Cross-linguistic Influence in Chinese Consonant Acquisition: A Case Study of Pakistani Students from a Third Language Perspective

Muhammad Awais
PhD Scholar, Nanjing University, China
Ali Hamza
Chinese language Internee Teacher, Confucius Institute at Agriculture University Faisalabad

Keywords

- Pakistani Learners of Chinese
- Third Language Acquisition
- Phonological Transfer
- Cross-Linguistic Influence（CLI）
- Consonant Errors

Abstract

For Pakistani learners of Chinese (with Urdu as their L1 and English as L2), their Chinese acquisition process shows a typical case of third language acquisition (TLA). However, existing research has mainly focused on L3 teaching, while cross-linguistic influence (CLI), especially at the phonetic level, remains under-researched. Moreover, studies targeting Chinese as the target language and particularly concerning Pakistani learners' phonetic acquisition are still lacking. This study concentrates on Chinese consonants as the main primary focus, examining the transfer effects of Urdu (L1) and English (L2) on the acquisition of Chinese consonants. A range of methodologies were employed: first, a questionnaire survey was conducted to obtain learners' linguistic background information in English (L2) and Chinese (L3); Second, recorded the participants pronouncing 22 Chinese consonants, collected the audio data, and analyzed their pronunciation accuracy: finally, interviews were made with the some most representative participants to cross-check the results of the audio data analysis, thereby minimizing the researchers' subjective preconceptions in data interpretation. The results show that Urdu employs both positive and negative transfer effects on Pakistani learners' Chinese phonetic acquisition, while the influence of English is mainly negative. The two languages jointly exacerbate negative transfer effects in terms of voicing characteristics; on the other hand, regarding aspiration characteristics, their influences oppose each other, with the positive transfer from Urdu Mitigating the interference from English. Furthermore, the internal similarity within the target language's phonetic system is also a primary driver of specific confusion-based errors.

1. Introduction

Research on language transfer goes back to the 1940s and 1950s. Under the sway of behaviorist theory, most researchers at that time thought that language transfer was an obstruction caused by learners' existing Ingrained native language habits on second language acquisition, and these obstruction was considered one of the primary reasons for limited second language proficiency (FRIES C C, 1947). A Contrastive Analysis Hypothesis given by Lado demonstrated that similarities between the native language and the L2 would result in positive transfer, while dissimilarities would result in negative transfer (LADO R, 1957). Therefore, early definitions of language transfer were rested entirely on comparing similarities and dissimilarities between the native language and L2, with particular reference to the influence of the native language on L2 learning, which was often perceived negatively. Later, scholars such as Odlin, Jarvis, S., & Pavlenko reformulated the meaning of language transfer as "cross-linguistic influence", which signifies the influence of a learner's knowledge of one language on their knowledge or use of another language (ODLIN T, 1989). This definition encompasses multilingual acquisition and clarifies that the effects of language transfer can be both positive (facilitating) and negative (impeding), becoming wildly accepted in academia. Thus, L2 acquisition researchers started to examine how all the language systems in a learner's mind (whether the native language, L2, L3, and so on) Have simultaneous interaction and competition during language production, giving rise to the concept of "third language transfer" (He Yin, 2024). There are several Cross-linguistic influencing factors in L3 transfer, such as language avoidance, "reverse transfer" from the L2 to the native language, languages perceived similarities, transfer between interlanguage systems, and specific factors of learners such as age and language proficiency (Tammy Wang, 2013). Although unanimity has been reached regarding the interaction between native and non-native sources of cross-linguistic influence, but the predictive variables for its strength and directionality remain unresolved. Currently ,There is no conclusive evidence representing that one factor is more important or influential than another (Li Lu, 2023), leaving ample room for more in-depth and scientific research. Most studies on language transfer in L3 acquisition concentrate on lexical/morphological and grammatical transfer. There is a lack of studies addressing phonetic transfer ((He Yin, 2024), and research on Chinese phonetics as a L3 is markedly lacking. Therefore, this paper will explore this under-researched gap by examining Pakistani learners of Chinese with a bilingual background (Urdu L1, English L2) and examining how their prior languages (Urdu and English) effect their acquisition of Chinese consonants. This paper will start by outlining previous research in this field and mentioning relevant theoretical frameworks to give readers a foundational background. Subsequently, various research

methods will be used to examine the specific characteristics of Chinese consonant acquisition by Pakistani learners and the cross-linguistic factors effecting this process.

From the standpoints of phonology, grammar, syntax, and morphology, Urdu, English, and Chinese show notable differences, which make them belong to different language families. Specifically, Chinese belongs to the Sino-Tibetan language family, while Urdu and English are belong to the Indo-European language family. Chinese syllables are basically comprise three fundamental elements: consonants (known as initials, appearing at the beginning of a syllable), vowels (known as finals, positioned at the end of a syllable), and tones (known as the most important element borne by the vowel, normally including four main lexical tones). The main elements of Chinese syllables can be more clearly understood as shown in the following picture.

