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The Affricate Sounds in English, Arabic and Persian Languages: A Comparative Study

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Abstract
This paper explores the nature and the characteristics of affricate sounds /tʃ/ and /dʒ/ in three languages: English, Arabic and Persian. Each language is different from the other because they belong to different families' origin. English is a west Germanic language, Arabic is a Semitic while Persian, an Indo-Iranian language, emerges from Indo-European language family. The paper is important: firstly, there is no paper studies the subject in three languages. Secondly, it reveals the misunderstanding and misconceptions of these sounds for second language learners. By focusing on their phonetic and phonological properties, the study identifies similarities and differences in affricates articulation, distribution and usage. Depending on descriptive analytical approach, the findings contribute to the broader understanding of cross-linguistic phonetic patterns and offer implications for second language acquisition and pedagogy.

Keywords: Affricates, Misconceptions, Descriptive Analytical Approach, Pedagogy

Introduction

English, Arabic, and Persian are three major languages spoken by millions around the world, each with a rich and distinct origin. English on one hand, originated from the Germanic languages brought to Britain by Anglo-Saxon settlers in the 5th century. Over time, it absorbed elements from Latin, Norse, and especially French, evolving into the modern English we use today. Arabic, on the other hand, is a Semitic language that began on the Arabian Peninsula. It dates back to at least the 6th century and is the language of the holy Quran, giving it a special role in Islamic culture. Classical Arabic later developed into many regional dialects. Persian, which known as Farsi, belongs to the Indo-Iranian branch of the Indo-European language family. It has ancient roots in the Persian Empire and has been spoken for over 2,500 years (Crystal, 2010) [14]. Modern Persian developed from Middle Persian used during the Sassanian Empire. Although the three languages are different in their number of sounds, they are all having affricate sounds in their phonemic systems.

Affricate consonants are unique segments that begin with a complete stop closure and release into a fricative sound, typically articulated at the same or adjacent place (Ladefoged & Johnson, 2014, p. 66) [28]. According to Kenstowicz (1994), affricates function as complex segments phonologically, often treated as single units due to their coarticulated nature while Peter Roach (2009) [50] states, "affricate sounds in English—specifically /tʃ/ as in church and /dʒ/ as in judge—are articulated at the post-alveolar place of articulation". This means the tongue makes contact just behind the alveolar ridge (the bony ridge behind your upper front teeth). These sounds begin as plosives (like /t/ or /d/) and release into fricatives (like /ʃ/ or /ʒ/), but the key is that both parts of the affricate are produced at the same place in the mouth. Affricates are considered complex segments as they contain two distinct phases: a stop closure followed by a fricative release (Catford, 1988) [11]. They are often described as "stop-fricative" sequences produced at the same place of articulation. These sounds have garnered significant attention in the fields of phonetics, phonology, language acquisition, and sociolinguistics due to their hybrid nature and variability across dialects and learner populations. In Arabic phonetics, the concept of affrication has often been treated as secondary or as a derived, particularly in Classical Arabic where affricates are generally absent (Watson, 2002) [60]. The primary affricate in Arabic is /dʒ/, represented by the letter ج. Arabic language doesn't have a wide range of affricate sounds compared to some other languages, but /dʒ/ is the key one as in the word ثلج ,مجد ,جندي which means soldier, glory, ice respectively.

Arabic dialects such as Iraqi and other Gulf countries have the second affricate sound /tʃ/ which is very common in the southern parts dialects of Iraq as in the word **چرچف** which means bed sheet. In Persian language (Farsi), affricate sounds play an important role in the phonetic system. While Persian has two main affricate consonants /tʃ/ and /dʒ/ in the modern and classic dialects as in the word **چای** which means tea and the word **جان** which means soul that are widely used in their language. Both English and Persian possess two primary affricate phonemes: a voiceless and a voiced postalveolar affricate. While the articulatory mechanisms are largely similar, subtle phonetic and phonological differences exist, particularly in terms of palatalization and phonotactic constraints. Understanding these differences is crucial for linguists, language teachers, and learners, especially in the context of second language acquisition and pronunciation training.

1. The statement of the problem

In order to find cross-linguistic similarities and differences, this comparative study examines affricate sounds in the English, Arabic, and Persian languages. Pronunciation issues among second language learners, particularly Arabic speakers learning English and Persian or the other way around, are the driving force behind this. Numerous scholars examine and evaluate English sounds, comparing them phonologically to their mother tongue counterparts. In order to help second language learners comprehend the phenomenon, this paper compares the affricates sounds in English, Arabic, and Persian.

