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Investigating the Pronunciation of the English Voiceless Post-alveolar Affricate /tʃ/ among Libyan EFL Students in the Department of English at the University of Sirte

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التحقق من نطق الصوت المركب الانفجاري الاحتكاكي /tʃ/ من قبل طالب اللغة الإنجليزية كلغة أجنبية من الليبيين في قسم اللغة الإنجليزية بجامعة سرت

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Abstract:
This study investigates the ability of Libyan Arabic EFL learners to produce the English voiceless postalveolar affricate /tʃ/, which is considered a problematic sound for most Arabic learners of English. The sample of the study was fifteen Libyan EFL undergraduate students who were chosen randomly from the Department of English at Sirte University. Each participant was given nine English monosyllabic and disyllabic words containing /tʃ/ in various word positions (initially-medially-finally). The method implemented for collecting data was recorded test and data collected were analyzed descriptively using Microsoft Excel 2010. Thus, the current study adopted a quantitative case study as the research design. The results revealed that /tʃ/ sound caused trouble to this study's students, even though all the given words were commonly used words. In spite of familiarity of the given data, the process of deaffrication of /tʃ/ occurred in the pronunciation of all participants at least for once. In other words, they pronounced /tʃ/ as /ʃ/, especially in the word-initial position followed by the word-medial while in word-final position the pronunciation for /tʃ/ was less difficult. Finally, the hypotheses of the CAH (Lado, 1957), MDH (Eckman, 1977), and SLM (Flege, 1987, 1995, 2003) were applicable to the study outcomes.

Keywords: English consonant, problematic sound, voiceless post alveolar, affricate, Libyan EFL students.

الملخص:
تبحث هذه الدراسة في قدرة متعلمي اللغة الإنجليزية كلغة أجنبية من الليبيين على نطق الصوت المركب الانفجاري الاحتكاكي /tʃ/، وهو صوت يُشكل إشكالية لدى معظم متعلمي اللغة الإنجليزية من العرب. تكونت عينة الدراسة من خمسة عشر طالبًا جامعيًا ليبياً من طلاب اللغة الإنجليزية كلغة أجنبية، اختيروا عشوائيًا من قسم اللغة الإنجليزية بجامعة سرت. أُعطي لكل مشارك تسع كلمات إنجليزية تحتوي على /tʃ/ في مواضع مختلفة (في بداية الكلمة ووسطها ونهايتها). الطريقة التي استُخدمت لجمع البيانات كانت عن طريق اختبار تسجيل الصوت، وحُللت البيانات وصفيًا باستخدام برنامج مايكروسوفت إكسل 2010. لذا، اعتمدت الدراسة الحالية دراسة الحالة الكمية كتصميم بحثي. كشفت النتائج أن صوت /tʃ/ تسبب في مشاكل لطلاب هذه الدراسة، على الرغم من أن جميع الكلمات المستخدمة كانت كلمات شائعة الاستخدام. وعلى الرغم من إلمام المشاركين بالكلمات، إلا أن عملية حذف الجزء الأول) حذف الصوت الانفجاري/t/) من صوت /tʃ/ ظهرت في نطق جميع المشاركين مرة واحدة على الأقل. بمعنى آخر، نُطق الصوت /tʃ/ كـ /ʃ/، خاصةً في بداية الكلمة متبوعًا بالوسط، بينما كان نطق /tʃ/ في نهاية الكلمة أقل صعوبة. وأخيرًا، يُمكن تطبيق فرضيات CAH (لادو، 1957)، وMDH (إيكمان، 1977)، وSLM (فليج، 1987، 1195، 2003) على نتائج الدراسة الحالية.

الكلمات المفتاحية: الصوت الساكن الإنجليزي، صوت اشكالي، الصوت المركب الانفجاري، الاحتكاكي، طلاب اللغة الإنجليزية كلغة أجنبية من الليبيين.

1. Introduction

The pronunciation is considered one of the most important parts of learning English as a second language (SL) or a foreign language (FL). In fact, learning SL or FL is not an easy task, especially in the early stages, as learners encounter unfamiliar elements such as new sounds that are pronounced in a completely different way from their first language (L1) (El Zarka, 2013). Because learning proper pronunciation is essential for successful communication, learners of English from different language backgrounds always have the desire to acquire a native-like accent. In spite of this, however, Arab Learners (AL) who learn English may commit errors in the pronunciation of sounds that they are not familiar with. Libyan Arabic learners who study English as a foreign language (EFL) are no exception, as they may mispronounce certain English sounds, particularly consonant contrasts such as /p/ vs. /b/, /f/ vs. /v/, /ʒ/ vs. /dʒ/, and /ʃ/ vs. /tʃ/. As Hassan (2014, p. 31) noted, "they substitute the sounds that they don't have in their native language with other sounds that are close to them in the place of articulation; e.g. they replace /p/ with /b/". This paper tries to investigate one of the few problematic English consonant sounds for the Libyan Arabic EFL learners - the pronunciation of the English voiceless postalveolar affricate /ʧ/ when it comes in three different word-positions (initial, medial and final).