This study focuses on Chinese consonants (initials), seeks to investigate whether the phonological characteristics of Urdu (L1) and English (L2) among Pakistani learners cause a learning effect on their acquisition of Chinese (L3) consonants. As the physical embodiment of language, Chinese phonetics performs the role of conveying meaning in communication. Therefore, attaining expertise in the fundamentals of Chinese phonetics, especially the fundamental knowledge of consonants, bears significant importance.

2. Review of the Literature

Research on third language (L3) phonological acquisition appeared as a very young subfield in the late 20th century and has only recently become a major focus of research (Cabrelli Amaro, J., & Wrembel, M, 2016). A growing body of evidence now supports the view that the general experience of bilingualism among trilingual learners can positively influence the perception and acquisition of an L3 phonology (KOPE?KOVá R, 2016). For example, to know the sources of "accent" in second or third language oral production, Llisterri and Poch-Olivé arranged three acoustic analyses comparing bilingual (Catalan L1–Castilian L2) and monolingual (Castilian L1) university students learning English or French. They exerted a influence of their L1 and/or L2 on their output of the respective target languages (English or French). Their results indicated that both groups of learners appeared to rely almost wholly on their L1 to articulate specific phonological features in the L2 or L3, with little evidence of L2 influence noticed in the bilingual case (Listerri, J., & Poch-Olivé, D, 1987). This

resulted in the proposal of an "L1 Transfer Hypothesis." To address the same issue, Llama et al. compared 18 L3 Spanish learners with L1 English and L1 French, investigating their Voice Onset Time (VOT) and aspiration patterns in phonological output. The study's results shown that despite typological dissimilarities between the participants' L1s and the target language Spanish, both learner groups typically followed the phonological patterns of their L2 instead of their L1. This result indicated that L2 status is a significant predictor of the source of cross-linguistic influence in L3 phonological output, providing an "L2 Transfer Hypothesis" (Llamas, R., Cardoso, W., & Collins, L, 2008). The inconsistent results regarding stronger influence from either the L1 or L2 in the above two studies were later explained by Williams and Hammarberg's longitudinal case study of learner SW. Their study found that in the starting stages of learning Swedish, SW consciously used their proficient L2 German phonology to minimize L1 English influence. However, over time and with growing L3 proficiency, characteristics of L1 English phonology Progressively and subconsciously permeated their Swedish output (Williams, S., & Hammarberg, B,1998, 2005). This observation uncovered that the source of cross-linguistic influence can dynamically change with the learner's proficiency level and learning stage, showing a important clue for addressing the apparently contradictory results in different studies. Apart from the research on forward transfer from L1 or L2 to L3, some researchers have also discovered reverse influence from the L3 on previously acquired L1 or L2 languages. For example, Wei Xiaobao examined the reverse impact of L3 learning on the preexisting phonological awareness development of bilingual children, result found that improvement in L3 English reading skills also improved L2 Chinese phonological awareness (Wei Xiaobao, 2018). Notwithstanding these findings, other studies indicate this reverse beneficial effect is not universal. Research on L3 combinations from non-cognate language families reveals that L3 phonological acquisition can also be effected by negative transfer from the L1 and/or L2 (Wang Sheng, 2018). Concurrently, the scope of research on L3 phonological transfer is expanding. Except focusing on L3 vowel acquisition, more researchers are using Voice Onset Time (VOT) of L3 stops to investigate learners' acquisition of the new language and cross-linguistic influencing factors (Liu Jiaqi, Zeng Ting, Zheng Yongyan, 2022). Some other researchers also have examined the influence of international students' L1 and L2 on their acquisition of L3 Chinese phonology, providing significant insights for Teaching Chinese as a Foreign Language practices (Wei Siwen, 2021). This paper also using the above content as a reference point, to examine the characteristics of Pakistani Chinese learners in acquiring Chinese consonants and to investigate which factors show cross-linguistic influence.

3. Methodology

3.1. Research Questions

The main objective of this study is to provide an initial understanding of the characteristics showed by Pakistani students in the acquisition of Chinese consonants and the related cross-linguistic influencing factors. In order to accomplish the above stated research objectives, the following research questions are proposed:

1. What are the similarities and dissimilarities among the consonant systems of Urdu, English, and Chinese?
2. Do these similarities and dissimilarities cause transfer (as noted by Kellerman (1983): “Not everything that looks transferable is transferable” (p. 113))?
3. What are the specific language transfer factors?
4. In terms of transfer effects, does the Urdu (L1) or English (L2) exert a stronger influence, or is there "dual interference"?

