three children use vowel schwa /ə/ which may indicate children at their infancy were using stress and unstress while using syllables.

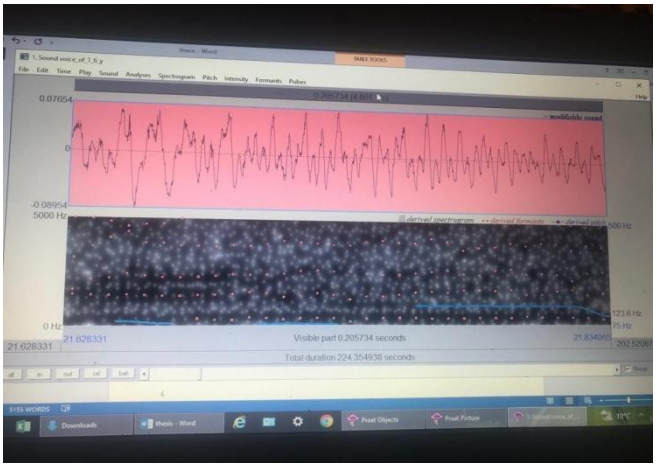
It may emphasize that children not only acquire different type of vowels but how to exert the stress or unstress on words, it is also the necessary feature which they adopt. In addition, initiation of intonation is also recorded as learning process in infancy.

Table 2

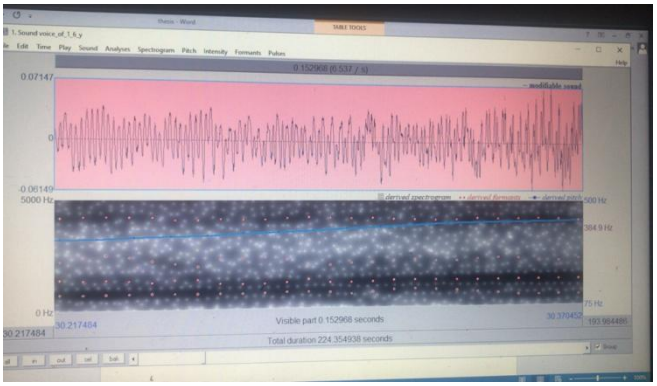
4.1.1Formant frequencies of 18month old Baby

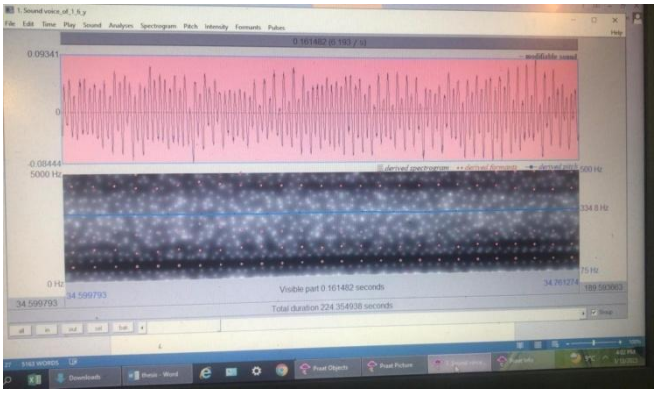
Vowels	F1 (Hz)	F2 (Hz)	F3 (Hz)
/Λ/	547	1637	2749
/u:/	683	1241	2197
/ʊ/	659	1366	2099
/e/	492	2050	2370
/ɜ:/	637	1370	2871
/ɔ: /	759	1641	2886
/ ɒ/	997	1775	3235