1.1 Statement of the Problem

Based on the researchers' observation in English language classroom in Libya, pronunciation does not receive much attention. Other components, i.e. such as reading, writing and grammar, may be focused on far more than pronunciation. As a result, students graduate from pre-university stages and even universities having many errors in pronunciation in general, and consonant pronunciation, in specific. In this regard, it is noticed that the students have problems in the pronunciation of some English consonant sounds. One of the most common examples of consonant pronunciation errors is the articulation of the voiceless postalveolar affricates /tʃ/. This can be attributed to the fact that the sound/tʃ / does not exist in any Libyan dialects (LD). Therefore, speakers choose the more familiar counterpart, namely /ʃ/. So one can hear Libyans say*[ʃiːf] instead of [ʧiːf] for "chief",*[ˈlekʃə(r)] instead of [ˈlekʧə(r)] for "lecture", and*[lʌnʃ] instead of [lʌnʧ] for "lunch".

1.2 Questions of the Study

This study tries to answer the following questions:

1. Do Libyan EFL learners face obstacles in pronouncing the English voiceless post-alveolar affricate /ʧ/?
2. Does the placement of the sound /tʃ/ in three different positions within words (initial, medial or final) influence its articulation?
3. What are the primary types of substitutions that are used for the sound /ʧ/?

1.3 Aims of the Study

The aims of the study are summarized as below:

1. To find out if Libyan EFL learners face obstacles in pronouncing the English voiceless postalveolar affricate /ʧ/.
2. To investigate whether the placement of the sound /tʃ/ in three different positions within words (initial, medial and final) influences its articulation.
3. To find out the primary type of substitution that is used for the sound /ʧ/.

1.4 Significance of the Study

English voiceless postalveolar affricate /ʧ/ has proven to be a difficult sound for most Arab speakers in general and Libyan Arabic speakers in particular. Thus, this study attempts to identify the problematic areas of pronunciation of the sound /ʧ/ and to identify the reason(s) behind why this pronunciation problem exists, and to offer possible ways that LA learners can follow to improve their English pronunciation to English's voiceless affricate /ʧ/. Besides, the findings of the current study can be important to the teachers as it may provide with knowledge of reason(s) for inaccurate articulation of /tʃ/ experienced by Libyan EFL students and this is in order to implement appropriate ways to overcome these obstacles.

2. Literature Review

2.1 Factors Affecting Pronunciation in General

The difficulties in English production by EFL learners arise from the fact that there are linguistic factors that prevent these learners from achieving native-like pronunciation. One of these factors is that the sound systems of Arabic and English are different in many aspects (Bell, 1995; Yule, 2009; Hassan, 2014). Moreover, the inconsistency of some sounds in English language, the mother tongue interference and the influence of spelling on pronunciation are assumed to be as additional factors (Power, 2003; Ladefoged, 2001; Carter and Nunan, 200; Othman & Abubaker 2021). There are also non-linguistics factors that impede or promote pronunciation skills development of non-native speakers such as, age, individual's personality, attitude towards the target language, native speakers and their culture, types of motivation and also the degree of exposure to the target language (Wong, 1987; Avery and Ehrlich, 1992).

2.2 Postalveolar Fricative and Affricate Sounds in English

Postalveolar sounds (sometimes spelled post-alveolar) are consonants articulated with the tongue near or touching the *back* of the alveolar ridge, farther back in the mouth than the alveolar consonants /t/ and /d/, which are at the ridge itself but not as far back as the hard palate (Roach,2009) . Examples of post alveolar consonants are /ʃ/, /ʧ/, /ʒ/ and /ʤ/ as in the words "ship", "chill", "vision", and "jump", respectively.

Affricates are consonants that begin as stops and are released as fricatives and they share the same place of articulation . English has two affricate phonemes: the voiced /ʤ/ and the voiceless /ʧ/, often spelled "j" and"ch" respectively (ibid). The affricate /ʧ/, which is the main concern of the current paper, is voiceless consonant in which /t/ glides from alveolar to postalveolar position, both /t/ and /ʃ/ are voiceless consonants so /ʧ/ is a voiceless consonants. /ʧ/ can be occurred in different word-positions, i.e. in the initial position, medial position and final position. On the other hand, /ʤ/ is a voiced consonant, which can be also found in various word positions (Roach, 2001).

Furthermore, The English fricatives consist of two sounds, the voiced sound /ʒ/, and the voiceless sound /ʃ/. These sounds are produced when the two organs come very close to each other but some space is left between them through which the air escapes causing friction (ibid). The following table can illustrate these points.

Table 2.1: English Postalveolar Sounds

Type of vibration	Symbol	Word	Transcription
Voiceless	/ʧ/ /ʃ/	Church Ship	/ ʧɜ:ʧ/ /ʃɪp/
Voiced	/ʤ/ /ʒ/	Age Vision	/eɪdʒ / /vɪʒn/

2.3 Consonant Inventory in Libyan Arabic

Libya is very large country with varying regional dialects (Pereira, 2008). Linguistically, MSA is the official and written form of Arabic that use in all Arabic countries, but it is not used in everyday conversations. In spite of this, each Arabic country, communicate using its own dialect (Al-Ani, 1970). LA is considered one of Maghrebi Arabic dialects (Chejne, 1969). "Maghrebi is generally considered to be one of the main dialect groups of Arabic, denoting the dialects spoken in a region stretching from the Nile delta to African's Atlantic coast-in other words, the dialects of Mauritania, Morocco, Algeria, Tunisia, Libya, parts of western Egypt, and Malta."(Benkato, 2020, p.197).