3.2. Research Methods

This study mainly employs the following four research methods to examine the characteristics showed by learners in the acquisition of Chinese consonants and the related cross-linguistic influencing factors:

1.Questionnaire Survey: The questionnaire method is used to collect learners' language background information in both Chinese and English.

2.Contrastive Analysis: A systematic comparison of the similarities and dissimilarities among the consonant systems of Urdu, English, and Chinese is conducted to give a theoretical basis for pinpointing potential transfer phenomena.

3.Audio Data Collection: A word list containing 22 Chinese consonants is designed, and participants are requested to read aloud and record the word list. The audio data are subsequently analyzed via perceptual listening and judgment to investigate learners' consonant errors, the causes of these errors, and the possible transfer influences from Urdu (L1) and English (L2).

4.Interview Method: Semi-structured interviews are conducted to cross-check the findings from the audio data analysis, thus reducing the researcher's subjective bias in data interpretation.

3.3. Participants

The study comprised 10 participants, including 3 males and 7 females, who were all beginner-level learners of Chinese from the Confucius Institute at the University of Agriculture, Faisalabad. The mean age was 20.6 years (SD = 1.71), with an age range of 19–23 years. Both in terms of acquisition order and dominance, Urdu was their L1, English their L2, and Chinese their L3. Their L2 (English) proficiency

was at an advanced level (mean years of English learning = 15.8, SD = 1.9), while their L3 (Chinese) proficiency was at a beginner level (mean months of Chinese learning = 2.55, SD = 0.55). Additionally, the participants stated speaking an average of 3–4 foreign languages (SD = 0.52; range: 3–4). Their self-assessed pronunciation proficiency in L2 (English) was 6.8 (SD = 1.14; rated on a scale from 1 to 10), and self-assessed pronunciation proficiency in L3 (Chinese) was 1.5 (SD = 0.53; rated on a scale from 1 to 10).

3.4. Instruments

This study used four methods: questionnaire surveys, comparative analysis, recorded data analysis, and interviews. The questionnaire was conducted to collect language background information on Chinese and English. By collecting participants' language learning history and acquisition order, the questionnaire ensured that their multilingual knowledge and usage patterns met the requirements for research participation. The comparative analysis method was basically used to contrast Urdu, English, and Chinese consonants based on their place and manner of articulation, aimed to establish a theoretical foundation for examining potential transfer phenomena. The recorded data analysis method was arranged to examine the actual acquisition characteristics of Chinese consonants by learners and to analyze whether the results of the trilingual comparison is the same as the learners' real acquisition patterns or the transfer influence from prior languages—consistent with Kellerman's (1983) said that "not everything that looks transferable is transferred" (p. 113). The interview part focused on reasons for phonetic errors in Chinese consonants acquisition. The inclusion of interviews helped minimize researcher subjective bias in interpreting the survey findings.

3.5. Data Collection & Data Analysis Method

First, all the participants completed a language backgrounds questionnaire. They were notified that their participation was on voluntary basis, all responses would be kept strictly confidential, and communication among participants was prohibited during the process. The questionnaire typically took about five minutes to complete. Second, a contrastive analysis of the consonants in the three languages (Urdu, English, and Chinese) was conducted, categorized according to place and manner of articulation. The Chinese consonant data were obtained from HSK Standard Course Level 1 by Jiang Liping (2014), English consonant data from Zhang Xuhong (2011), A Contrastive Analysis of Chinese and English Consonant Systems and Phonological Processing, and Urdu consonant data from Lü Jie (2016), A Contrastive Analysis of Chinese, Hindi, and Urdu Consonants. Then, recorded data of a word list of 22 Chinese consonants were gathered. All participants reported no history of hearing disorders and

showed normal speech perception ability. The recordings were collected in the form of an assignment to ensure concentrated and careful pronunciation from the students. Subsequently, two native Chinese speakers are requested to evaluate the recordings and list the pronunciation errors. Finally, interviews were conducted with five representative participants who showed typical mispronunciations, focusing on the reasons behind their phonetic errors in Chinese. The incorporating interviews helped minimize researcher subjective bias in the interpretation of the results.

4. Result and Discussion

4.1. A Comparison of the Consonant Systems of Urdu, English, and Chinese

In Urdu and English, there are consonants that are identical or similar in pronunciation to the consonants in Chinese. Some consonants are present in Chinese but are not exist in English or Urdu, while Urdu and English also have certain consonants that do not exist in Chinese. The following is a systematic comparison of the consonants in Chinese, Urdu, and English, analyzing their similarities and dissimilarities, followed by the data organization and analysis.