1. Praat image of /Λ/

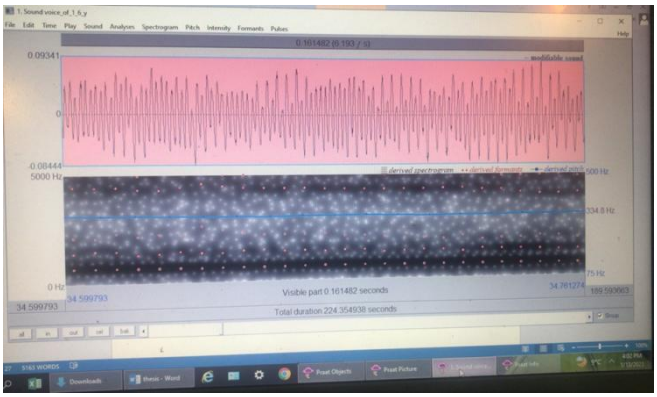


2. Praat image of /u:/

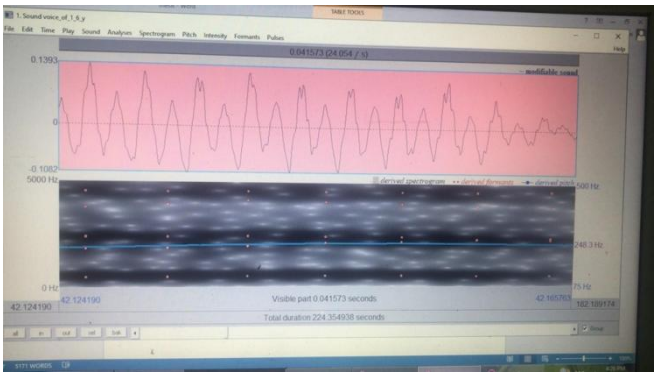




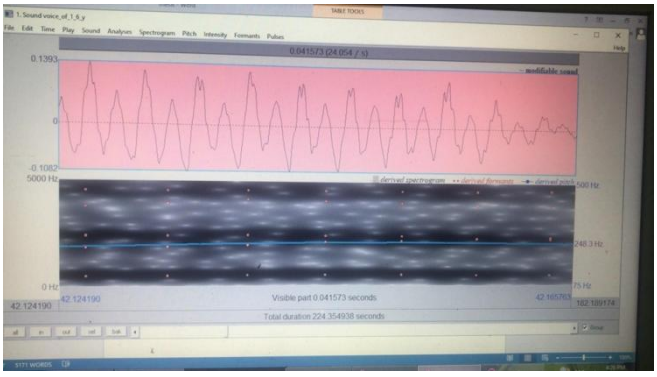
3. Praat image of /ʊ/



4 Praat image of /e/



5. Praat image of / ɜ: /



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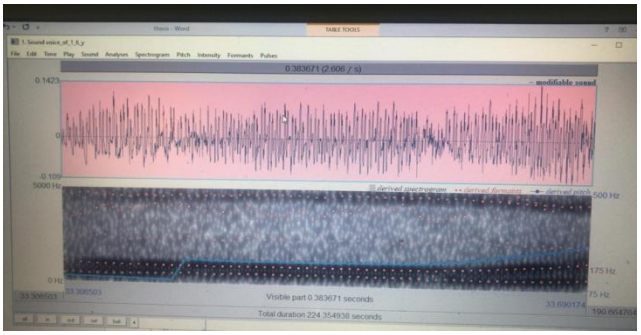

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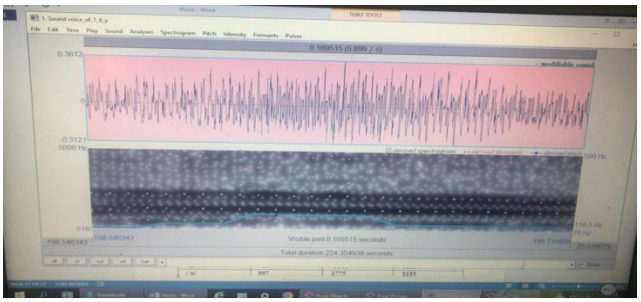
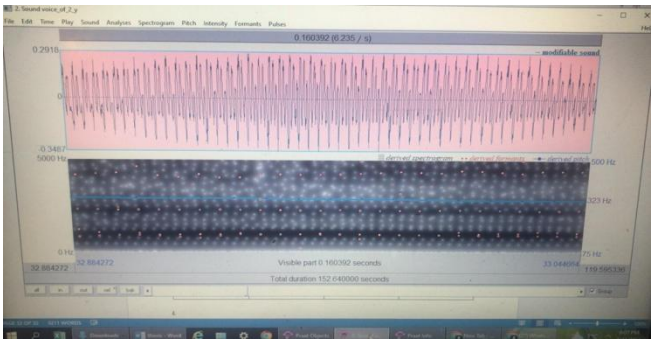