With regard to consonants, Modern Standard Arabic (MSA) has 28 consonants (including two semi-vowels /w/ and /j/) and these consonants can be either voiced or voiceless (Sabir, 2014). Thus, Arabic is considered as a consonant-heavy language compared to English that has twenty-four consonant phonemes (Majeed, 1999; Chouchane 2016). Abumdas (1985) states that LA has almost the same consonants found in MSA. It has 28 consonants plus two other sounds which are the voiceless uvular stop /q/ and the glottal stop / ʔ / which are only found in MSA. For more clarity, the 28 consonants plus the other two are shown in the table below.

Table 2.2: Libyan Arabic Consonant Inventory (from Pereira 2009, p. 549)

	Labial	Labiodental	Dental	Inter-dental	Alveolar	Post-alveolar	Palatal	Velar	Uvular	Pharyngeal	Glottal
Stops -v +v Emphatic	b		t d T D					k g	q		ʔ
Nasals	M				n						
Fricatives -v +v Emphatic		f		θ ð đ	s z S Z	ʃ ʒ			x ɣ	ħ ʕ	h
Liquids					l r						
Glides	W						j				

Even though LA is a consonant-heavy dialect, its consonant inventory lacks some consonant sounds that the English language consonant inventory has, which are /p/, /v/, /ʧ/ and /ʤ/ as it can be seen in the above table. The noticeable thing is that LA allows most of the consonant contrasts as /t/-/d/, /k/-/g/, /s/-/z/, /θ/-/ð/. Unlike English,

LA lacks the consonant contrasts /p/-/b/, /f/-/v/, /tʃ/-/ʃ/, /dʒ/-/ʒ/. According to (Watson, 2002) because these oppositions are absent in Arabic, the above contrasts seem to be problematic for Arab speakers in learning English. As previously mentioned, the focus of this study is the voiceless postalveolar affricate /tʃ/, which is not found in the phonemic inventory of LA nor in the phonological system of MSA. Although in the study of Maddieson (1984) the sound /tʃ/ "is the most popular affricate sound across the world's languages. In one survey, it was found in 141 out of 317 languages" (cf. Alqarni, 2013. p.5). Moreover, some varieties of Arabic spoken-dialects have the voiceless post alveolar affricate /tʃ/ like Gulf Arabic (GA) dialects which is a group of dialects spoken in the United Arab Emirates, Qatar, Kuwait, and part of Bahrain, Oman, Saudi Arabia and Iraq but as allophones not phonemes (Al-Braik, 1982; Alqarni ,2013; Szreder and Derrick, 2023). Thus, one can hear *[tʃatəf] in GA instead of [katəf] in MSA for "shoulder" and [di:tʃ] in GA instead of [di:k] in MSA for "rooster".

2.4 Related Theories

Eckman, Elreyes and Iverson (2003) claimed that when L2 learners try to learn a contrast in L2, they may face three scenarios in their acquisition of this contrast. The first scenario is that the L1 has different sounds to L2; secondly, the L1 contains one of the phonemes like in L2 and thirdly the L1 has both phonemes like L2, but they are allophones of the same phoneme in the L1, whereas in the l2, they are separate phones.

The purpose of this study is to examine the second scenario by investigating how Libyan speakers learn the English contrast [ʃ-ʧ] that is assumed difficult in their acquisition of English. For this purpose, this section presents an overview description of three hypotheses namely (CAH), (MDH) and (SLM). These theories were used in order to explain the findings of the current study.

2.4.1 Contrastive Analysis Hypothesis (CAH)

CAH argues that the key to ease or difficulty in foreign language learning lies in the comparison between the native and the foreign language. Lado (1957) assumed that "the student who comes in contact with a foreign language will find some features of it quite easy and others extremely difficult. Those elements that are similar to his native language will be easy for him and those elements that are different will be difficult" (p.2). In other words, CAH predict that less familiar sounds will be more difficult to learn than familiar sounds.

While the prediction made by the CAH— that less familiar sounds will be more difficult to learn than familiar sounds— may be defendable in some instances, the CAH came under criticism for failing to predict some robust acquisition patterns. One such example is the distribution of voiceless and voiced obstruent (a collection of plosives, fricatives, affricates) in German and English. In English, both voiced and voiceless consonants occur in initial, medial and final position in a word. In German on the other hand, both voiced and voiceless obstruents occur in initial and medial position but only voiceless sounds occur in final position. Studies have shown that there is a directionality of difficulty in learning in that while German learners of English have difficulty with learning the voicing contrast in final position in English(e.g. ta[g] to ta[k]) , English learners of German do not have a problem with suppressing the contrast.

2.4.2 Markedness Differential Hypothesis (MDH)

The MDH retained the idea from the CAH that languages must be compared or contrasted to determine the difficulty of learning but added to this the notion of a "relative degree of difficulty" defined by markedness.

Archibald (1998) showed that Eckman's definition of markedness as "phenomenon A in some languages is more marked than B if the presence of A in a language implies the presence of B but not vice versa''(p.55) . Thus, Eckman (1977) hypothesized that x is more marked that y if the presence of x implies the presence of y, but not vice versa. With respect to acquisition, more marked structures are considered to be more difficult to acquire than unmarked less marked structures, which will be easier. Eckman (2008) then concluded that the difficult areas of the target language are those that are both different from the L1 and relatively more marked than the L1.