The Chinese phonetic system consists of 22 consonants, with 21 consonants serve as initials appearing at the start of a syllable, while one nasal consonant, ng[ŋ], appears at the end of syllable. Urdu possesses a considerably larger consonant range than Chinese, both in terms of quantity and in the diversity of places and manners of articulation, with a total number of 39 consonants. The number of English consonants lies between that of Chinese and Urdu, amounting to 28. The following tables clearly organize the consonants of Chinese, English, and Urdu, arranging them according to their place and manner of articulation.

Table 1: Plosive Consonants Comparison Table

Languages	Place and Manner of Articulation																							
	Bilabial				Alveolar				Retroflex				Velar				Uvular				Glottal			
	Voiceless		Voiced		Voiceless		Voiced		Voiceless		Voiced		Voiceless		Voiced		Voiceless		Voiced		Voiceless		Voiced	
	Aspirated	Unaspirated	Aspirated	Unaspirated	Aspirated	Unaspirated	Aspirated	Unaspirated	Aspirated	Unaspirated	Aspirated	Unaspirated	Aspirated	Unaspirated	Aspirated	Unaspirated	Aspirated	Unaspirated	Aspirated	Unaspirated	Aspirated	Unaspirated	Aspirated	Unaspirated
Chinese	[pʰ]	[p]			[tʰ]	[t]							[kʰ]	[k]										
Urdu	[pʰ]	[p]	[bʱ]	[b]	[ʈʰ]	[ʈ]	[ɖʱ]	[ɖ]	[tʰ]	[t]	[dʱ]	[d]	[kʰ]	[k]	[gʱ]	[g]		[q]				[ʔ]		
English		[p]		[b]		[t]		[d]						[k]		[g]								

1. Plosive consonants

There are six plosives consonants in Chinese (b[p], p[pʰ], d[t], t[tʰ], g[k], k[kʰ]), while Urdu has eighteen (پ[p], پھ[pʰ], ب[b], بھ[bʰ], ت/ط[t], تھ[tʰ], د[d], دھ[dʰ], ٹ[ʈ], ٹھ[ʈʰ],

ڈ[d], ڈھ[dʰ], ک[k], کھ[kʰ], گ[g], گھ[gʰ], ق[q], ع[ʔ]), and English has six (p[p], b[b], t[t], d[d], c, k[k], g[g]). From the above comparative analysis, it can be observed that all six Chinese plosives are found in the Urdu consonant system, while the English consonant system possesses [p], [t], and [k] but is devoid of consonants [pʰ], [tʰ], and [kʰ]. As Urdu functions as the national language of Pakistan and holds a comparatively higher status, and since that Urdu and Chinese both have identical bilabial plosives, it can be hypothesized that Pakistani learners of Chinese should theoretically confront no difficulty in acquiring Chinese bilabial plosives. So it can be suggested that the (positive) transfer influence of Urdu is comparatively stronger in learning Chinese plosives. It should be noted that Urdu possesses voiced plosives [b], [bʰ], [d], [dʰ], [g], [gʰ] corresponding to the voiceless plosives [p], [pʰ], [t], [tʰ], [k], [kʰ], and English also has voiced plosives [b], [d], [g] corresponding to the voiceless plosives [p], [t], [k]. These voiced plosives can trigger transfer effects in the acquisition of Chinese voiceless plosives [p], [pʰ], [t], [tʰ], [k], [kʰ].

Table 2: Fricative Consonants Comparison Table

Languages	Place and Manner of Articulation																					
	Labiodental		Apical		Alveolar		Retroflex		Dorsal (front)		Dorsal (back)		Uvular		Glottal		Laminal	
	Voiceless	Voiced	Voiceless	Voiced	Voiceless	Voiced	Voiceless	Voiced	Voiceless	Voiced	Voiceless	Voiced	Voiceless	Voiced	Voiceless	Voiced	Voiceless	Voiced
	Aspirated / Unaspirated	Aspirated / Unaspirated	Aspirated / Unaspirated	Aspirated / Unaspirated	Aspirated / Unaspirated	Aspirated / Unaspirated	Aspirated / Unaspirated	Aspirated / Unaspirated	Aspirated / Unaspirated	Aspirated / Unaspirated	Aspirated / Unaspirated	Aspirated / Unaspirated	Aspirated / Unaspirated	Aspirated / Unaspirated	Aspirated / Unaspirated	Aspirated / Unaspirated	Aspirated / Unaspirated	Aspirated / Unaspirated
Chinese	[f]		[s]				[ʂ]	[ʐ]	[ɕ]		[x]							
Urdu	[f]	[v]	[s]	[z]									[ɢ]	[ʁ]	[h]		[ʃ]	[ʒ]
English	[f]	[v]	[s]	[z]	[θ]	[ð]									[h]		[ʃ]	[ʒ]