Table 3

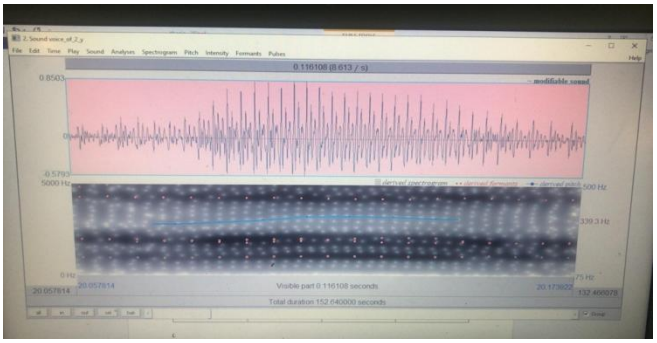
4.1.2Formant frequencies of 24 old month old Baby

Vowels	F1 (Hz)	F2 (Hz)	F3 (Hz)
/Λ/	1035	1874	1972
/ ə /	888	1375	2599
/a: /	1097	1512	2074
/i: /	601	1832	3389
/ɔ: /	1153	1751	3578
/ɜ: /	1075	1532	2198
/u: /	685	939	2020

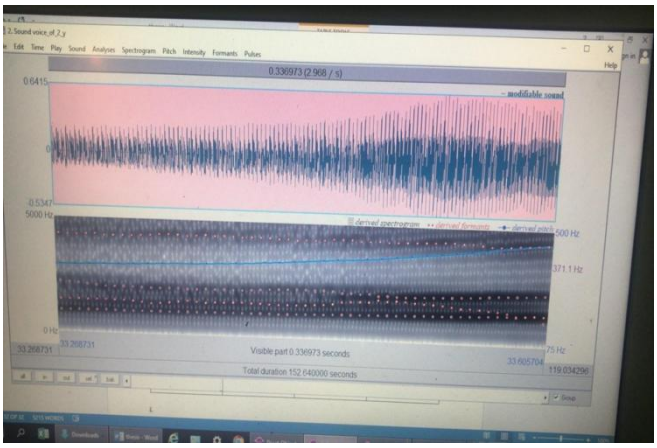
1. Praat image of /Λ/



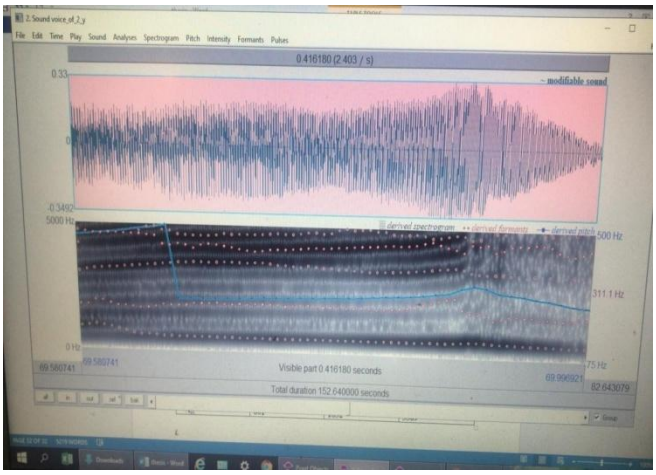
2. Praat image of / ə /



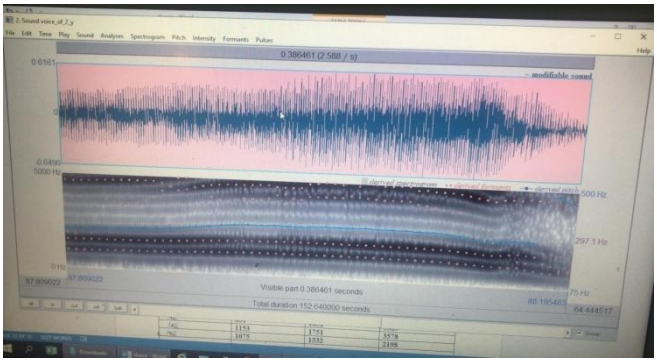
3. Praat image of /a: /



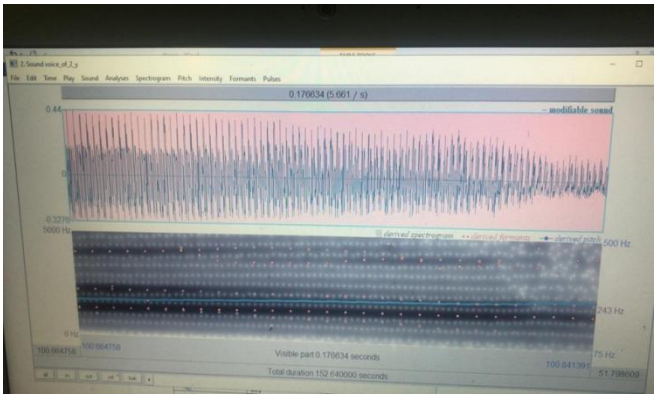
