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POSTVOCALIC RHOTICITY IN PAKISTANI VS. BRITISH ENGLISH: AN ACOUSTIC ANALYSIS

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ABSTRACT

This study conducts a comparative acoustic analysis of postvocalic /r/ in Pakistani English (Pak E) and British Received Pronunciation (RP) among BS-level students. While RP is characteristically non-rhotic, PakE displays variable rhoticity influenced by Urdu retroflex /ɾ/ and sociolinguistic factors. Using Praat software, productions of monosyllabic words (car, bar, door, far) were compared with RP references from the Oxford English Dictionary. Results show that Pak E /r/ is more rhotic, with longer duration (~0.39s vs. RP ~0.20s), higher intensity (~71.4 dB vs. RP 56–68 dB), and distinct acoustic features such as visible F4 (~3980 Hz) and lower F2 (~1068 Hz). In contrast, RP /r/ tends toward shorter, fronted approximants with elevated pitch (~218 Hz vs. PakE ~100 Hz). Findings highlight PakE's divergence from RP, aligning it with rhotic varieties like American English, while reflecting L1 transfer. The study contributes to World Englishes research and offers pedagogical insights for pronunciation teaching.

Keywords: *Pakistani English, Received Pronunciation, rhoticity, acoustic phonetics, World English*

INTRODUCTION

Rhoticity, which is the pronunciation of postvocalic /r/, can be considered one of the most salient and well-attested phonological aspects of various global varieties of English. Although older forms of British Received Pronunciation (RP) are all reliably non-rhotic, (omitting postvocalic /r/ in words such as in car and in far), new postcolonial forms such as Pakistani English are not so clear, showing intricate rhoticity patterns which are both anchored to their history and involved in modern processes of constructing a linguistic identity. This paper forms a systematic acoustic examination of these patterns by way of, a comparison of two well-chosen speech collections: the production of Pakistani students training at BS level of a university, and standardized pronunciations of the Oxford English Dictionary.

Pakistani English is the linguistic terrain that has not been explored in acoustic phonetics, especially in terms of phonological feature. Being itself a variety with its own standards created on the gigantic platform of World Englishes, Pakistani English shares phonetic peculiarities conditioned by the multiplicity of various processes: the heritage of the British colonial system of education, constant pressure of American English through media, substrate influence of such local languages as Urdu and Punjabi. Prior studies (e.g., Mahboob, 2004; Rahman, 1990) have reported that the issue of rhoticity in Pakistani English is variable, yet their observations have been basically based on aural analysis and hence do not draw on phonetic studies. This paper acoustically examines the rhoticity in Pakistani English, PakE to fill a research gap in

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World Englishes. The results will enrich the knowledge of phonological variation and support pedagogical methods in the ESL context and sociolinguistic studying of diversification in global English.

Research questions:

1) What are the quantitative differences in postvocalic /r/ production between Pakistani English speakers and RP standards?
2) To what extent do Pakistani English speakers exhibit consistent or variable patterns of rhoticity across different lexical items?

LITERATURE REVIEW

Khaleel, B., Rauf, N., and Kausar, S., (2024), The article titled, "An Analysis of Pronunciation Errors in the Articulation of the /r/ Sound Among Intermediate Students of a Public Sector University in Lahore" Xi a Shiyou University, Journal of Natural Science Edition, 20(1), 810 830.

