Epenthesis: The Movement of the Urdu Alveolar-Fricative Sound into the Punjabi Palatal-Affricate Sound

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Abstract-Pakistan is a multilingual country where the Urdu language serves as lingua franca. Although Urdu is the national and official language of Pakistan, it bears the status of the second language (L2) in most of the regions due to the dominance of regional languages. The Punjabi language is the first language (L1) of the people of Punjab. This study intends to investigate the interlanguage influence and extralinguistic factors of phonological variants produced in the process of epenthesis of Punjabi palatal-affricate (/dʒ/) with the deletion of Urdu alveolar-fricative (/z/). The analysis of this study has been conducted using PRAAT software which proved that the native Punjabi speakers replace the /z/ sound with the /dʒ/ sound no matter if it occurs at the start, middle, or the end of a word. Moreover, this process of epenthesis is the result of the influence of the native language, i.e. Punjabi. The outcome of the analysis indicates that the gender and dwelling (urban or rural) of the participants have nothing to do with epenthesis. However, the education of the participants is the main reason for epenthesis.

Keywords-epenthesis; phonological variant; interlanguage influences; extralinguistic factors

I. INTRODUCTION

Being the national language of Pakistan, Urdu serves as lingua franca for all the regions of the country, where regional languages are spoken as the first language (L1), i.e. Punjabi in Punjab, Pashto in Khyber Pakhtunkhwa, and Sindhi in Sindh. The relationship of influence between Urdu and regional languages is reciprocal, as the medium of instructions at educational institutions of Pakistan is Urdu [1-3]. As far as Punjabi is concerned, it shares a lot of its diction with Urdu due to their cultural similarities. In other words, variants of various Urdu words are found in Punjabi. Since several words are the same in Urdu and Punjabi, the Punjabi speakers pronounce these (Urdu origin) words with phonological variations due to the influence of their first language. Similar to Urdu and Punjabi, several other languages have influenced each other in many ways, e.g. phonological, orthographic, and accentual variations [4-7]. Therefore, many research works have been conducted to analyze the influence of one language on another.

Authors in [8] investigated the process of phonological variations and the way laterals have been developed in the last three generations of Punjabi-English bilinguals residing in the United Kingdom. The findings of the study conclude that the speakers of the third generation still have high phonetic distinctions among their Punjabi and English as compared to the first and second generation. Moreover, the accent of younger speakers (third generation) does not match with the native English speakers, although they have developed a unique accent which is similar to British Asian English. Authors in [9] analyzed prevocalic /r/ in the non-rhotic expression of English speakers of the UK through articulatory and acoustic data. The data obtained from 24 speakers show that the patterns of lingual variation of rhotic expression is similar to the non-rhotic expression of the English speakers. Moreover, the authors suggested that a specific lip posture of Anglo-English /r/ is different from /w/ due to their exposure of labiodental variants and the stream of air that maintains a contrast between /r/ and /w/.

Authors in [10] analyzed the cues which are important to contrast between Urdu and Hindi laryngeal stops. They argue that murmured and breathy voices are the key features to differentiate among the voiced aspirates in the process of sound production. In other words, the authors found that aspirated sound (breathy voice quality) is sufficient for the identification

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of voiced aspirates even if one of the other two key features (prevoicing and aspiration) is missing. Authors in [11] argue that the phonemic realization of /r/ in two Scottish towns is variable due to various linguistic and sociolinguistic factors [11]. Their findings show that the realization of /r/ bears a change from the alveolar tap to the approximant in one of the selected towns whereas the other town shows no variation and thus can be considered as linguistically orthodox. Moreover, the variation in the realization of the same phoneme /r/ largely depends upon the phonological environment of the area in which it is spoken.

It is evident from the existing literature that few studies draw the comparison of various linguistic and non-linguistic factors of Urdu and Punjabi. Therefore, the current research work analyzes the movement of the Urdu alveolar-fricative phoneme (/z/) into the Punjabi palatal-affricate phoneme (/dʒ/) using PRAAT software. Four different but mutual tokens of Urdu and Punjabi have been selected for this study to analyze the reciprocal influence of both languages. To ensure the phonological variations, samples have been collected on the basis of literacy, living style, and gender.