2. The aim of the paper

In order to determine whether affricate sounds are pronounced the same way in three distinct languages or not, the paper tries to identify any similarities or differences among them. It attempts to phonologically investigate the sounds in three different languages.

3. Objectives of the study

- To describe the affricate /ʧ/-/ʤ/ sounds in English, Arabic and Persian.
- To analyze the articulatory and acoustic features of affricates in three languages.
- To compare the phonological behavior of affricates in English, Arabic and Persian.
- To examine the implications for second language learners.

4. The Paper questions

The following significant question for teachers before second language learners will be addressed in this paper:

- How do the affricate sounds /ʧ/-/ʤ/ differ from or resemble one another in English, Arabic, and Persian?
- What are the main similarities and differences between the affricate sounds in English, Arabic and Persian?

5. Literature Review

The phonological features of the affricate consonants /tʃ/ and /dʒ/ exhibit varied status across English, Arabic, and Persian. Lass (1992) discusses how Middle English phonology underwent major changes, including the palatalization of velar stops (e.g., /k/ → /tʃ/ before front vowels: i, e, a, i:).He illustrates how affricates originated via phonological changes rather than being innate to the language and links this process to previous Old English developments. Hogg (1992) [20] gives a comprehensive picture of Old English phonology, which notably lacked affricates like /tʃ/ and /dʒ/. In other words, affricates were not phonemic in Old English but developed later through palatalization and coalescence. Millward and Hayes (2011) [39] offer examples from modern speech to illustrate historical development for /t/ + /j/ → /tʃ/ and /d/ + /j/ → /dʒ/ in many contexts through coalescence and analogical spread. While Baugh and Cable (2012) [6] state that the affricate /dʒ/ was reinforced or introduced via French influence such as 'Chivalry' → /ˈtʃɪvəlri/ and 'Justice' → /ˈdʒʌstɪs/, expanding its presence in English. Crystal (2005) [12] provides a narrative-based history of English, accessible and well-documented. He emphasizes the dynamic and evolving nature of English phonology over time that affricates reflect the convergence of internal change and external influence in English sound history.

The affricate sounds in Persian (Farsi) - primarily /tʃ/and /dʒ/ have a long history in the language, but their development is quite different from English. Persian is an Indo-Iranian language (a branch of the Indo-European family), and the emergence of affricates in it results from historical sound changes, language contact, and phonemic mergers over time. In Old Persian, there is no evidence of affricates like /tʃ/ or /dʒ/ in its phonemic inventory (Skjærvø, 2009) [54]. In Middle Persian, affricates began to appear as allophones or as part of lexical borrowings, for example: the /dʒ/ sound emerged through palatalization and contact with other languages, including Aramaic, Parthian, and Greek. Evidence of /tʃ/ also begins to appear, though inconsistently. By the time of Classical Persian (9th–11th centuries CE), affricates /tʃ/ ***(چ)*** and /dʒ/ ***(ج)***had become well-established phonemes. These sounds appear clearly in early Persian poetry and texts. The letter (**چ**) was not part of the original Arabic script, and was added in Persian to represent the /tʃ/ sound. The sound /dʒ/ was already present in Arabic, and was used in Persian. The affricates became phonemic and orthographically marked in New Persian. Contact with Arabic, Turkic, and European languages contributed to the stabilization and expansion of affricates in Persian vocabulary.

Moradi (2018) [40] and Usmanyar (2022) [59] highlight that both affricates are phonemic in Persian and consistently represented orthographically. This contrasts with Arabic, where /dʒ/ is presented in Modern Standard Arabic (Alshalaan, 2020) [5], while /tʃ/ does occur only in certain dialects such as Iraqi and Arabic Gulf countries. Mahootian (1997) [36] emphasizes the systemic stability of Persian affricates in native phonology, while Alshalaan (2020) [5] notes dialectal variation in Arabic speech communities, especially in the voicing and articulation of /dʒ/. Collectively, these studies reveal the cross-linguistic asymmetries in affricate distribution and offer important implications for second language acquisition and contrastive phonology. These studies compare sounds in two languages only while this paper tries to compare affricate sounds in three languages at the same time.