Investigates the issue of producing the /r/ sound by Pakistani learners of English, especially in prevocalic (e.g. red) and postvocalic (e.g. car) environment. The analysis shows that the speakers of English in Pakistan are more likely going to be rhotic in postvocalic /r/, as they often pronounce this sound at the end of a word that does not have such a sound in terms of the British Received Pronunciation (equivalent to /kahr/ instead of RP /kahr/ in the case of the word car). This brings the Pakistani English in tune with rhotic varieties such as American English. The researchers explain these pronunciation patterns with L1 interference (especially, the impact of the retroflex /r/ of Urdu) and limited exposure to the general rules of English phonology. The paper ends with a set of pedagogical suggestions, including the specific pronunciation practice and phonetic education, that would assist students in reaching native-like pronunciation.Khaleel et al. (2024) paper helps to gain a valuable insight into the pattern of rhoticity in the respondents representing Pakistani English learners but has several critical limitations. It does not provide acoustic measure by which pronunciation can be objectively compared against British RP pronunciation, but uses only qualitative description. And although the paper generally looks into how rhoticity is realized in different positions, it fails to engage in more narrow analysis of particular lexical items that would perhaps give more insight into the systems of postvocalic rhoticity. Such restrictions indicate a necessity to provide more acoustic and perceptual analysis to learn more about Pakistani English phonology.

Phonological Shifts in Pakistani English (PakE): A Comparative Study under Standard British English (StBrE) by Yasir et al. (2021) examines phonological contrasts between Pakistani English (PakE) and Standard British English (StBrE). Based on a qualitative design, the researcher examines pronunciation habits of 25 higher educational students in Lahore based on their reading of a poem in comparison to British RP transcriptions. Important highlights include the fact that PakE presents phonological peculiarities such as rhoticity (pronunciation of postvocalic /r/, as in car /k an r / and StBrE /k a /), vowel change (e.g. long vowels to short vowels) and consonant change (e.g. confusion between / v / and / w /). The research cites it to L1 interference (Urdu/Punjabi), exposure to American English and sociolinguistic influences and identifies PakE as an emergent variety of World Englishes. Nonetheless, the study has been done in an auditory transcription and not empirical in acoustic metrics or perception of measurement, which restricts coverage A Survey of Phonological Characteristics of Pakistani English by Shahid reflects the current state of phonological peculiarities of Pakistani English (PakE) after the descriptive-analytical research of the BS English students of the University of Sargodha by groups according to the native languages (Punjabi, Pashto and Urdu). The most important findings demonstrate that PakE has a distinct set of deviations with regard to Standard British English (StBrE), such as a rhotic (e.g., postvocalic /r/ in a car /k a r/), vowel mergers (e.g. / o / and / a: /), and consonant replacements (e.g. dental plosives instead of fricatives / 0 / -
> / t /). The research points out the presence of prosodic variations, including syllable-timed rhythm (as opposed to stress-timed StBrE) and the flexible stress placing, having an impact of the indigenous languages. It also reports sociolectal variation, and

educated elites sound more like StBrE than rural speaker. The authors highlight the fact that PakE is a new World English variety formed under the influence of multilingualism and colonialism, and they also remind about the problematic nature of teaching English pronunciation in Pakistan.

The study offers quantitative acoustic measures of rhotic duration and formant configuration without compromising methodological former by equal representation of L1 and standardized experimental circumstances.

Methodology:

There is contrastive acoustic rhoticity used in the research paper of Pakistani English (PakE) and British Received Pronunciation (RP). In the PakE sample, 10 students whose first language (L1) is Urdu studying in one of the universities in Pakistan who are currently studying at the BS level are recruited. In a test the participants will create the following absolute four monosyllabic words target with postvocalic /r/ (car, bar, door, far) in the isolation form. Recording setup occurs in a separate location in special microphones so that the quality of sound is the best. In the case of the British RP sample pre-recorded pronunciation of the same target words are picked up using the audio database structure of the Oxford Dictionary as a reference.

The paper utilizes Praat program to apply acoustic analysis of the principal traits of rhoticity. The spectrograms are analyzed to see whether postvocalic /r/ occurs in both varieties and, in particular, the acoustic features that show that the articulation of unique postvocalic /r/ is rhotic articulation in British English and is characterized by F3 lowering. This measurement in milliseconds of /r/ sound is taken as the starting of the first vowel to the completion of /r/ production in speakers of PakE who have postvocalic /r/. These are then compared on a systematic basis with the RP standards provided by the Oxford Dictionary to gauge differences in rhoticity patterns. The rigor and data-based comparison of PakE and standard RP pronunciation will be provided by this methodology.