2. Fricative Consonants

Chinese has six fricatives (f[f], s[s], sh[ʂ], r[ʐ], x[ɕ], h[x]), Urdu has nine (ف[f],و[v],ث/ص/س[s],ظ/ض/ذ/ز[z], خ[χ], غ[ɣ], ہ/ح[h], ش[ʃ], ژ[ʒ]), and English also has nine (f[f], v[v], s (as in "sin")[s], z[z],th(as in"thin")[θ], th (as in"this")[ð], h[h], sh[ʃ], s (as in"vision")[ʒ]) fricatives. From the above comparative analysis, it is apparent that Chinese f[f] and s[s] have completely phonetically identical corresponding fricatives in both the Urdu and English consonant systems. Therefore, it can be hypothesized that there is no notable difference in the strength of transfer influence from Urdu or English in these two fricatives acquisition. However, the other four Chinese fricatives ([ʂ], [ʐ], [ɕ],and [x]) do not have identical equivalents in the consonant systems of either Urdu or English.

Table 3: Affricate Consonants Comparison Table

Languages	Place and Manner of Articulation															
	Apical				Retroflex				Dorsal (front)				Laminal			
	Voiceless		Voiced		Voiceless		Voiced		Voiceless		Voiced		Voiceless		Voiced	
	Aspirated	Unaspirated	Aspirated	Unaspirated	Aspirated	Unaspirated	Aspirated	Unaspirated	Aspirated	Unaspirated	Aspirated	Unaspirated	Aspirated	Unaspirated	Aspirated	Unaspirated
Chinese	[tsʰ]	[ts]			[tʂʰ]	[tʂ]			[tɕʰ]	[tɕ]						
Urdu													[tʃʰ]	[tʃ]	[dʒʰ]	[dʒ]
English		[ts]		[dz]										[tʃ]		[dʒ]

3. Affricate Consonants

Chinese has six affricate consonants (z[ts],c[tsʰ],zh[tʂ],ch[tʂʰ],j[tɕ],q[tɕʰ]), Urdu consonant system possesses four (چ[tʃ],ﭽ[tʃʰ],ج[dʒ],ﺠ[dʒʰ]), and English also has four (ts as in "seats"[ts],ds[dz],ch[tʃ],j/dge[dʒ]). From the above comparative analysis, it can be apparent that among Chinese affricates, only the [ts] consonant has an identical affricate in the English consonant system. The other five Chinese affricates ([tsʰ], [tʂ], [tʂʰ], [tɕ], and [tɕʰ]) have no identical or similar equivalents in either Urdu or English. Therefore, it can be inferred that in learning [ts], the transfer influence from English holds a primary position.

Table 4: Nasal Consonants Comparison Table

Languages	Place and Manner of Articulation															
	Bilabial				ALveolar				Dorsal (Back)				Velar			
	Voiceless		Voiced		Voiceless		Voiced		Voiceless		Voiced		Voiceless		Voiced	
	Aspirated	Unaspirated	Aspirated	Unaspirated	Aspirated	Unaspirated	Aspirated	Unaspirated	Aspirated	Unaspirated	Aspirated	Unaspirated	Aspirated	Unaspirated	Aspirated	Unaspirated
Chinese			[m]				[n]				[ŋ]					
Urdu			[m]				[n]									[ŋ]
English			[m]				[n]									[ŋ]

4.Nasal Consonants

There are three nasal consonants in Chinese ([m], [n], and [ŋ]), Urdu and English also have similar nasal consonants. It is important to note that nasal consonant [ŋ] in Urdu and English shares the same manner of articulation, but there is a minor difference in the place of articulation. This minor difference does not modify the actual pronunciation or meaning of [ŋ]. Therefore, it can be hypothesized that when learning

this nasal consonant, there is no significant language transfer between Urdu and English.

Table 5: Lateral, Flap, Trill, and Semivowel Consonants Comparison Table

Languages	Place and Manner of Articulation																			
	Lateral				Trill				Tap/Flap				Semivowel							
	Apical				Apical				Retroflex				Bilabial				Palatal			
	Voiceless		Voiced		Voiceless		Voiced		Voiceless		Voiced		Voiceless		Voiced		Voiceless		Voiced	
	Aspirated	Unaspirated	Aspirated	Unaspirated	Aspirated	Unaspirated	Aspirated	Unaspirated	Aspirated	Unaspirated	Aspirated	Unaspirated	Aspirated	Unaspirated	Aspirated	Unaspirated	Aspirated	Unaspirated	Aspirated	Unaspirated
Chinese			[l]																	
Urdu			[l]				[ɾ]				[ɽ]								[j]	
English			[l]				[ɾ]								[w]				[j]	

5.Lateral, Flap, Trill, and Semivowel Consonants

The lateral consonant [l] in Chinese has identical consonant in both Urdu and English. Therefore, it can be deduced that in learning lateral consonant [l], there is no significant positive or negative transfer effect between Urdu and English. Additionally, trills, flaps, and semivowel consonants present in Urdu and English are not fall within the scope of this study, as Chinese lacks similar consonants.