The MDH correctly predicts that German learners will have more difficulty in acquiring the voiced consonants in final position because voice is assumed to be marked than voiceless (and also presumably because the final position is more marked than the initial or the medial position explained by the typological universal: if a language has codas it also has onsets). The MDH also, by the same token, correctly predicts that English learners will have no difficulty in learning final devoicing because voiceless is unmarked. This leads to the implicational universal that is the presence of a voicing contrast in final position implies the presence of a voicing contrast in medial position, which in tum implies the presence of voicing contrasts in initial position. In other words, the presence of A implies the presence of B but not vice versa and the presence of B implies the presence of C but not vice versa, thus A is the most marked and C the least marked.

2.4.3 Speech Learning Model (SLM)

This model was developed by Flege (1987, 1995, 2003) who claimed that non-native phones are classified relative to native language phonemes based on phonetic similarity. This is referred to as "an equivalence classification" (Flege 1987, p.49). Equivalence classification prevents adults from producing L2 phones authentically because they are unable to make effective use of sensory input in speech learning.

Thus it is claimed that "the extent to which learners approximate the phonetic norms of an L2 differs with respect to whether the phone is new or similar" (Flege, 1987, p.48). Here a new phone has used to refer to as "an L2 phone which does not have a counterpart in L1" (p.95). On the other hand, a similar phone was defined as "a phone which is realized in an acoustically different manner than easily identifiable counterpart in L1" (pp.58-59). In other words, new phones that do not have an equivalent in the L1 learners eventually realize them in order to learn their production. While similar phones that differ from their counterparts in the L1, L2 learners face difficulty in pronouncing them, because they do not systematically occur in the L1 phonetic system. L2 learners thus strive to maintain contrast between segments of the L1 and L2 in the same way that monolinguals maintain contrasts in their L1.

Flege (2003) concluded that L2 learners would be unable to authentically articulate an L2 phone unless they establish a phonetic category for that L2 phone. This means that while English learners of French may be able to accurately produce/y/ in French (because they create a new category for it) they may not be able to authentically produce French /u/ for which they create no category (because it is too similar to English/u/). The more the perceived phonetic distance between L1 and L2 phone the greater the chance it is that L2 category will be created.

2.5 Related Studies

This review of literature includes some of the most prominent research studies that were carried out to investigate the production of the English voiceless postalveolar affricate /tʃ/ by Arabic learners. In fact, a number of Arab researchers have conducted research to identify the difficulties that Arab face when they produce the English sounds that are absent in Arabic in general and the English affricate /tʃ/ in particular.

However, very few studies have been conducted on the production of English affricates by Libyan Arabic learners. Shredi and Shitaw (2022) who followed quantitative and acoustic design carried one of the earliest linguistics studies out. This study examined the errors produced by eight undergraduate students from the university of Tripoli who were given 52 words containing the English's Affricates / ʧ/ and /dʒ/ in three different positions. The study revealed that the position of the affricates and the number of syllables in the target words has an influence on accuracy. Moreover, the study's participants employed the process of deaffrication particularly when the target sounds occurred in final position.

As mentioned earlier, several studies have been conducted on Arabic ESL learners to identify and investigate their pronunciation to the English affricate /tʃ/. Bin Hadjah and Jupri **(**2018), for example, conducted a study on 4 Yemeni EFL postgraduate students who were given a list of 18 words consisting the target sound of the study -/ʧ/ in different positions (initial, medial and final). The data were analyzed using Praat phonetic software, so it had a quantitative case study design. The results indicated that Yemeni EFL learners have difficulties in producing the /tʃ/ sound, especially in the initial and final positions. Also the results of this study were to some extent, in line with the Markedness Differential Hypothesis (MDH), The Language Transfer Theory (LTT) and Contrastive Analysis Hypothesis (CAH).

Alqarni (2013) carried out a similar study. This study investigated the realization for the English sound /tʃ/ in Najdi Saudi ESL learners' pronunciation. This study examined 18 Najdi ESL learners who had been in the US. They were given 16 English items containing /tʃ/ in two word-positions (initial and final). In this study, a quantitative design was and both SPSS and Speech analyzer software were performed for analysing the data. The results revealed that Najdi learners had difficulties in realizing the sound /tʃ/, and they substituted to its counterpart in L1 sound which is /ʃ/. The study also showed that /tʃ/ caused trouble for the participants especially in the final position than when it occurred in initial position. Finally, the CAH (Lado, 1957), MDH (Eckman, 1977), and LTT (Gass and Selinker,1994) provided support for the study's results.

Another study has carried out by Jabali and Abuzaid (2017). The study aimed at identifying the English consonant sounds that are mispronounced by20 Palestinian EFL undergraduate students from the English Department at An-Najah National University. These learners pronounced words that have the problematic sounds in all positions (initially, medially, and finally). The data were collected by using digital recordings as the participants were asked to read the words slowly and carefully while the researchers were recording them. The study concluded that the most problematic sounds for these learners were/p/ , /tʃ/, /dʒ/, /ɹ/, and /ŋ/.

3. Method

In this section, the research design and the research method are shown followed by the participants. Then, the tasks and materials were illustrated. Finally, the data collection and the data analysis are explained.