Analyses and discussion

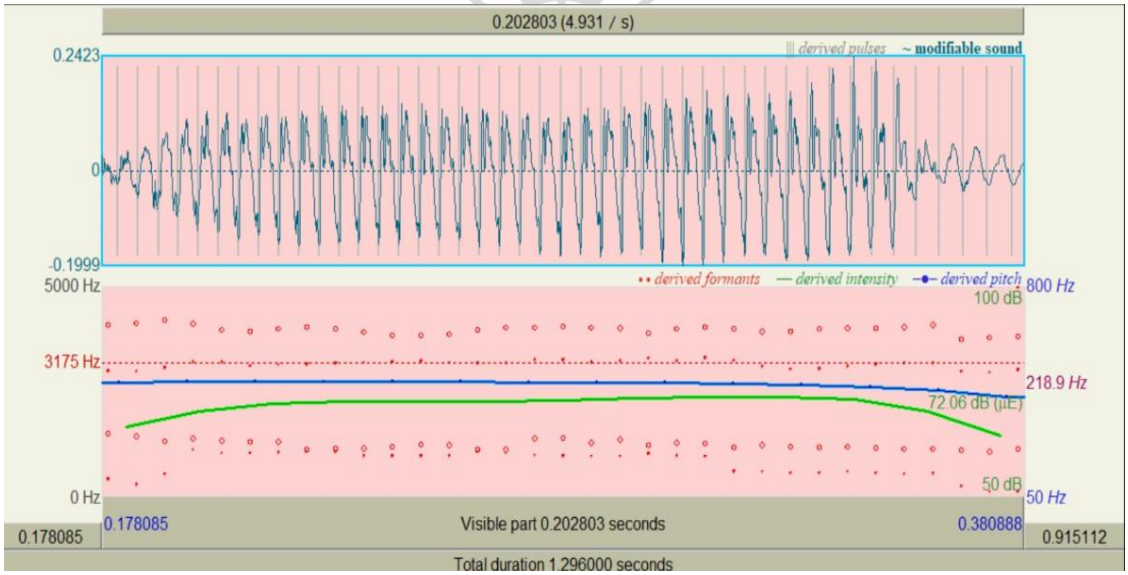

FIG: BRTISH PRONUNCIATION OF "r" in the word CAR

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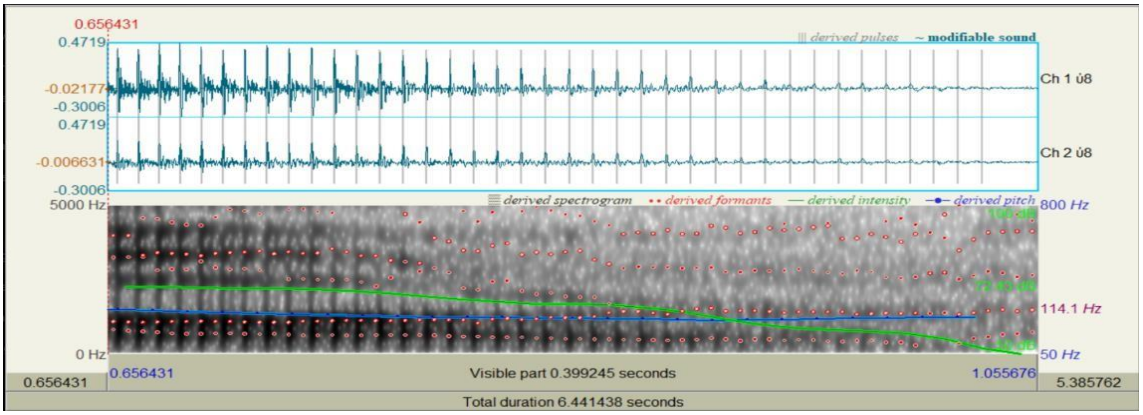