4.2. Summary

Through a comparative analysis of the consonant systems of Chinese, Urdu, and English founded on place and manner of articulation, the following conclusions can be inferred:

1.The consonant characteristics of both Urdu and English wield a similar level of transfer influence on the acquisition of Chinese consonants. For example, plosives such as b[p],d[t],g[k]; fricatives such as f[f],s[s]; nasals such as m[m],n[n],ng[ŋ]; and the lateral consonant l[l] present in the consonant systems of all three languages with virtually identical phonetic characteristics. Therefore, these can be provisionally classified as the consonants that are easiest to learn.

2.But in certain cases, one of the two languages may wield a stronger and more symbolic transfer influence on learning specific Chinese consonants. For example, the aspirated plosives in Chinese (p[p^h],t[t^h],k[k^h]) have fully identical counterparts only in the Urdu consonant system, while the affricate z[ts] possesses completely identical phonetic features only within the English consonant system. Even though these consonants do not have direct equivalents in both Urdu and English concurrently, learners can still depend on the phonetic system of one language to facilitate positive transfer. Thus, these consonants can be provisionally classified as being of moderate difficulty.

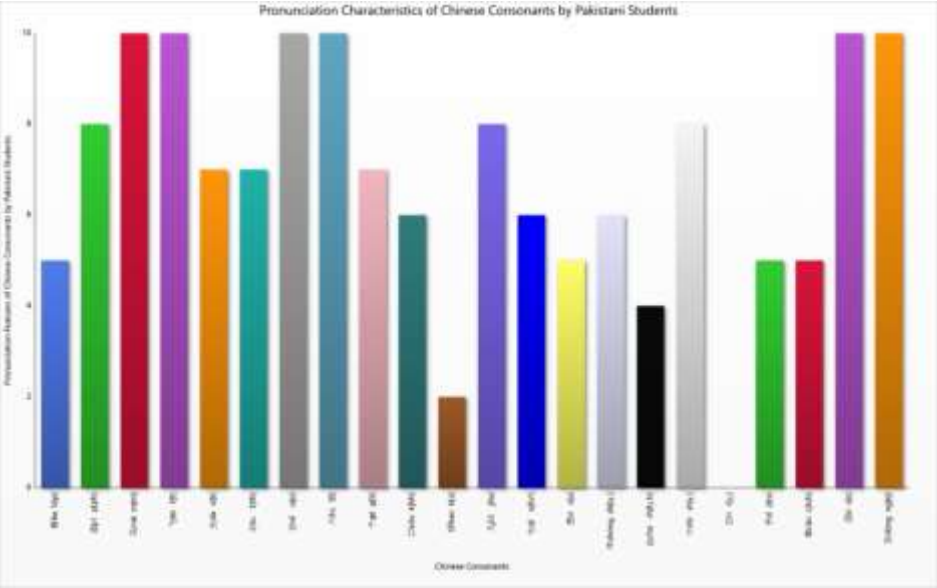
3. Some Chinese consonants do not have fully similar counterparts in both Urdu and

English in terms of phonetic characteristics. These include fricatives such as sh[ʂ],r[ʐ],x[ɕ],h[x], and affricates such as c[ts^{h}],zh[tʂ],ch[tʂ^{h}],j[tɕ], and q[tɕ^{h}]. These consonants significantly different from the learners' existing phonetic systems in terms of place or manner of articulation. Therefore, learners often need to build new articulatory habits from square one and are more vulnerable to interference from their native language or other previously acquired languages. These can be provisionally classified as the most challenging consonants to acquire.

However, do seemingly auditorily identical, similar, or corresponding consonants Inevitably lead to transfer effects? As Kellerman (1983) said, “Not everything that looks transferable is transferable” (p.113). This indicates that phonological transfer is not only determined by superficial similarities in phonetic form but is also constrained by multiple constraints, such as learners’ psychological cognition and language awareness. Thus, to reach a more scientific and representative conclusions, it is important to further verify these provisionally judgments through empirical studies, for example, by analyzing recorded speech data or arranging interviews.

5. Analysis of Recorded Data, Interview Results, and Discussion

Figure 1: Pronunciation Characteristics of Chinese Consonants by Pakistani Students



Based on the evaluation of audio recordings of 22 Chinese consonants from 10

Pakistani learners, the following articulatory error patterns were observed:

1. The consonants b[p],d[t],g[k], and z[ts] are consistently pronounced as their voiced equivalents [b], [d], [g], and [ʒ]/[z] respectively.