II. METHODOLOGY

In this section, the methodology for analyzing the movement of the Urdu alveolar-fricative into the Punjabi palatal-affricate has been provided in detail. Data collection is outlined in subsection A while the detail of the analysis process using PRAAT software is presented in subsection B.

A. Data Collection

To investigate interlanguage phonological variation through epenthesis of the Punjabi palatal-affricate phoneme (/dʒ/) with the deletion of the Urdu alveolar-fricative phoneme (/z/) semantic fields were made for the collection of data from the native Punjabi speakers. Eight Punjabi native speakers have been selected as sample for the purpose of analysis. Among the selected Punjabi native speakers, 4 were educated and 4 were uneducated. Data were recorded using voice recorder without telling the subjects so that the responses may be recorded in natural frequency. The subjects have been kept anonymous.

B. Analysis Process

The PRAAT is open-source software that has been widely used by the research community to perform speech analysis in various disciplines [12]. To perform the analysis, the PRAAT software converts the sound file into frames and calculates multiple pitch values within the frame length [13]. Therefore, PRAAT has been used to analyze the phonemic movement from alveolar-fricative to palatal-affricate. The key steps we took for the analysis process using PRAAT have been mentioned as follows:

- Step 1: Record the selected words for 4 seconds or longer.
- Step 2: Open the selected sound files in PRAAT and chose "Edit" from the main menu.
- Step 3: Select the stable part of the file from the sound editor and extract the stable part to focus on the targeted phonemes.
- Step 4: Activate the pitch, energy, and spectrum functions to complete voice analysis.
- Step 5: Repeat the above-mentioned steps until achieving satisfactory results to perform analysis as fair as possible.

In PRAAT, the length of the time interval is measured from the pitch value of a sound when the sound signal is higher than the average sound signal. The range of the pitch is defined between maximum and minimum values of the intensity of the sound signal.

III. RESULTS AND DISCUSSION

The simulation results of this study are discussed in this section. The analysis is conducted through different samples and analysis process using PRAAT. The samples include 8 different Punjabi native speakers, namely an educated adult male, an uneducated adult male, an educated adult female, an uneducated adult female, an uneducated rural male, an uneducated urban male, an educated rural male, and an educated urban male.

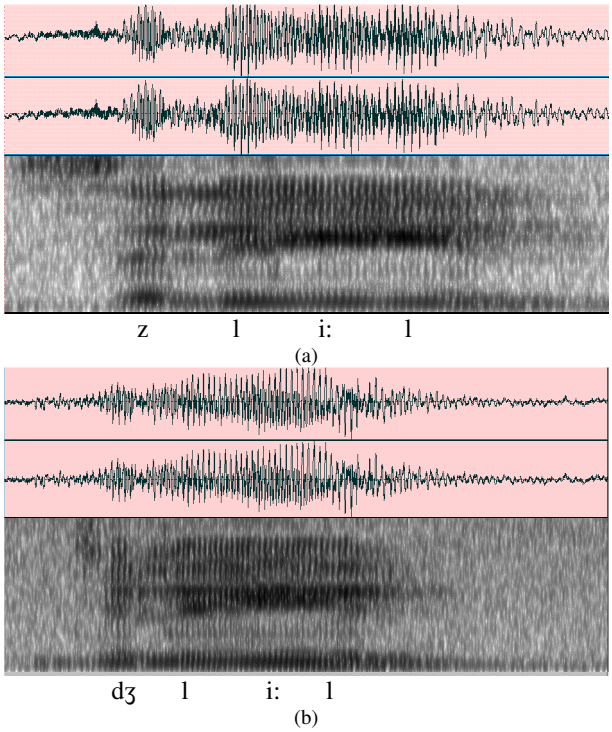

Fig. 1. Comparison of the pronunciation of the word "Zaleel" (dishonored): (a) educated male, (b) uneducated male.

The speech samples consist of 4 lexemes, i.e. Zaleel (dishonored), Namaz (prayer), Roza (observing fast), and Raza (name). Figures 1-4 illustrate the speech analysis of the selected lexemes with the chosen Punjabi native speakers. The speech analysis results of "Zaleel" and "Namaz" are presented in Figures 1-2. The comparison of the word "Zaleel" in terms of pronunciation by educated and uneducated males has been drawn in Figure 1.