4 . Praat image of /i: /



5. Praat image of /ɔ: /



6.Praat image of /ɜ: /



7. Praat image of /u: /

DOI: 10.5281/zenodo.18478874

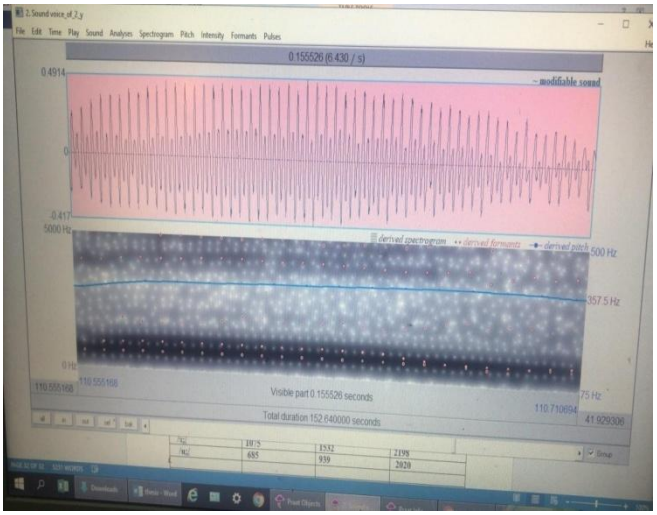
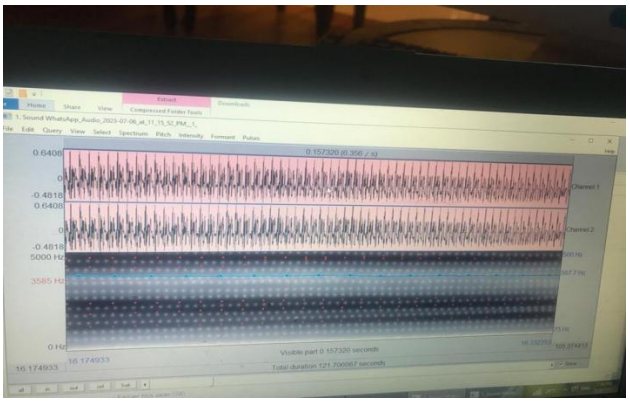


Table 4

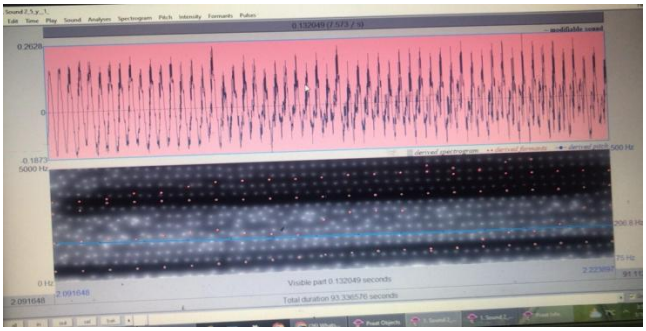
4.1.3Formant Frequencies of 30-month-old Baby

Vowels	F1 (Hz)	F2 (Hz)	F3 (Hz)
/Ə/	1289	2110	2326
/i: /	648	1878	3300
/Λ/	1183	1458	2418
/ʊ/	1072	1320	3408
/u: /	450	1826	2716
/e/	116	1129	2228
/æ/	1419	2024	2655
/a:/	1139	1890	2320