5.1 Definitions of key terms

5.1.1 Affricates are "consonants which start with a complete closure like a plosive, but instead of being released suddenly, the closure is released gradually, producing friction like a fricative." (Roach, 2004: 62) [50].

5.1.2 Palatalization is defined by Crystal (2008: 347) [13] as "a general term referring to any articulation involving a movement of the tongue toward the hard palate".

5.1.3 Coalescence as Crystal (2008: 82) [13] defined it" a term used in linguistics, especially in historical studies, to refer to the coming together to of linguistic units which were originally distinguishable. Allophones of a phoneme may coalesce, as many different phonemes and different morphemes." Coalescent (adj.) (Crystal,2008: 82) [13] a term used in phonetics and phonology as a part of classification of types of assimilation. In coalescent (or 'reciprocal') assimilation, each of two adjacent articulations influences the other. An example is the fusion of [d] and [j] to produce [dʒ] in such phrases as *could you*.

5.1.4 Convergence as Trask (1999, p: 77) [57] put it "a process in which languages or dialects become more similar to each other through contact, often leading to shared structural features".

In Arabic language /dʒ/ is the only affricate consonant in Qur'anic recitation and Fusha. The lack of another affricate in Arabic may support the claim that the sound /dʒ/ is a newcomer to Arabic but this is incorrect. Watson (2002) [60] points out that /dʒ/ is the only affricate in the Arabic phonemic inventory and may appear "marginal" due to its phonetic variability across dialects (e.g., realized as /g/, /ʒ/, or /dʒ/), this does not support the conclusion that the phoneme itself is a recent addition to the language. On the contrary, the presence of /dʒ/ in Classical Arabic is well attested in core vocabulary and appears frequently in the Qur'ān in all word positions — initial (e.g., **جحيم** /dʒaħiːm/), medial (e.g., **مجيد** /madʒiːd/), and final (e.g., **خرج** /xaradʒa/). Furthermore, the use of /dʒ/ in pre-Islamic poetry, one of the most conservative linguistic sources for early Arabic, reinforces the phoneme's historical rootedness as it appear in this Arabic verse written by Antara bin Shadad:

يُثيرُ القلبَ من شوقٍ وَعاج وجفْنُ الحُسْنِ في عَيْنَيْكِ ساجِ

From a historical-comparative perspective, /dʒ/ in Arabic is traceable to Proto-Semitic *ǧ or *gʲ, which indicates that it is not a borrowed element but an inherited feature that evolved through regular sound change (Retsö, 2013; Lipiński, 2001). Therefore, the presence, distribution, and historical development of /dʒ/ strongly suggest that it is not a newcomer but an original component of the Arabic phonological system.

The Arabic voiced /dʒ/ is a member of the palatal or post-alveolar group of consonants, according on its site of articulation. "If the language has one sound, like p in pie, made by a gesture (controlled movement) involving the two lips, then it is likely to have others, like b and m, as in by and my, made with similar lip gestures," claims Ladefoged (2001) [27]. This indicates that the identical /dʒ/ movements are used to produce another sound in the Arabic language. Actuallyit is found in the Arabic dialects such as Iraqi and Gulf ones. They have a voiceless counterpart /tʃ/ which is also a palatal or post-alveolar sound. It is found in three positions: initially, medially and finally such as **چف**/tʃef/ means forehand, **چرچف** /tʃa ɾ tʃaf/ means bed sheet, **شباج**/ʃiba: tʃ/ means window. The presence of the voiceless postalveolar affricate /tʃ/ in Iraqi Arabic dialect, particularly in rural and southern varieties, represents a notable divergence from Classical Arabic, which has only one affricate consonant entirely. Scholars generally attribute the emergence of /tʃ/ in Iraqi Arabic to a combination of internal phonological development and extensive contact with non-Arabic languages. One widely accepted explanation is that /tʃ/ developed through the palatalization of the velar stop /k/ in specific phonetic environments, particularly before front vowels (Erwin, 1963). For example, the Classical Arabic word kalb ("dog") often surfaces as tʃalib in Iraqi dialects, demonstrating a systematic sound change. This affrication process is common in many languages and is likely the result of natural articulatory shifts. In addition to internal developments, language contact has played a crucial role in the phonological evolution of Iraqi Arabic. Iraq has historically been a multilingual region where Arabic coexists with Kurdish, Persian, Turkish, and Neo-Aramaic—languages that all include the /tʃ/ phoneme in their sound inventories (Versteegh, 2001; Owens, 2000). The prolonged and widespread contact with these languages likely contributed to both the introduction and entrenchment of /tʃ/ in the local Arabic dialects. Versteegh (2001) specifically notes that the affrication of /k/ to /tʃ/ in Iraqi Arabic may reflect substrate influence from Aramaic or borrowing from Persian and Kurdish phonology. Thus, the phoneme /tʃ/ in Iraqi Arabic is best understood not as a retention from Classical Arabic, but as a product of both phonological innovation and sociolinguistic contact in a historically rich and diverse linguistic environment.