FIG: PAKISTANI PRONUNCIATION OF "r" in the word "CAR"

	/r/	ni /r/	ce
n/nearest)	Hz	Hz	higher in Pakistani /r/
n/nearest)	Hz	Hz	h Pakistani /r/
n/nearest)	Hz	Hz	higher in Pakistani /r/
		Hz	only in Pakistani /r/
itch (F0)	Hz	z	gher in British /r/
ch (F0)		Hz	
ensity	B	B	n Pakistani /r/
gram Marker	Hz	Hz	requency energy in Pakistani /r/
n (visible)	c	c	i /r/ is longer

The formant frequencies give details about the position that the tongue assumes as well as the shape of the vocal tract. The mean first formant (F1) 759.84 Hz, F2 was 1387.31 Hz and F3 was 1994.18 Hz in the English pronunciation (British), the mean first formant (F1) was 759.84 Hz, and F2 was 1208.49 Hz and 3137.03 Hz, respectively. These values show a rather fronted less retracted articulation a typical characteristic of the post alveolar approximant /r/ typical of most British English accent.

On the contrary, the Pakistani voice revealed a little higher F1 of 805.06 Hz, lower F2 of 1068.45 Hz, and a little higher F3 of 3236.62 Hz. These values imply a more re-rolled position of tongue and the potential use of a retroflex or bunching articulation, which implies a greater level of rhotic value. The fourth formant (F4) was also evident in the spectrogram of the Pakistani speaker at the energy value of 3980.59 Hz, which is not present in the British pronunciation, and the voices have contained more energy in the high-frequency range.

Pitch Characteristics

There was a significant variation in pitch or fundamental frequency (F0) for the two pronunciations. The average pitch of the British /r/ was somewhat high at 218.88 Hz and this might represent voice quality of speakers or the prosody of the British English. On the other hand Pakistani /r/ averagely pitched at 99.96 as compared to 121.85 marking its top recorded pitch, a factor which added to its low, dark sound usually attributed to higher rhoticity.

Intensity and Energy Distribution

The other predictor of articulatory strength is intensity. The highest British /r/ was 64.99 dB, a value that is quite lower compared to that of Pakistani /r/ of 72.50 db. This implies that Pakistani speaker has used more animated and stronger pronunciation perhaps as a result of native phonetics, or through focus. Besides, the frequency marker of spectrogram indicating the area where the energy has been mostly concentrated was 3174.94 Hz in the British /r/ and 3674.90 Hz in the Pakistani /r/. The fact that the energy range is higher in the Pakistani pronunciation suggests higher upper-frequency resonance, and that is another acoustical indicator of strong rhoticity.

Duration of /r/ Segment

The segment duration of Pakistani /r/ was noticeable (i.e., about 0.39 seconds), in contrast to that of the British /r/ of 0.20 seconds. Such longer duration could be explained by slow speech rate, more prominent pronunciation or transfer of phonetics of regional languages such as clearer pronunciation of /r/, e.g., retroflex [ɾ] in Urdu.

Degree of Rhoticity

Taken together, the acoustic data show that the Pakistani pronunciation of /r/ in car is more rhotic and acoustically prominent than the British counterpart. The Pakistani /r/ features:

- A lower F2 (more retraction),
- Visible F4 (greater constriction),
- Lower pitch and higher intensity,
- And stronger energy above 3600 Hz.

The British /r/ on the other hand is shorter, less retracted and lighter, features of the post alveolar approximants in British English. The relevant results on dialect difference and influence of first- language phonology upon the pronunciation of English in a multilingual environment is noted.