1. Praat image of /Ə/

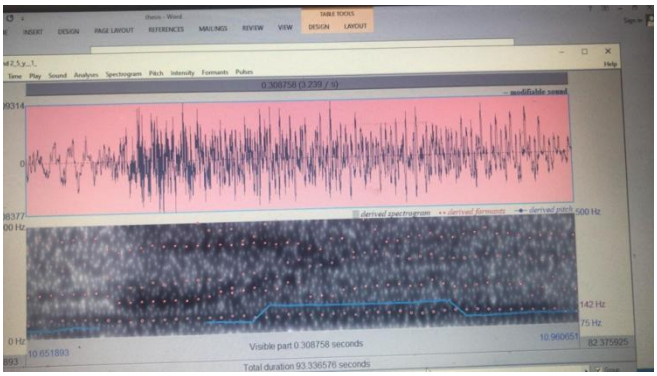


2. Praat image of /i:/

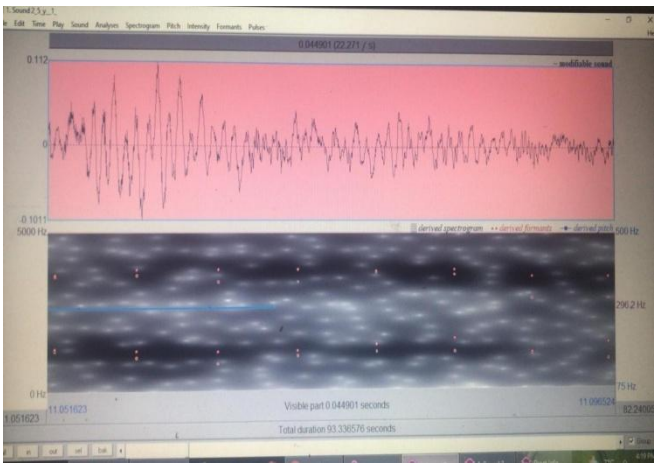


3. Praat image of/Λ/

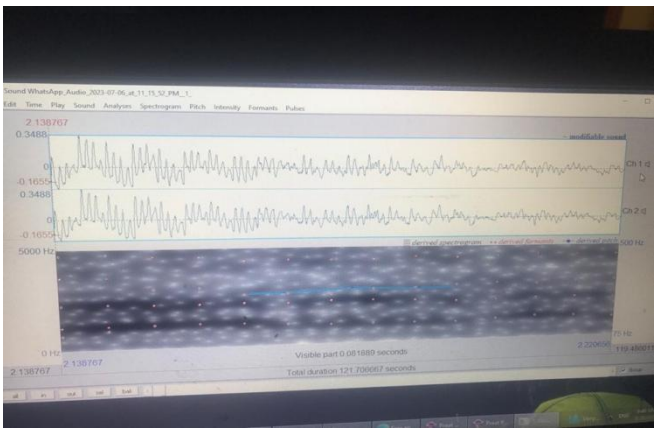
4. Praat image of /ʊ/



5. Praat image of /u/



6. Praat image of /e/



7. Praat image of/æ/

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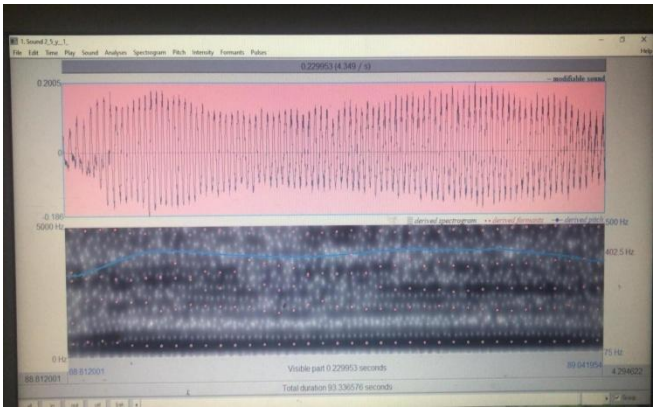