6. Methodology

This paper adopts a comparative descriptive approach grounded in phonetic and phonological analysis. The data consists of a group of words gathered from standard English and Persian languages and Iraqi Arabic dialect especially for /tʃ/. These words are analyzed phonetically and linguistically. Three groups of words written orthographically in the mother tongue and phonetically in IPA(International Phonetic Association) to know how they are pronounced, including academic descriptions of affricate sounds in three languages. The analysis follows the articulatory phonetics model presented by Ladefoged (2001) [27] and Roach (2009) [50], supplemented by Arabic phonological studies (***الزبيدي، 2012؛ القيسي، 1989***).

The methodology involved:

1. Identifying affricate sounds in Standard English and Modern Standard
2. Arabic (MSA), as well as major dialectal variations.
3. Comparing their articulatory features using the International Phonetic Alphabet (IPA).
4. Examining their distribution across different word positions and dialects.
5. Analyzing learner difficulties based on phonological contrasts between the two systems.
6. This method ensures that both qualitative linguistic features and cross-language differences are systematically highlighted.

6.1 Phonological Characteristics of /tʃ/ and /dʒ/ in English

/tʃ/ is a voiceless post alveolar affricate, produced by stopping the airflow with the tongue just behind the alveolar ridge, then releasing it into a fricative. Ladefoged, P., & Johnson, K. (2014) [28]. While /dʒ/ is its voiced counterpart, made the same way but with vocal cord vibration. These sounds are considered distinct phonemes in English because they can change the meaning of a word when substituted—this is where minimal pairs come in.

Initial position		Medial position		Final position	
/ʧ/	/ʤ/	patches	badges	match	madge
Cheep	Jeep	wretched	regid	latch	ladge
Chip	Gyp	etching	edging	catch	ladge
Choke	Joke	pitcher	bidger	witch	widge
Cheer	Jeer	kitchen	gidgen	patch	padge

6.2 Phonological Characteristics of /ʧ/ and /ʤ/ in Persian

In Persian, the affricate phonemes /ʧ/ and /ʤ/, represented orthographically as چ and جrespectively, are both postalveolar in place of articulation and affricate in manner, involving a complete closure followed by a fricative release. The voiceless /ʧ/ and the voiced /ʤ/ are phonemically distinct and occur freely in word-initial, medial, and final positions, unlike in some languages where affricates are restricted or derived from clusters. These sounds are common in native Persian vocabulary and are not limited to loanwords. Persian does not exhibit aspiration for /ʧ/, a feature that distinguishes it from its English counterpart. These sounds can be found in minimal pairs.

Initial position		Medial position		Final position	
ʧa:l	ʤa:l	naʧa:r	naʤa:r	baʧ	baʤ
ʧi:n	ʤi:n	pa:ʧe	ba:ʤe	moʧ	moʤ
ʧu:p	ʤu:b	pertʃem	perdʒem	fleʧ	fleʤ
ʧep	ʤeb	a:ʧa:r	a:ʤa:r	kaʧ	kaʤ
ʧek	ʤek	biʧi:də	biʤi:də	xa:ʧ	xa:ʤ

6.3 Phonological Characteristics of /ʧ/ and /ʤ/ in Arabic

The voiced postalveolar affricate /ʤ/, represented orthographically by the Arabic letter ج is a phonemic segment in Modern Standard Arabic (MSA) and is widely attested across, its lexicon. Articulatory, /ʤ/ begins with a complete closure at the alveolar ridge, produced by the tongue tip contacting the upper alveolar region, followed by a release into a fricative segment articulated at the postalveolar zone. This two-phase gesture—stop plus fricative—classifies /ʤ/ as an affricate. It is voiced, meaning the vocal folds vibrate throughout its production. According to Monassar (2019), the affricate [ʤ] is composed of the dental/alveolar stop [d] and the alveo-palatal fricative [ʒ], both voiced, resulting in a homorganic affricate segment that is stable in MSA but subject to dialectal variation in regional Arabic varieties.