2. The aspirated consonants like p[p^h],t[t^h],k[k^h],c[ts^h],ch[$tʂ^h$], and q[$tɕ^h$] are pronounced with insufficient or weak aspiration.

3. The consonant h[x] is systematically mispronounced as [h] or [χ].

4. The consonant r[ʐ] is produced as a trill sound.

5. Systematic articulatory confusion is noticed between the consonant pairs zh[tʂ]/j[tɕ], ch[$tʂ^h$]/q[$tɕ^h$], and sh[ʂ]/x[ɕ].

Identical written form is a primary factor influencing pronunciation. Both Chinese Pinyin and English use the Latin alphabet as their orthography, while in daily life, Latin letters are also commonly used to write Urdu (e.g., in text messages). Phonetic comparison is unavoidable in the process of language learning, and similarity in background act as the basis for such comparisons. Error patterns one to four concern cases where the writing symbols are the same but the pronunciations are not exactly identical. A defining characteristic of Urdu and English is the distinction between voiced and voiceless sounds, while Chinese mainly distinguishes between aspirated and unaspirated sounds. In this context, Chinese exhibits a one-to-one correspondence with both Urdu and English.

Particularly in error feature one, both Urdu and English possess a transfer influence resulting in the voicing of Chinese voiceless consonants b[p],d[t],g[k], and z[ts]. Interviews showed that students make such errors due to the following reasons: 1.The same written forms yet different phonetic features result in voicing phenomena; 2.In Urdu and English, these consonant are voiced, whereas in Chinese the same consonant forms are voiceless. For example, students often pronounce (爸 father) bà [$pä^{51}$] as [$bä^{51}$]. Thus, it is clear that both languages lead to negative transfer in this aspect.

In error feature two, Pakistani learners of Chinese often produce insufficient airflow when pronouncing the aspirated consonants p[p^h],t[t^h],k[k^h],c[ts^h],ch[$tʂ^h$], and q[$tɕ^h$], tend to pronounce them as unaspirated sounds. For example, representative examples include pronouncing (突 sudden) tū[t^hu^{55}] as dū[tu^{55}] and (口 mouth) kǒu[k^ho $ʊ^{214}$] as [$koʊ^{214}$]. Interviews show that this error is mainly caused because the written forms of these aspirated consonants in Chinese are identical to those of unaspirated consonants in English, while the main difference is found in the aspirated feature of the Chinese consonants. This shows that English may create negative transfer in this aspect. It is important to note that this error was only found in the recordings of four students, while the other six students did not demonstrate it. This is probably because Urdu comprises aspirated consonants with identical phonetic features, showing that Urdu may create positive transfer in this aspect.

In Error Feature Three, the Chinese fricative consonant h[x] inherently exhibits

multifaceted phonetic characteristics, falls under the category of "multi-phoneme" consonants in Chinese. For example, in many words, it is pronounced as [x] or [h]; however, there is no clear criteria for when or in which words a specific allophone should be used. This consonant is one of the most difficult consonants to acquire. In this survey, the word used for analysis was (好 Good) hǎo [xɑʊ^{214}], and around 80% of the participants pronounced it as [x] or [h]. The reasons for this may be: first, the written form is identical to that in English, but differences in the place or manner of articulation may cause the errors; second, the notably complex allophonic variations of h[x] make it difficult to decide which language's consonant system influences the transfer effect in this aspect.

In Error Feature Four, the Chinese consonant r[ʐ] is a retroflex voiced fricative without aspiration. However, the consonant denoted by the same written form in both Urdu and English is [r], which is predominantly characterized as a trill. On the contrary, the Chinese r[ʐ] possesses no trill quality whatsoever. Analysis of the audio data reveals that 100% of the participants featured similar pronunciation errors in this aspect. In this case, Chinese shows in a one-to-one correspondence with both Urdu and English, with no clear discrimination in the strength of transfer influence from either language.

Error Feature Five refers to the Perceptual Assimilation Model, which proposes that phonetic confusion in the target language is influenced by perceptual equivalence of speech sounds. Learners are inclined to analogize the phonetic sounds of the target language with acoustically similar phonemes from their preexisting phonetic experience. Based on interview data, it was observed that learners compared similar consonants in the target language, causing to the assimilation of zh[tʂ]/j[tɕ], ch[tʂ^{h}]/q[tɕ^{h}], and sh[ʂ]/x[ɕ], respectively. Perceptual assimilation is caused by the close articulatory positions or methods of the target language sounds themselves and does not create any cross-linguistic phonetic transfer.