3.1 Research Design

For this study, the quantitative method was used effectively to provide reliable percentages from the data collected.

3.2 Research Method

In this study, the researchers relied on a recording test to collect the data from the sample of the students. In fact, recordings have been used by many researchers as a tool of collecting their data (e.g. Shredi and Shitaw, 2022; Jabali and Abuzaid, 2017; Hassan, 2014; Hago, 2015).

3.3 Participants

The participants were Libyan EFL students from Sirte University enrolled on a range of undergraduate semesters in the Department of English. The number of participants was 15 students and their age range was 22-25. They were both males and Females and they were randomly chosen.

3.4 Tasks and Materials

A word list-reading task was only utilized for eliciting data from the study's participants. This task is considered one of Labovian model that is used by many researchers in previous studies in the literature. In this task, students were asked to pronounce nine words containing the problematic sound /tʃ/ in three different word positions: initially (e.g., *check*), medially (e.g., *teacher*), and finally (e.g., *catch*). These words are monosyllabic and disyllabic words and they were adapted from (Loi, 2018). Most of these words were simple and familiar and they were used in regular speech (see Appendix).

3.5 Data Collection

15 participants were chosen to read the 9 words containing the sound /tʃ/ / in different word-conditions individually. These words were also listed individually and randomly with another six words that did not contain this sound (e.g. table, TV). The purpose of these six words was to act as fillers or distracters (see Appendix), in order to disallow the speakers from identifying the actual purpose of the study, because once they realized that they might deliberately produce the accurate sound. For ethical considerations, the researchers obtained permission from each participant, informing them that their pronunciation would be recorded and that the recordings would remain confidential and be used solely for the research study. The recording procedure took place in the Language Centre in a quiet empty room at Sirte University. Before starting the recording test, an adequate reading time was given for each student so they could be familiar with the words before recording them. Then they were asked to read the words slowly and carefully once while the researchers recorded the test. Each record lasted approximately from five to six minutes and the test were recorded using TT.561MV microphone that was connected to a Toshiba Laptop. VLC media player was used as the programme for recording. After finishing the task, the researchers transcribed the participants' utterances phonemically by using IPA symbols (Roach, 2001) in order to compare their outputs with the target language.

3.6 Data Analysis

The recordings were analyzed by repeatedly listening to the participants' pronunciations in order to identify correct and incorrect productions. During this process, the researchers wrote a list of the recorded sounds in order to decide the correct pronunciations and the incorrect ones. The participants' pronunciation errors were considered the dependent variable. Whereas, the target sound in three different positions of the word (initial, medial and final) was the independent variable was the target. Descriptive statistics was performed using Microsoft Excel 2010.

4. Results

For clarity of analysis, four tables were presented and analyzed descriptively. The first three tables show the frequency analysis of the participants' articulations of each word that has the target sound /tʃ/ in three different word positions of, whereas the fourth table presents the percentages of the total number of pronunciations of the /tʃ/ sound by all participants in all word positions. Moreover, two charts were designed to show the pronunciation accuracy per word and pronunciation accuracy by word position.

Table 4.1: Frequency of Correct and Incorrect Pronunciations of / tʃ / Sound by 15 Students per Word in Initial Position

Words	NS	NSC	Percentage	NSI	Percentage
Check	15	8	53%	7	47%
Chat	15	9	60%	6	40%
child	15	7	47%	8	53%

NS means the number of students, NSC means the number of students with correct pronunciation and NSI means the number of students with incorrect pronunciation.

As shown in Table 4.1, almost half of the participants produced /tʃ/ correctly, while the other half produced it incorrectly when it occurred in the initial position. The above table shows that the *chat* was managed well by nine participants (60%) and only six participants (40%) articulated it wrongly. Both the words *check* and *child* were

produced correctly by eight (53%) and seven (47%) participants respectively and in turn it was articulated wrongly by seven and eight participants respectively.

Table 4.2: Frequency of Correct and Incorrect Pronunciations of / tʃ / Sound by 15 Students per Word in Medial Position

Words	NS	NSC	Percentage	NSI	Percentage
kitchen	15	12	80%	3	20%
Lecture	15	11	73%	4	27%
teacher	15	11	73%	4	27%

Table 4.2 indicates that most of the participants managed well when /tʃ/ occurred in medial position as twelve participants out fifteen articulated the word *kitchen* correctly (80%) and only three participants were unable to produce it accurately (20%). The results of the recorded test also showed that both words, *lecture* and *teacher*, were articulated correctly by eleven participants (73%), while four participants (27%) pronounced them incorrectly.

Table 4.3: Frequency of Correct and Incorrect Pronunciations of / tʃ / Sound by 15 Students per Word in Final Position

Words	NS	NSC	Percentage	NSI	Percentage
watch	15	15	100%	0	0%
rich	15	11	73%	4	27%
catch	15	15	100%	0	0%

It can be seen from the data in Table 4.3 that the participants' performance with the sound / tʃ / was significantly better when it occurred in the final position of the above words. For instance, all fifteen students articulated the words *watch* and *catch* correctly (100%). Only four participants (27%) mispronounced the target sound /tʃ/ in the word *rich*. Figure 4.1 below illustrates the overall pronunciation accuracy per word.