The voiceless postalveolar affricate /ʧ/, though not native to Classical or Standard Arabic, has emerged in several Arabic dialects through processes such as palatalization and language contact. Phonetically, /ʧ/ is articulated by first forming a complete closure between the tongue tip and the postalveolar region (as in /t/), followed by a turbulent release into a fricative segment resembling /ʃ/. This dual-phase articulation classifies it as an affricate. It is voiceless, meaning the vocal cords do not vibrate during its production. According to Mahajna and Davis (2018), the development of /ʧ/ in dialects such as Baghdadi Arabic and rural Levantine varieties is attributed to internal phonological mechanisms—particularly the palatalization of /k/ before high front vowels—and reinforced by historical contact with Turkish during the Ottoman period, where /ʧ/ is phonemic and frequent. Both affricates can be found in three positions of the words:

Initial position		Medial position		Final position	
ʧa:d	ʤa:d	ħeʧi	ħeʤi	ħa:ʧ	ħa:ʤ
ʧa:y	ʤa:y	benʧer	benʤer	bitiʧ	benʤ
ʧa:bak	ʤa:bak				
ʧa:rik	ʤa:rik				

Here's an overview of the voiceless postalveolar affricate /ʧ/ in the dialects of southern Iraq, particularly focusing on Basra and the surrounding regions.

6.4. The Affricate /ʧ/ in Southern Iraqi Dialects:

6.4.1 Phonological Characteristics

In southern Iraqi dialects, especially in Basra, the affricate /ʧ/ is a prominent phoneme. It often emerges as a result of the palatalization of the voiceless velar stop /k/, particularly when adjacent to front vowels. This phonological process leads to a shift from /k/ to /ʧ/, a feature that distinguishes southern dialects from other Iraqi varieties. Moreover, in many Bedouin-related dialects (Kuwait, Bahrain, eastern Saudia, etc.), Standard Arabic kāf becomes [t͡ʃ] (written "چ" or "تش" in dialect) under palatalizing conditions. This is often triggered by following front vowels (especially /i/) and by the old feminine/addressing -ik suffix (the "kashkasha" phenomenon).

6.4.2 Lexical Examples

The presence of /ʧ/ in southern Iraqi Arabic is evident in various lexical items. For instance:

1. The Standard Arabic word kalb (dog) is realized as ʧalib in the southern dialects.
2. Katheer (many) may be pronounced as ʧiΘi:r in the most rural areas of Iraq (Baghdad, Salah Aldin, Al-anbar) which are in the middle and west part of Iraq.
3. Mekaan (place) may be pronounced as mi ʧa:n.
4. It can be in the final position of the word such as ibnik (your son) can be pronounced as ibniʧ. This /ʧ/ is a possessive pronoun coming at the end of the words that are probably nouns. It refers to the possession of a single feminine only.

These are some examples illustrate the systematic nature of the /k/ to /ʧ/ shift in specific phonetic environments in the following table in three positions:

kereza:t	ʧereza:t	ykaðib	yʧ aðib	abu:k	abu: ʧ
kifu:f	ʧifu:f	kam ʧə	ʧam ʧə	Fek	feʧ
ka:n	ʧa:n	hika:ya	hi ʧa:ya	ʧa:ku:k	ʧa:u: ʧ
ki:s	ʧi:s	yeh ki:	yeh ʧi:	Samak	sima ʧ
keta:l	ʧeta:l	siki:n	saʧi:n	Misk	misi ʧ

Table 1: Comparative overview of /tʃ/ across languages and dialects:

Language/ Dialect	Voiced Counterpart	Orthographic Representation	Native or Borrowed	IPA Transcription	Example Word(s)	Notes on Usage
English	/tʃ/	"ch"	Native	/tʃɜːtʃ/, /tʃiːz/	church, cheese	Common in all positions; phonemic
Modern Standard Arabic	/tʃ/	N/A	Absent	/taʃɣiːl/	تشغيل (tashghīl) — not /tʃ/	/tʃ/ absent; not phonemic
Gulf Arabic	/tʃ/	"تش"	Borrowed	/tʃuːf/	تشوف (tshoof see you)	Widespread in vernacular, esp. pronouns
Iraqi Arabic	/tʃ/	"چ" or "تش" depending on script	Borrowed	/tʃaːj/, /tʃef/	چاي (chay – tea), چف (tʃef – forehand)	Fully phonemic; Sociolinguistic marker
Persian	/tʃ/	"چ"	Native	/tʃaːj/, /tʃatr/	چای (chāy – tea), چتر (chatr – umbrella)	High frequency; clear affricate contrast
Kurdish (Sorani)	/tʃ/	"چ"	Native	/tʃaːw/, /tʃoːn/	چاو (chaw – eye), چۆن (chon – how)	Contrastive and stable in inventory
Turkish	/tʃ/	"ç"	Native	/tʃaj/, /tʃodʒuk/	çay (tea), çocuk (child)	Strong phonemic contrast; native affricate
Aramaic (Neo-Syriac)	/tʃ/	Aramaic script variations	Borrowed/ Substrate	/tʃa.diːʃa/ (dialectal)	ܩܕܝܫܐ (qaddīsha – holy)	Exists in some Neo-Aramaic Dialects

While the /tʃ/ sound is characteristic of southern Iraqi Arabic, it's worth noting that similar phonological phenomena occur in other Arabic dialects. For example, in some Gulf Arabic dialects, the /k/ to /tʃ/ shift is also observed, indicating a broader pattern of affrication in certain Arabic-speaking regions. In other words, Arabic classical /k/ regularly palatalized to /tʃ/.

6.4.3 Sociolinguistic Factors

The usage of /tʃ/ in southern Iraqi dialects is not merely a phonetic variation but also carries sociolinguistic significance. It serves as a regional marker, distinguishing speakers from south of Iraq or from rural areas if s/he is the middle part of Iraq. This phoneme can influence perceptions of identity and social belonging within the Iraqi linguistic landscape. Many words containing /tʃ/ in Iraqi Arabic trace back to Turkish, Persian, or even regional Aramaic substrates. In dialects like Baghdadi Arabic, /tʃ/ isn't just phonetic—it's a social cue, distinguishing rural versus urban speech, or younger versus older generations.

As a conclusion, the following table shows the affricate sound /tʃ/ in many languages. It illustrates that /tʃ/ operates as a native affricate in English, Kurdish, Persian, and Turkish, while appearing as a borrowed or sociolinguistically marked feature in Arabic dialects such as Gulf Arabic and Iraqi Arabic especially south of Iraq such as Basri dialect.

6.5 Educational Implications

- Teaching both systems together (English & Arabic) or (English & Persian) can improve learners' linguistic awareness .
- Highlights the importance of integrating phonological sensitivity into morphological instruction.

6.6 Affricates Acquisition Across English, Arabic, and Persian

Affricate sounds /tʃ/ and /dʒ/ pose significant pronunciation challenges for learners whose first language lacks these phonemes. Several studies have highlighted that phonological interference and instructional context play pivotal roles in learners' acquisition of affricates. Al-Hilou (2023) conducted an empirical investigation into the mispronunciation of English affricates by Iraqi EFL learners. The study revealed that /tʃ/ was most frequently mispronounced in final word position, while /dʒ/ posed difficulties in initial position. Learners in e-learning environments showed higher error rates than those in face-to-face instruction, suggesting that modality affects phonetic performance. The errors were largely attributed to interlingual interference from Arabic, where affricates are not standard phonemes (Al-Hilou, 2023) [4].

In contrast, Persian EFL learners often substitute /dʒ/ with the fricative /ʒ/, a sound native to Persian but phonetically distinct from English affricates. Studies show that Persian learners struggle with voicing distinctions and affricate articulation, particularly in environments lacking immersive exposure to native pronunciation models (e.g., Ghafar Samar & Mashhadi, 2012). Meanwhile, native English speakers demonstrate strong affricate proficiency, supported by early phonological exposure and natural acquisition processes. Affricates in English are integral phonemes, appearing commonly in initial and final positions (e.g., "jump," "watch"), reinforcing their functional and phonological salience in L1 acquisition. In other words, temporal coordination in Arabic as Estaitieh (2014) [9] mentioned is less common and sometimes indistinct refers to the fact that affricate sounds (such as /dʒ/) are not always produced with a precise and clear temporal sequence between the plosive and fricative phases, as is typically observed in languages like English or Persian. This results in these sounds being less acoustically distinct or differentiated.