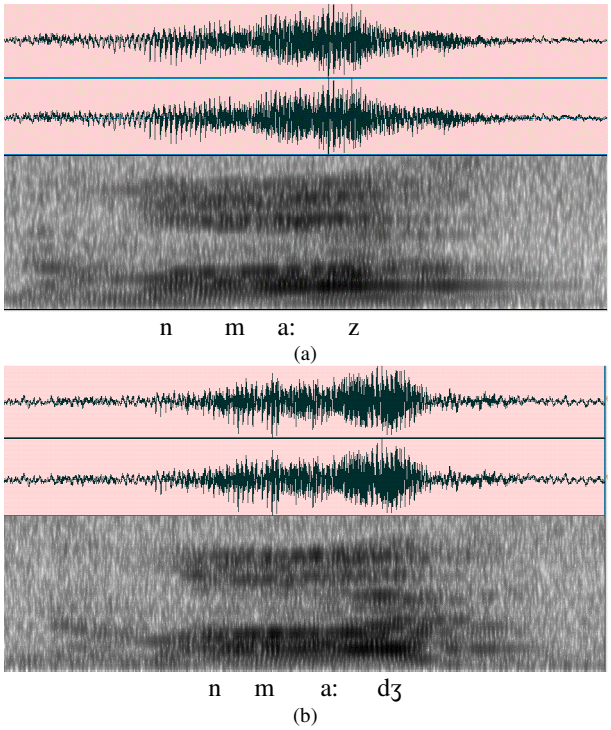

Fig. 2. Comparison of the pronunciation of the word "Namaz" (prayer): (a) educated female, (b) uneducated female.

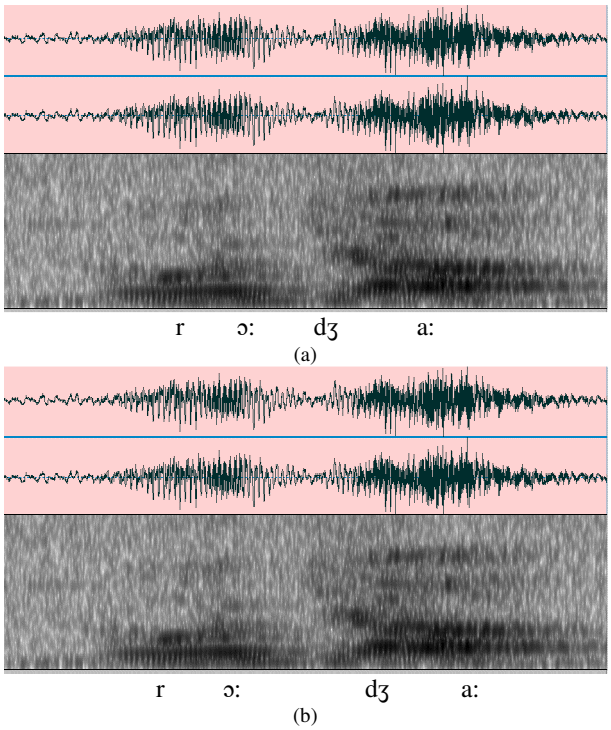

Fig. 3. Comparison of the pronunciation of the word "Roza" (observing fast): (a) uneducated rural male, (b) uneducated urban male.

Figure 2 shows the comparison of pronunciation of the word "Namaz" by educated and uneducated females. Figure 1(a) shows that the /z/ phoneme, at the initial position of the word /zli:l/, has been pronounced by an educated male as alveolar-fricative /z/, whereas an uneducated male pronounced the same phoneme as palatal-affricate /dʒ/, as shown in Figure 1(b). On the other hand, Figure 2 shows the same phoneme at the ending position of the word "Namaz" which has been pronounced as alveolar-fricative /z/ by an educated female in Figure 2(a) whereas an uneducated female pronounced the same phoneme as palatal-affricate /dʒ/ in Figure 2(b).