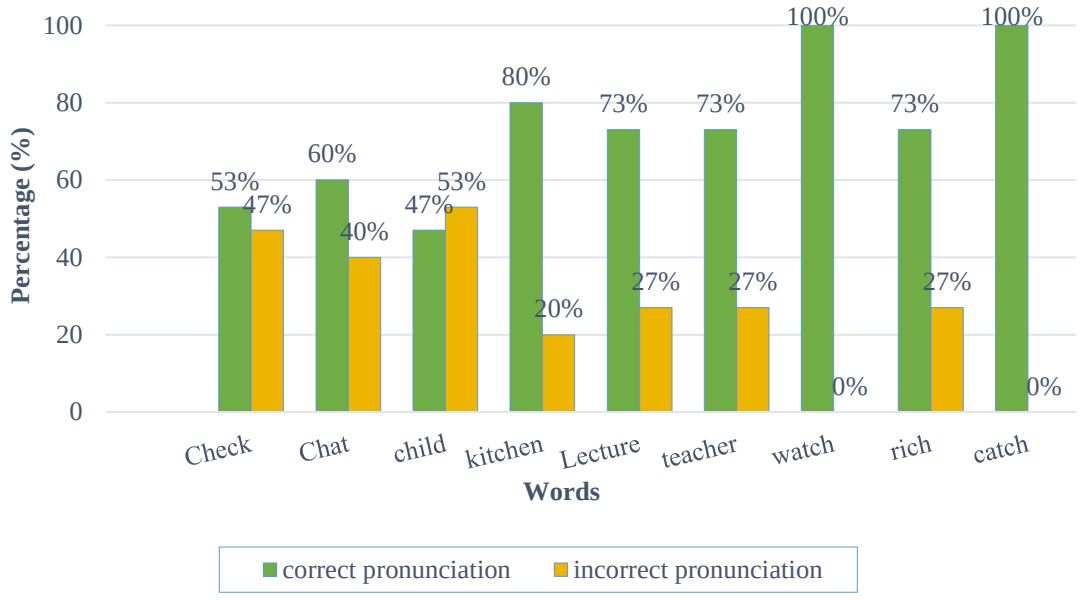

Figure 4.1: Pronunciation Accuracy of /ʧ/ per Word

Turning now to Table 4.4 as it shows the total number of accurate and inaccurate pronunciations by all participants in all word-positions. It illustrates that the fifteen participants had few errors in pronouncing the /tʃ/ sound especially in final and medial positions of the words as the percentage of correct pronunciation was 91% and 76% respectively. However, this was not the case when the target sound occurred in word initial-position as it caused some trouble to all participants with a percentage of correct pronunciation 53%. Thus, in order to simplify their pronunciation of the affricate / tʃ , they deaffricated it to the fricative /ʃ/.The process of deaffrication of /tʃ/ was only the primary type of substitution. The substitution pattern occurred 47% of the time in the word-initial position, 24% in the medial position, and only 9% in the final position.

Table 4.4: Percentages of Correct and Incorrect Pronunciations of / tʃ / by all Participants

Position	Correct	Incorrect	Std. Deviation
Initial	53%	47%	0.51
Medial	76%	24%	0.43
Final	91%	9%	0.29

As Table 4.4 shows, there are significant differences in the pronunciation of / tʃ/ when it came in the three different word-positions. The calculated value of standard deviation for the /tʃ / sound in word-initial position was (0.51) and word-medial position was (0.43) which are quite greater than the calculated value for the /tʃ/ sound in word-final position (0.29). For more clarity, the following figure illustrates the accurate and inaccurate pronunciations in each position of word.