7. Conclusion

This study has provided a comparative analysis of the affricate sounds in English and Arabic and Persian, highlighting both the similarities and differences in their phonetic and phonological characteristics. Through the examination of articulatory features, phonological distributions, and dialectal variations, it has become evident that while the three languages employ affricates, the way these sounds' function and are realized differs significantly. Affricate sounds / tʃ / and / dʒ / can be produced in three positions: initially, medially and finally. These sounds can be found through minimal pairs: words that differ by only one sound which is crucial in phonology for identifying phonemic contrasts.

In English, affricates /tʃ/ and /dʒ/ are established phonemes, integral to the phonological structure of the language. They appear in a wide range of word positions and exhibit distinct phonemic contrasts with Arabic, particularly Modern Standard Arabic (MSA) that has fewer affricates than English which is /dʒ/. Some dialects also use the voiced version /dʒ/, creating sound pairs like /tʃaːi/ "tea" and /dʒaːi/, a variant that adds poetic or borrowed flavor. It is subject to dialectal variation, with different realizations such as /g/ in Egyptian Arabic and /ʒ/ in Levantine Arabic. Additionally, affricates in Arabic often arise as a result of phonological processes like palatalization in certain dialects.

The comparative analysis has shown that while English maintains a clear, consistent usage of affricates, Arabic presents a more fluid, context-dependent distribution of these sounds. This variability is further accentuated by the rich dialectal diversity within the Arabic language.

From a practical standpoint, the study underscores the challenges faced by Arabic speakers learning English, especially with regard to the pronunciation of affricates. The phonemic differences between English and Arabic affricates can lead to errors in second language acquisition, such as the substitution of /dʒ/ with /ʒ/, and a lack of differentiation between the English affricates.

In conclusion, understanding the role of affricates in both English and Arabic offers valuable insights into cross-linguistic phonological systems, providing implications for language teaching, speech therapy, and phonetic research. Further studies exploring additional dialectal variations in Arabic and their interaction with other languages would enhance our understanding of these complex sounds and their role in human language.

Table 2: Phonetic overview of /tʃ/ and /dʒ/:

Feature	/tʃ/	/dʒ/
Type	Voiceless affricate	Voiced affricate
Place of articulation	Palato-alveolar	Palato-alveolar
Manner	Stop + fricative	Stop + fricative
Voicing	No vocal cords vibration	vocal cords vibration

Table 3: the use of /tʃ/ and /dʒ/ in languages:

Language	/tʃ/ Status	/dʒ/ Status	Notes
English	Phonemic	Phonemic	Common in native words
Arabic	Dialectal (not MSA)	Phonemic (MSA)	/tʃ/ in Iraqi dialects and Gulf;/dʒ/ varies by dialect
Persian	Phonemic	Phonemic	Both have unique letters

The /tʃ/ sound is phonetically similar in English, Persian, and some Arabic dialects—all are voiceless postalveolar affricates—but their phonological, sociolinguistic, and orthographic status varies significantly:

- English: Native, aspirated, phonemic.
- Persian: Native, unaspirated, phonemic, stable.
- Arabic dialects: Regional, unaspirated, phonemic or marginal depending on dialect.
- Modern Standard Arabic (MSA): No native /tʃ/, uses substitutions in formal speech. In other words, the affricate /tʃ/, while not part of Classical Arabic, definitely plays a prominent role in several Iraqi dialects and Gulf varieties that gives it a special twist.

English and Persian both use /dʒ/ as a stable, voiceless postalveolar affricate. Arabic uses /dʒ/ officially in MSA, but realization varies widely in dialects: Some dialects merge it with /g/, /ʒ/, or /j/, especially in Egyptian, Gulf, and North African Arabic. This makes Arabic unique in the range of variation for /dʒ/, even though the standard form aligns with Persian and English phonetically. /dʒ/ is a voiced postalveolar affricate found in English (e.g., judge), Persian (e.g., **جشن**), and Arabic MSA (e.g., **جمل**), though it varies in dialects.

Abbreviations

MSA = Modern Standard Arabic
DIA = dialect Iraqi Arabic
IPA = International Phonetics Alphabet

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