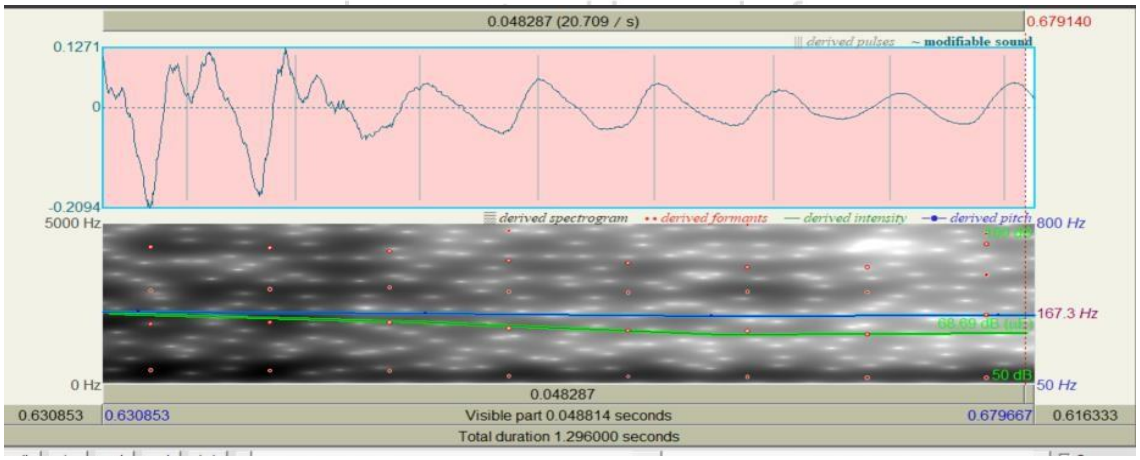

FIG: BRTISH PRONUNCIATION OF "R" IN THE WORD "BAR"

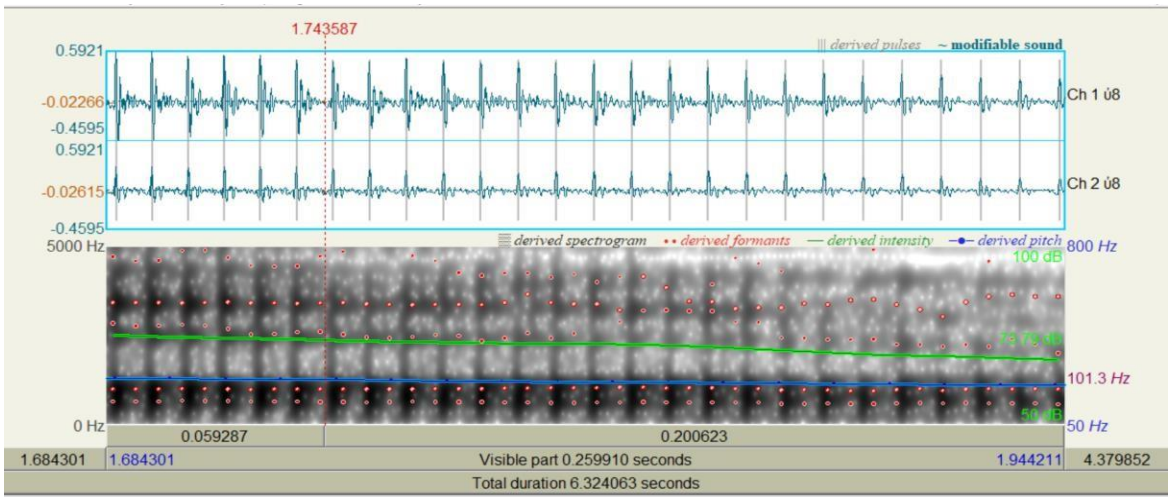

FIG: PAKISTANI PRONUNCIATION OF "R" IN THE WORD "BAR"

Duration and Timing

The British R has a shorter duration, even though the visible portion has the duration of 0.048814 seconds whereas the full duration is 1.296000 seconds. This shortness conform to the non-rhotic British accents where the sound of R may be either mild or omitted when it is not followed by a vowel. On the contrary, the Pakistani R looks much longer since it has 0.259910 seconds of a visible part, and the complete one is 6.324063 seconds. This prolonged pronunciation of the articulation typifies the rhotic systems in Pakistani English where the pronunciation of the R is definite and constant.