6. Conclusion

Based on the analysis of pronunciation errors among Pakistani learners of Chinese language, the following conclusions can be recapitulated from the standpoints of transfer influences from Urdu and English:

1. Transfer Influence of Urdu

The influence of Urdu possesses a distinct bidirectional nature, comprising both positive and negative transfer influence. Positive transfer influence is mainly manifested in the acquisition of aspirated consonants. Since Urdu has consonants with phonetic features same to those of Chinese aspirated stops/affricates (e.g., [p^{h}],[t^{h}],[k^{h}]), it offers an accurate pronunciation model for most learners, significantly permitting the acquisition of these phonemes and minimizing errors related to insufficient aspiration.

Urdu's Negative transfer influence mainly observed in two areas: voicing effects and the pronunciation of r[ʐ]. Firstly, because the Urdu consonants corresponding to the letters b, d, g, and z are voiced, learners often voice the corresponding voiceless consonants in Chinese. Secondly, the Urdu trill consonant [r] shares the same written form (text form) as the Chinese retroflex fricative r[ʐ], but their articulation methods are different. This difference leads to a systematic error where learners pronounce r[ʐ] with a trilled quality.

2. Transfer Influence of English

The influence of English is largely asymmetrical and negative. It conflicts with Chinese in two main phonetic features: voicing and aspiration, thereby impeding with learning. In English, the corresponding sounds for letters like b, d, and g are voiced consonants, which directly causes learners to voice the corresponding voiceless consonants in Chinese. Meanwhile, although English plosives (p, t, k) are aspirated voiceless sounds in word-start position, their aspiration strength is usually weaker than in Chinese. Additionally, their written forms are identical to those of the unaspirated Chinese consonants b[p],d[t], and g[k]. This notable difference between form and phonetic feature makes some learners to produce Chinese aspirated sounds (such as p, t, k) with insufficient aspiration or to mispronounce them as their unaspirated counterparts.

3. Comprehensive Impact and Internal Confusion

Common Negative Transfer: Regarding the voicing bias (error feature one), the consonant system characteristics of Urdu and English are consistent, both contradicting those of Chinese. Therefore, they jointly produce a strong negative transfer.

Unclear Transfer Influence: The variation in producing Mandarin h[x] (error feature three) shows an unclear transfer source. This is due to the elemental complexity of its allophony in Chinese, coupled with the existence of phonetically similar sounds ([h] or [χ]) in both Urdu and English, making it difficult to identify a dominant transfer origin.

Perceptual Assimilation: The confusion between zh/j, ch/q, sh/x (error feature five) drives primarily from their internal phonological similarity within the Chinese consonant sound system. This represents a clear case of perceptual assimilation and is not directly caused by cross-linguistic transfer from Urdu or English.

In summary, Urdu generates both positive and negative influences on the phonetic acquisition of Pakistani learners of Chinese, But the impact of English is mainly characterized by negative transfer. The two languages coincide in their influence regarding the feature of voicing, thereby strengthening negative transfer. In contrast, their effects differ on the feature of aspiration, with the positive transfer from Urdu partially counteracting the interference from English. Furthermore, the internal phonetic similarities within the target language system also serve as a significant factor contributing to specific confusion errors.

7. Teaching Recommendations

In teaching, teachers should masterfully leverage the similarities among the three languages to mitigate the negative learning effect on Pakistani students' learning of Chinese consonants.

In teaching Chinese consonants, teachers should fully exploit students' existing phonetic knowledge to create a positive learning effect. Specifically, they can utilize:

- Consonants are common in all three languages (e.g., m[m], f[f], etc.)
- The resemblance between Urdu aspirated consonants and Chinese aspirated consonants (e.g., [p^h] to [p^h])

These points can effectively help students in learning the Chinese consonants. In terms of articulation, the focus should be on distinguishing aspirated and unaspirated consonants, and, when necessary, the teacher should clarify the difference between voiceless and voiced consonants. Teachers can use demonstration techniques (as described in Zhao Jinming's Introduction to Teaching Chinese as a Foreign Language), such as slowing down the speech rate, expanding mouth movements, or using a piece of paper to demonstrate airflow when teaching aspirated sounds. By using a clear demonstration method, students can observe and imitate, thereby learning correct pronunciation.

Teachers can also use the comparative method in teaching. Through the comparison, teachers can clarify key differences, for example:

- By comparing the phonetic systems of Urdu and English with Chinese, such as showing the phonetic difference between the Chinese r[ʐ] and the Urdu [r].
- By conducting intra-linguistic comparison within the Chinese phonological system itself, such as clarifying the characteristics of aspiration features between b, d, g, and p, t, k, and clarifying the distinctions in places of articulation among j, q, x, zh, ch, sh, and z, c, s.

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Citation of this paper

Muhammad Awais. (2025). Cross-linguistic Influence in Chinese Consonant Acquisition: A Case Study of Pakistani Students from a Third Language Perspective. *Erevna: Journal of Linguistics and Literature*