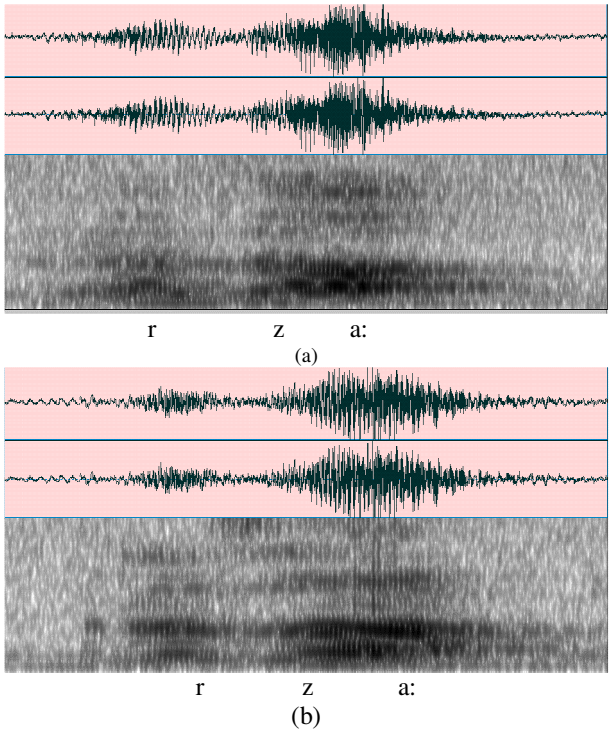

Fig. 4. Comparison of the pronunciation of the word "Raza" (name): (a) educated rural male, (b) educated urban male.

Figures 3-4 present the speech analysis results of the words "Roza" and "Raza". Figure 3 reflects the comparison of the pronunciation of "Roza" between uneducated rural and uneducated urban males. Figure 3(a) shows that the /z/ phoneme, in the middle of the word /rɔ:za:/, has been pronounced as alveolar-fricative /z/ by an uneducated rural male. On the other hand, an uneducated urban male pronounces the same phoneme as palatal-affricate /dʒ/ as shown in Figure 3(b). Figure 4 showcases the pronunciation comparison of "Raza" between an educated rural male and an educated urban male. The phoneme /z/ is in the middle of the word /rza:/ and has been pronounced by both the participants as a palatal-affricate /z/.

Pitch is a fundamental acoustic feature for the analysis of the speech process. The pitch of the phoneme /z/ is higher than that of /dʒ/ as shown in Figure 1, although both are voiced phonemes. Similarly, phoneme /z/ has higher pitch than /dʒ/ as shown in Figure 2. The results indicate that the epenthesis of /dʒ/ at the place of /z/ depends on the premise of being educated or not. However, gender is not a decisive factor for this epenthesis. The pitch of the phoneme /dʒ/ in Figure 3(a)

and (b) remained almost unchanged, whereas the pitch of phoneme /z/ is higher in Figure 4(a) than (b). It can be deduced from the results that the urban or rural setting of the participants has nothing to do with the replacement of /z/ with /dʒ/, but the factor whether the participant is educated or not is the major reason for epenthesis. The educated participants are less likely to accept the influence of native Punjabi language, as the medium of instructions at educational institutions is Urdu. The spectrograms in Figures 1-4 show a very slight difference as alveolar-fricative and palatal-affricate are both voiced phonemes and create more vibration in vocal cords than the voiceless phonemes.

IV. CONCLUSION AND FUTURE WORK

Epenthesis is a prominent feature of interlanguage variations. It has been observed from the analysis that the initial, middle, and final position of the Urdu alveolar-fricative phoneme (/z/) is always epenthesized by the Punjabi palatal-affricate phoneme (/dʒ/), a permanent feature of the phenomenon having only one variable of orthographic knowledge of Urdu language. This interlanguage influence of the second language has been developed in the educated native Punjabi speakers permanently. Therefore, they pronounce /z/, not /dʒ/, however, uneducated native Punjabi speakers pronounce it as /dʒ/ because they did not acquire the influence of Urdu.

In future work, we intend to extend our analysis to the influence of Punjabi language on English and Arabic using PRAAT and machine learning algorithms. The reciprocal influence of Punjabi and Urdu can be analyzed at phrase or sentence level. In this way, we plan to analyze the impact of the native language on the national language in terms of phonological variations along with syntactic variations.

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