8. Praat image of /a: /

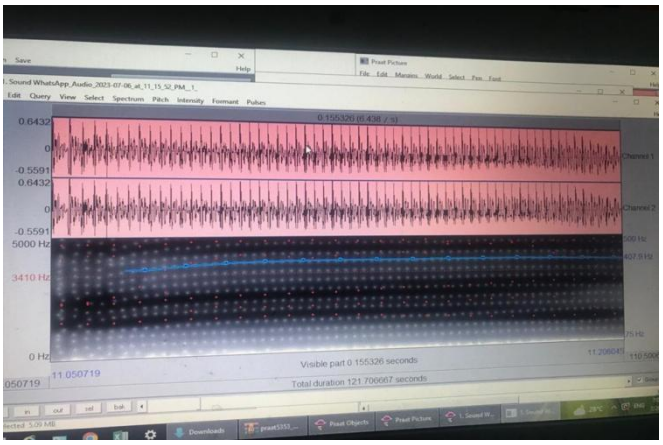
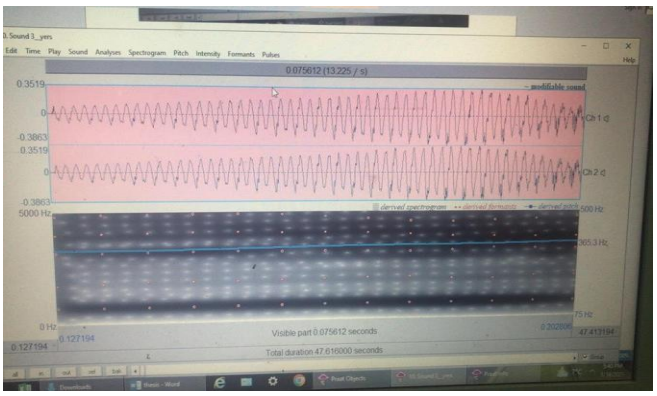


Table 5

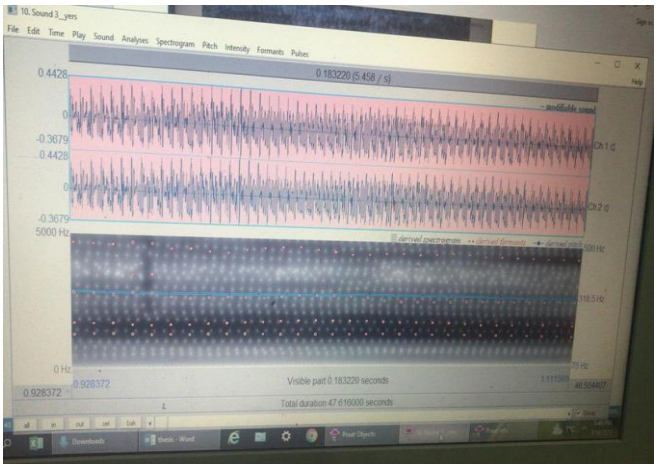
4.1.4Formant Frequencies of 36 old Baby

Vowels	F1 (Hz)	F2 (Hz)	F3 (Hz)
/e/	731	1892	3208
/ʌ/	1186	1195	2359
/ a:/	1278	1733	2720
/ə/	640	2191	475
/ɒ/	1023	1861	2682
/ ɔ:/	813	1400	2687
/ ʊ/	858	1488	2117
/i:/	907	2293	3443
/æ/	842	1385	2273