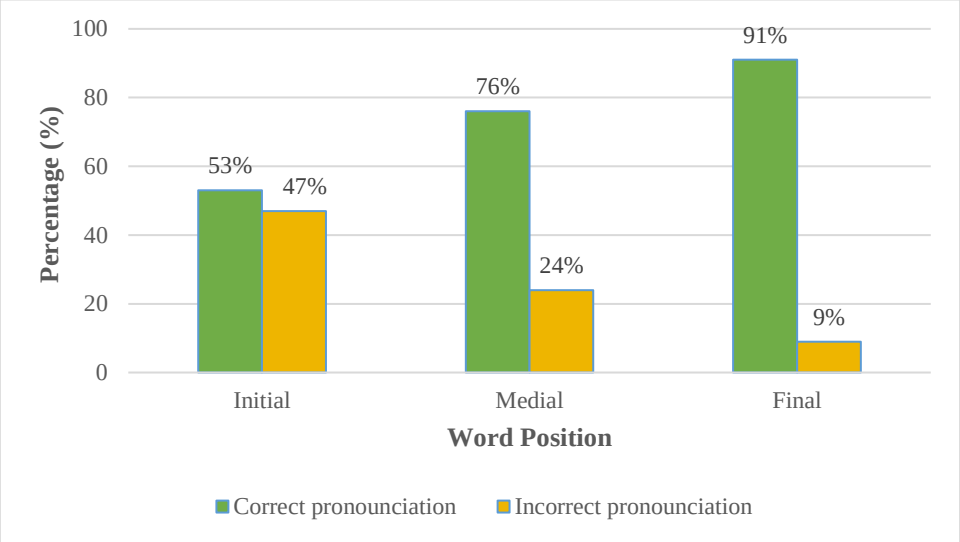

Figure 4.2: Pronunciation Accuracy of /ʧ/in Different Word Position

5. Discussion

Research Question 1 aimed to find out if Libyan EFL learners face obstacles in pronouncing the English voiceless postalveolar affricate /ʧ/. The results of this study revealed that the study's participants had difficulties in producing the English sound /ʧ/. In spite of this, the /ʧ/ sound was considered a challenge for the participants, the total number of tokens pronounced by the study's participants was 135, of which 99 (73%) were accurate and 36 (27%) were inaccurate. This finding appeared from the fact that all the words given to the participants were familiar and commonly used. Hence, it is possible to hypothesize that the familiarity with these words could be attributed to the low rate of errors and this finding is in agreement with Alqarni's (2013) findings which showed that "Familiarity with certain words might explain the difference in the occurrence of errors between words"(p.40). For this study, the three main hypotheses namely (CAH), (MDH) and (SLM) are employed in order to consider the results of this study. In general, the results of this study were to some extent, in line with these hypotheses.

The Contrastive Analysis Hypothesis (CAH) would predict that Arabic learners of English would find those segments that English has and Arabic does not, difficult to learn (thus [p v ʧ ʤ]) would be difficult to learn. Similarly, English learners of Arabic would find those sounds in Arabic that do not exist in English difficult to learn i.e. mainly uvulars and pharyngeal (cf. Jasmine, 2010). Consider the Arabic and English segment inventories below.

Table 5.1: Arabic and English Consonants

	Labial	Dental	Alveolar	Palatal
Arabic	b f m w	ð θ	t d s z n l r	š ʒ y
English	p b f v m w	ð θ	t d s z n l r	ʃ ʒ ʧ ʤ y
	Velar	Uvular	Pharyngeal	Glottal
Arabic	k g x ɣ	q ɓ χ	ʕ ħ	h ʔ
English	k g			h

From Table 5.1 above, CAH would predict that Libyan EFL learners face difficulties in producing /ʧ/, because of the absence of the this sound in AL in general and in the phonemic inventory of LA in specific.

Another hypothesis used in this paper was the Markedness Differential Hypothesis (MDH). The central claim of MDH is that the difficulties in acquiring the L2 sounds are because the target language is different and more marked than native language. In this case, it can be assumed that because the English phoneme /ʧ/ is absent from the consonant inventory of LA, LA learners of English may face a challenge to acquire it because it is different. However, the Markedness Differential Hypothesis (MDH) predicted that if a language has voiced obstruents, it must also have voiceless obstruents. From this markedness concluded two things. The first thing was on language typologies that there are no languages with only voiced obstruents but there are languages with only voiceless obstruents (Korean, for example). The second thing on markedness that voiced obstruents are more marked than voiceless obstruents or voiceless is the unmarked. According to this assumption LA learner of English will have no difficulties in acquiring /tʃ/ as it is voiceless and relatively less marked. In spite of this, however, this was not the case, as this study's participants could not manage well with the unmarked sound /tʃ/, and they tended to replace it with its counterpart in L1, namely /ʃ/.

On the other hand, later work has proven that the new sounds may be quite easy to learn than similar sounds and Flege (1987) held this view. This view is called the Speech Learning Model (SLM) that claimed that the L2 leaners have more difficulties in producing similar phones than the new phones. This is because L2 learners can create a phonetic category for the new sounds, where the L2 sounds that have an equivalent in L1, tend to pose more difficulties and this is referred to as an 'equivalence classification'. Therefore, it can be assumed that Libyan EFL learners failed to produce the sound /ʧ/ authentically because it is similar to its equivalent sound in their L1, namely /ʃ/ (ش), thus they could not create a new phonological category for / ʧ / and instead they merged the sound / ʧ / to the same category of / ʃ/. From above it can be understood that the more dissimilar L2 phones are from the nearest L1 phonemes the higher the chance of creating a new phonological category for the L2 sounds. This does not hide the fact that most of this study's participants managed quite well with the sound / ʧ/, especially in word-final position. This finding provided further support to SLM, which claimed that L2 learners are able to auditorily detect the acoustic differences distinguishing similar L1 and L2 phones and the phonetic representatives that guide segmental articulation continue to be modifiable throughout life because of phonetic input (Flege, 2003).

For Research Question 2 in investigating whether the placement of the sound /tʃ/ in three different positions within words (initial, medial and final) influences its articulation, this study revealed that the sound /tʃ/ caused trouble for Libyan learners, especially when it occurred in the initial position. In this position, the total number of accurate pronunciations was 24 with a percentage 53%. In the medial position, the total number of accurate pronunciations was 34 with a percentage of 76%. The best performance for all the study's participants was when the sound /tʃ/ occurred in word-final position, as the total number of accurate pronunciations was 41 with a percentage of 91%. This finding contradicted the results of Alqarni (2013) as he found that the /tʃ/ sound was difficult in the final position of the word than in the initial position of the word. Furthermore, Shredi and Shitaw (2022) and Jabali and Abuzaid (2017) found that learners struggled with the pronunciation of /tʃ/ in word-final position. Bin Hadjah and Jupri **(**2018) found that the incorrect realization of the sound /tʃ/ was when it occurred in both initial and final positions.