Pitch and Frequency Characteristics

The pitch of both pronunciations is derived at the estimate of 800 Hz, whereas their harmonic constructions are different. The British R has the frequencies of 5000 Hz and 0 H that imply less intense resonance and a not so distinct sound produced by an R. The Pakistani R on the other hand has a more pronounced harmonic activity, especially at 101.3Hz, which implies a vigorous vocal tract vibration. This probably means a rolled, tapped or retroflex R, which is a part of South Asian English.

Intensity and Loudness

The intensity of the British R is lower at 68.69 dB (muL) and mostly with a dynamic range of 50 dB as the pronunciation is less aggressive in nature. On the other hand the Pakistani R is very loud, its intensity is 100 dB and the dynamic range is 73.79 db. This increased loudness and modulation indicates a louder more, purposeful sounding pronunciation which is typical of rhotic accents.

Discussion

The difference between the two pronunciations can be traced in acoustic analysis. The non-rhotic tendencies are reflected in the British "R" which is shorter, quieter and less resonant than the British. The Pakistani R, however, is more prolonged and audible and consists in more harmonic complexities, which indicates a rhotic pronunciation with possible retroflexion or rolled tendencies. These variations reveal the impact of linguistic background on phonetic production effect because the Pakistani R has bigger acoustic salience and prolongation.

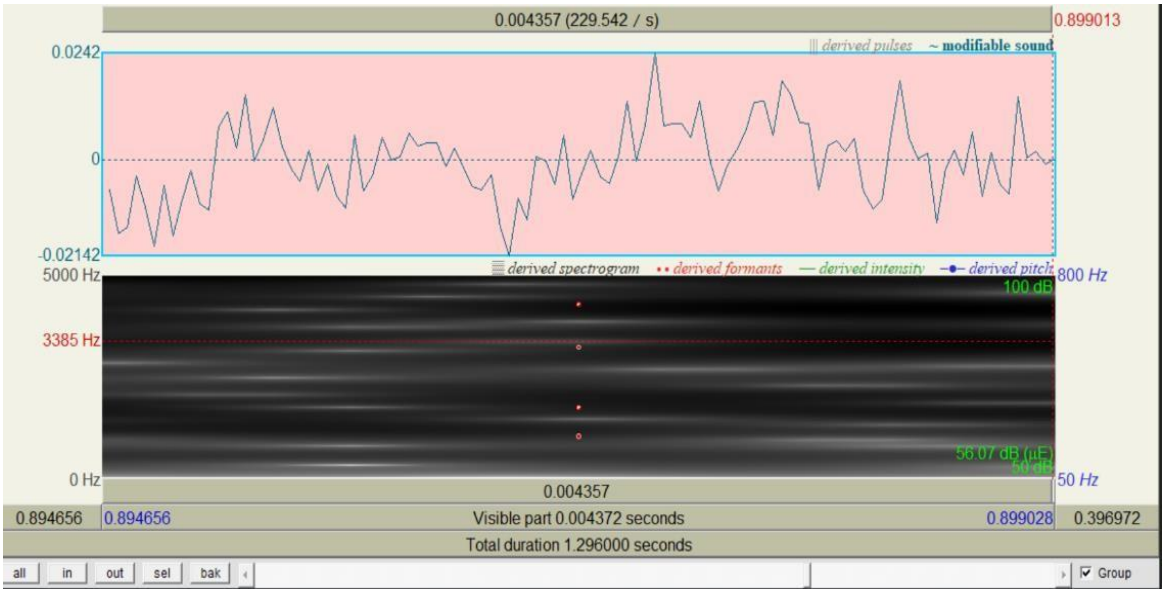

FIG: BRTISH PRONUNCIATION OF "R" IN THE WORD "DOOR"