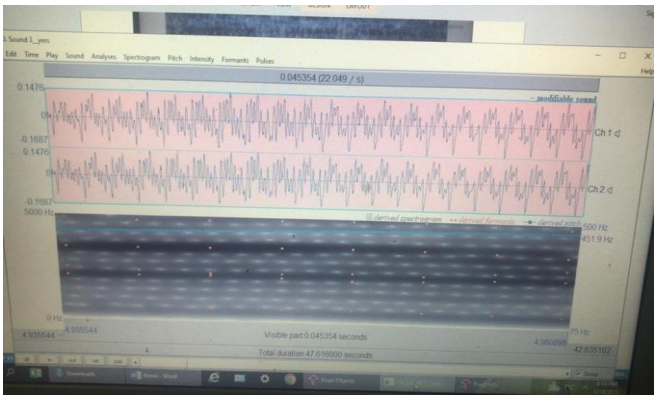


1. Praat image of /e

2. Praat image of /ʌ/



3. Praat image of / a:/



4. Praat image of /ə/

5.Praat image of/ɒ/

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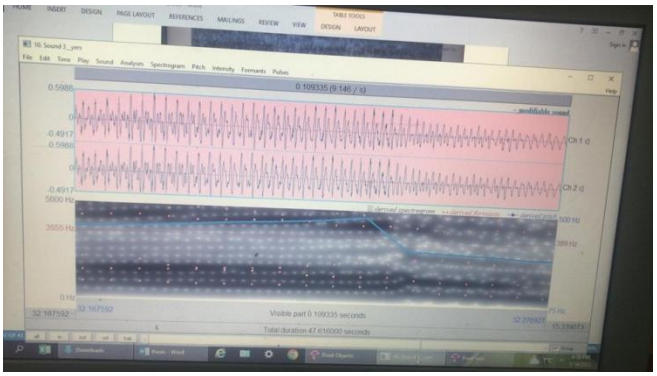
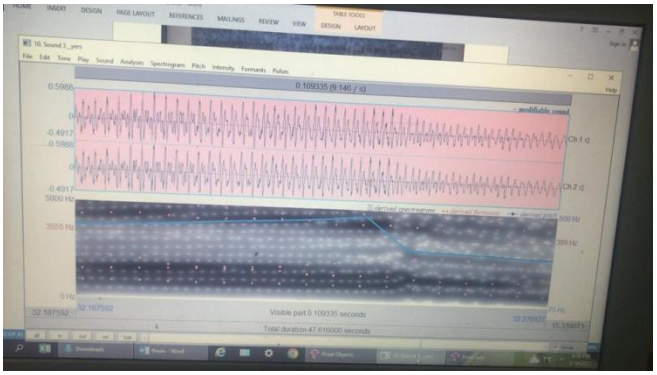
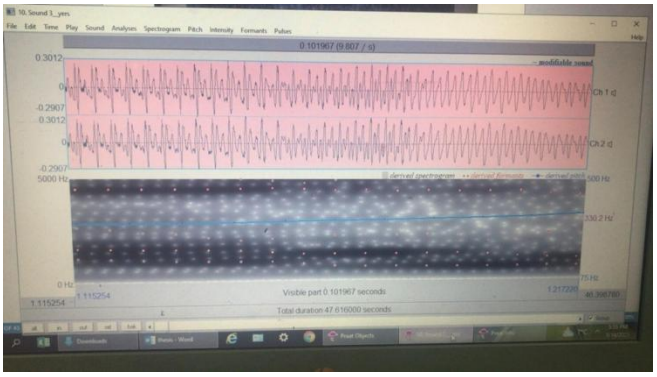
6.Praat image of / ɔ: /



7.Praat image of / ʊ/



8.Praat image of /i:/



9. raat image of /æ/

References

1. Bokhari, S., (1985). *Phonology of Urdu language*. Karachi: Royal Book Company
2. Hussain, S., 1997. *Phonetic correlates of lexical stress in Urdu*. Communication Sciences and Disorders-Speech and Language Pathology. Evanston: Illinois. PhD Thesis.
3. Hussain, Q., Mahmood, R. and Mahmood, M.A., (2011). *Vowel substitution: A comparative study of English loans in Punjabi and Urdu.* International Journal of Linguistics, 3(1), pp.E31(1-13)
4. Khan, U. (2010*). Of Turkish loanwords in Urdu and Dr Sabir. The dawn, p. 2. https://www.dawn.com/news/582032/of-turkish-loanwords-in-urdu-and-dr-sabir-*
5. Raza, A.A., (2009). *Design and Development of an Automatic Speech Recognition System for Urdu. FAST-National University of Computer and Emerging Sciences*, Lahore Pakistan. PhD Thesis.
6. Saleem, A. M., Kabir, H., Riaz, M. K., Rafique, M. M., Khalid, N., and Shahid, S (2002).*Urdu Consonantal and Vocalic Sounds*. CRULP Annual Student Report. Centre for Research in Urdu Language Processing. [Online]. Available from.http://www.cle.org.pk/Publication/Crulp_report/CR02_01E.pdf [Accessed 10 October, 2014]. W.Graham (2015)
7. Categories: English Speech Sounds

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