In this study, the CAH and SLM hypotheses cannot be applied to explain a reason behind the few errors in the production of /tʃ/ in the medial and final position than initial position, because they do not predict the directionality of difficulty and they focused more on individual phonemes rather than pairs in a contrast. On the other hand, the Markedness Differential Hypothesis (MDH) introduced a common implicational universal which is if L1 (e.g. English, Arabic, Swedish) has a voicing contrast in initial, medial and final positions of a word, the L2 learner will not have difficulties in acquiring that contrast. However, "the presence of a contrast finally implies a contrast medially, which in turn implies a contrast initially" (Eckman, 1977, p. 322). According to MDH Libyan learners will maintain voiceless /tʃ/ when it occurs in the three different positions, firstly because it is voiceless sound and its counterpart is also voiceless, so they are unmarked sounds. Secondly, because LA allows a voicing contrast initially, medially and finally of a word (e.g. /k-g/, /s-z/, /t-d/ contrasts). However, the finding contradicted the assumption of MDH as the participants' performance were better when the phoneme /tʃ/ occurred in the final position and medial respectively than the initial position which is considered unmarked. Consequently, the MDH makes no predication in this area. Because of the emphasis on differences between the NL (native language) and the TL (target language), the MDH can make no predictions about learning patterns that make reference to markedness but no differences between the NL and the TL are present. In fact, previous studies supported this finding and one of them was conducted by Altenberg and Vago (1983) for Hungarian and Farsi learners of English respectively. They carried out research on the production of final voiced obstruents in English. Although all three languages have a voicing contrast in final position, speakers showed final devoicing. Thus, the MDH would wrongly predict that the learners of English would have no difficulty in learning the contrast.

For Research Question 3, the result of this study revealed that the primary type of substitution of the English /ʧ/ was only deaffrication. In other words, all the participants simplified the /tʃ/ sound and pronounced it as /ʃ/ in order to make it more similar to its counterpart sound in their L1 that is (ش). The process of deaffrication occurred in all word-positions. The participants deaffricated /ʧ/ to /ʃ/ 21 out of 45 times (47%) in the word-initial position. It also occurred 11 out of 45 times (24%) in the medial position and only 4 out of 45 times (9%) in the final

position. This result is consistent with the previous works which found the process of deaffrication was followed by most of Arabic EFL learners (Shredi and Shitaw, 2022; Bin Hadjah and Jupri, 2018; Jabali and Abuzaid, 2017; Alqarni, 2013).

As it was mentioned earlier that SLM would predicate that equivalence classification prevent L2 learners from establishing a phonetic category for similar but not for new sounds. In order for the above to be explained by SLM, it must be the case that the study's participants approximated but not achieve the phonetic form of similar L2 phones. In this case these learners merged the phonetic properties of /ʧ/ phone to this of similar L1 phoneme, which is /ʃ/, and does this then affect their production of English phoneme /ʧ/.

6. Conclusion

According to the findings of this study, Libyan EFL learners encountered some difficulties in producing the target sound /ʧ/ in several words. It was found that /ʧ/ was most often replaced with /ʃ/ in the word-initial position, more so than in the medial or final positions. This indicates that word position influenced the accuracy of the participants' pronunciation of /ʧ/. In fact, there were fewer errors when the investigated sound /tʃ/ occurred in final and medial word position. This may be attributed to the fact that all words were familiar words. Furthermore, since all participants were English learners from the English Department, it can be predicted that learners who frequently use the L2 are more likely to attain native-like L2 pronunciation than those who rarely do so.

7. Limitations of the Study

There are some limitations that must be clarified. First, it only presented the articulation of one consonant sound, which is the voiceless postalveolar affricates /ʧ/. Second, the results of this study could not be generalized to all Libyan EFL students due to the fact that the sample was small and limited to English students from the Department of English at University of Sirte. Furthermore, the chosen words were too limited as they were only 9 words.

8. Recommendations

In light of the previous findings, the researchers recommend that learning English will not be successful if learners cannot communicate effectively. Inappropriate pronunciation often leads to misunderstandings and, consequently, to a breakdown in communication (Na'ama, 2011). Regardless of students' command of English vocabulary and grammar, teachers should draw the attention of Libyan Arabic learners to the importance of pronunciation in learning English. They should integrate pronunciation practice into lessons so that students have more opportunities to discriminate phonetic differences, whether between pairs of L2 sounds or between L1 and L2 sounds (e.g., /ʃ/ vs. /ʧ/). This is important since L2 perception is often poor because the L1 phonetic system filters out L2 sound properties. Libyan EFL students should also make an effort to distinguish between /ʃ/ and /tʃ/, especially when they occur in different word positions, and work on correcting their pronunciation.

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Compliance with ethical standards

Disclosure of conflict of interest

The author(s) declare that they have no conflict of interest.

Appendix

/tʃ/ in Word-Initial Position

Words	Transcription
Check	/tʃek/
Chat	/tʃat /
Child	/tʃaɪld /

/tʃ/ in Word-Medial Position

Words	Transcription
Kitchen	/kitʃən/
Lecture	/lɛktʃə/
Teacher	/ti:tʃər /

/tʃ/ in Word-Final Position

Words	Transcription
Watch	/ wɑtʃ/
Rich	/rɪtʃ
Catch	/kætʃ/

List of Distracted Words

	Words
1-	Table
2-	Thief
3-	Room
4-	Woman
5-	Student
6-	TV