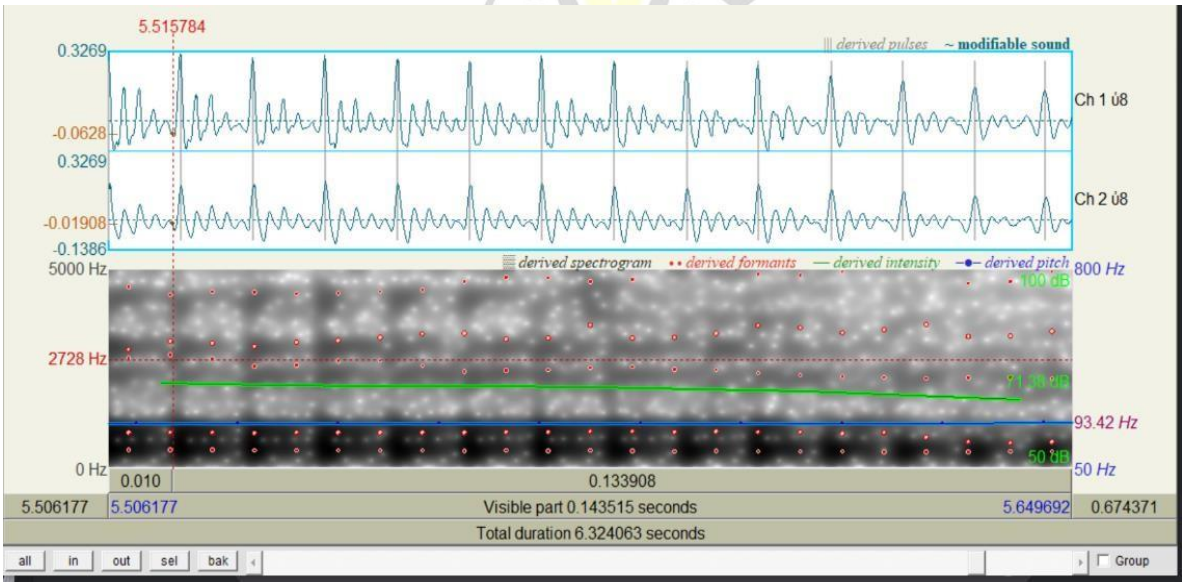

FIG: PAKISTANI PRONUNCIATION OF "R" IN THE WORD "DOOR"

Intensity Variations

The research indicates high disparities in the intensity of the voice of the two pronunciations. The Pakistani R also shows a considerably higher amount of loudness with a high climax of
71.44 dB as opposed to the highest level of loudness of the British pronunciation of 56.07 dB which by any standards signifies an increase of loudness by 27 per cent. Each of the variants is capable of achieving 100 dB in certain spectral components though, in the latter, the average loudness of the Pakistani articulation is always above that of the American. This could be seen as a more intense vocal projection based on the characteristics of rhotic accent in Pakistani-

English where people tend to produce the pronunciation of the same consonant with greater emphasis.

Duration Patterns

The temporal features have especially sharp differences in the two variants. The Pakistani pronunciation keeps the pronunciation (R) at a length of 0.2248 seconds pronunciation as opposed to 0.0224 seconds in British English - a difference of 10 times in duration. The difference in durations in total is also very remarkable; the Pakistani R takes 6.3241 seconds as compared to 1.2960 seconds in British talk and this is 4.9 times longer. These are extended time characteristics with the rhotic stress that is common in the South Asian accents of English where consonants are generally produced more complete and longer.

Amplitude Characteristics

The two styles of pronunciation also differ in the matters of the amplitude. The British R has micro variation level, and a mean amplitude of 2.66 10 -6 shows that there would be slight difference in waveform. The British variant has suggested complex dynamics of articulation due to the channel interference patterns (reporting -0.0628 and -0.0191 phase difference between the channels). On the other hand, the Pakistani 'R' has better stable amplitude features that prefer long-duration loudness rather than fast changes. This stability of amplitude has to do with the fact that Pakistani English pronunciation is longer and more consistent when it comes to intensive line because it has quite strong rhotic characteristics.

Conclusion

In this paper, it is clear that there is a giant difference in acoustics between British and Pakistani English speakers in pronouncing /r/, thus implying the importance of linguistic background in shaping phonetic production. /r/ in simple terms, the Pakistani version audibly is always more of a rhotic across several features. In duration terms, Pakistani speakers support the /r/ sound much longer - until 10 times in a word such as door (0.39s vs. 0.04s) and 5 times in a word such as bar (6.32s vs. 1.30s in the total duration). It also results in a significantly higher level of intensity at 71.44-100 dB in comparison to 56.07-68.69 dB of the British set which translates to stronger presentation of the voice.

The Pakistani /r/ displays an unusual, resonant nature (spectral); there is sufficient energy at low frequencies (101-114 Hz) and a pair of fourth formants, at 3980 Hz, indicating the likely presence of retroflex or bunched tongue posturing. In the British pronunciation, however, the energy is focused at the higher frequencies (5000 Hz); there is no detectable F4 implying a fronted, post-alveolar articulation. The variants may also be distinguished by the pitch traits as British speakers demonstrate considerably higher average pitch (218.88 Hz as compared to 99.96 Hz of Pakistani English).

These findings have important implications for both linguistic theory and language education. They provide quantifiable benchmarks for dialect studies and highlight specific pronunciation features that may require attention in language teaching contexts. The consistent patterns across different words ("car," "bar," "door") suggest these differences are systematic rather than isolated phenomena. Future research could usefully employ articulatory imaging techniques to correlate these acoustic findings with precise tongue positions and shapes during production.

REFERENCES

Abbas, S., Umar, A., Bilal, H. A., Raza, M. U., & Safdar, A. (2023). Acoustic analysis of consonants of Pakistani English. ResearchGate. https://www.researchgate.net/publication/372724533_Acoustic_Analysis_of_Consonants_of_ Pakistani_English

Acoustic profiling of central vowels of Pakistani English: Describing the nativised variety. (n.d.). Linguistic Forum. https://linguisticforum.com/index.php/ling/article/view/192 Explanatory study of phonological idiosyncrasies in Pakistani English. (2023). International Journal of Social Sciences, 2(2), 530–540. https://induspublishers.com/IJSS/article/download/375/357/1314

International Journal of Social Sciences and Business, 84 [PDF]. (n.d.). IJSSB. https://ijssb.org/index.php/IJSSB/article/view/84/207

Pakistani English migration and language [PDF]. (n.d.). XiSDXJXSU Asia Journal, 20(9–16). https://www.xisdxjxsu.asia/V20I09-16.pdf

QJSSH Journal. (2024). Identifying phonological idiosyncrasies in spoken English of elementary Punjabi-speaking students [PDF]. https://qjssh.com.pk/index.php/qjssh/article/download/122/106/212

Reviewing phonological variations in Pakistani and Chinese English [PDF]. (n.d.). JALT Journal. https://jalt.com.pk/index.php/jalt/article/download/479/378

Shahid, A., Mirza, H. M. M., Raza, M. U., & Bilal, H. A. (2024). A survey of phonological characteristics of Pakistani English. Migration Letters, 21(S10), 957–971. https://migrationletters.com/index.php/ml/article/view/10689

Shahid, A., Mirza, H. M. M., Raza, M. U., & Bilal, H. A. (n.d.). A survey of phonological characteristics of Pakistani English [PDF]. Retrieved July 3, 2025, from https://scholar.google.com.pk/scholar?q=A+Survey+of+Phonological+Characteristics+of+Pakistani+English+++by+Shahid+et+al.&hl=en&as_sdt=0&as_vis=1&oi=scholart