

Absence of English Phonemes from Arabic; The Impact on EFL and ESL learners' Production of Loanwords

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Abstract

The present study aims to address whether the absence of foreign English phonemes from the Arabic phonemic inventory have impacts of EFL and ESL learners' pronunciation of English loanwords differently. The study adopts a comparative approach, seeking to examine whether the two groups of learners used the same or different phonemes for substituting or approximating the target phonemes. 28 English loanwords were utilized to test the productions of 15 learners at Salman Bin Abdul-Aziz University, Saudi Arabia (EFL) and 15 learners at the Center for English as a Second Language in Southern Illinois University, USA (ESL). Probing the impact of the learners' L1, Arabic language, on the production of loanwords via numerous theories and frameworks such as transfer, approximation, and the Markedness Differential Hypothesis showed that these English loanwords underwent certain phonological modifications. Both EFL and ESL learners showed transfer from L1 to L2, native Arabic phonological processes, while only ESL learners showed a universal pattern, such as VOT approximation. That is, both EFL and ESL learners substituted /v, ɪ, tʃ/ with /f, r, ʃ/, but they differed in their production of /p/. While EFL learners substituted /p/ with /b/, ESL learners reflected approximated sound to /p/.

Keywords: loanword, Arabic, transfer theory, Approximation, phonemic substitution, EFL learners, ESL learners

1. Introduction

Loanwords are words that enter and get used in one language, the host language, from another language, the donor language. These kinds of words are also called borrowed words. Although some researchers distinguish between the two terms, it is not the focus in this paper. In this paper, loanwords are any English words integrated, written or spoken, in Arabic. These words are not part of the host/recipient language vocabulary but integrated from the donor language to become part of the recipient language's lexicon (Haspelmath, 2009). Language contact affects the majority of the world's languages. When it happens, the most common outcome is borrowing. Words are usually "loaned" when a contact between two languages, nations, or cultures occurs (Hoffer, 2002). The contact could be due to many factors such as trade, immigration, arts, technology, war, colonization, globalization, or fashions and foods (Maamoun, 2020). The contact situation between English-speaking countries and Arabic-speaking countries has resulted in the influx of English (loan) words into the Arabic language. This lexical borrowing can be related to linguistic factors such as Arabic lexicon enrichment, which results in loanword adaption (Thomason & Kaufman, 2001). When a language integrates foreign lexical items from another language, it either incorporates them directly (adopt) to its lexicon or it modifies (adapts) them to its phonological structure (Bueasa, 2015). Thus, the presence of some phonemes in the donor language and the absence from the recipient language results in loanword adaptation, like phonemic substitution, which have an impact on phonological structures, particularly at the segmental level (Hock & Joseph, 2019).

Standard Arabic phonemic inventory does not comprise sounds like /p, v, ɪ, tʃ/ that exist in English. The lack of these phonemes in Arabic has increased the interest to investigate Arabic speakers' production of English phonemes (Alomoush & Al Fagara, 2010). Many researchers studied the effect of the first language (L1) on the second language (L2) production, showing the lack of phonemes in L1 results in negative transfer or approximation when producing L2 (Flege & Eefting, 1987; Fourakis & Iverson, 1985). This paper aims to examine whether the absence of these phonemes from Arabic affect EFL and ESL learners' pronunciation of English loanwords in Arabic. While the ESL learners were a group of students in the Center of English as a Second Language (CESL) in Southern Illinois

University in the US, the EFL learners were a group of undergraduate students in Salman bin Abdul-Aziz University in Saudi Arabia.

Countless English loanwords come across Arabic speakers in their daily lives which they pronounce differently from the pronunciation of English speakers. Since some English phonemes are absent from Arabic, speakers of Arabic resort to substitute them with the most similar phonemes available in their L1's inventory. For instance, Arabic speakers tend to substitute English /ɪ/ with /i/, /p/ with /b/ etc. This is due to the fact that English and Arabic have different phonological structures. Loanwords usually go under reformation to conform to the recipient language's structure. In this paper, various English loanwords modified to Arabic phonology will be used to illustrate the effect of L1 via transfer.

The current study is organized as follows; the first section presents the introduction, and the significance of the study. The second section lays out theoretical background, previous research which has been discussed in the field of loanword phonology and in production studies. The third section presents the methodology which outlines the research problem and questions, the participants, the instruments and procedure. Later, the fourth section presents the analysis, results and the discussion. Finally, the fifth section presents the conclusion in which limitation and further studies are discussed.

1.1 The Significance of the Study

The goal of the current study is to present empirical evidence about the status of phonemic substitution in the speech of English as Second Language (ESL) learners and English as a Foreign Language (EFL) learners. It investigates whether EFL and ESL learners reflect similar productions of loanwords or alter their speech differently when pronouncing loanwords. It also asks whether native speakers of Arabic adopt new foreign phonemes such as /p/.

2. Literature Review

There has been an increasing interest in research addressing the absence of foreign phonemes from one language. Existing research has shown that the nonexistence of certain phonemes in a language causes speaker to substitute, or approximate sounds when producing L2 phonemes (Alharbi, 2013; Alotaibi, 2013; Alqarni, 2013; Hickey, 1982; Morandini, 2007). These kinds of studies investigate the production of EFL or ESL learners, attributing the results on theories like transfer Major (2008), and the Markedness Differential Hypothesis (Greenberg, 2010).

With respect loanwords, Major (2008) indicated that loan phonology phenomena have much to do with transfer and that native speakers of the recipient language pronounce loanwords as if they were words from their L1. Major (2008) claims that transfer is based on the similarity between sounds in the L2 and in the L1. To narrow down the scope of transfer to phonemic or segmental substitutions, lots of research have explained that phoneme substitution is due to the absence of target phonemes in the borrowing language.

Hickey (1982) investigated palatalization of English loanwords in Inis Me ãn Irish (IMI), which was considered as a significant phenomenon that is responsible for the majority of changes in IMI. It had two equivalents: non-palatal and palatal. For instance, in the word *university* the non-palatal /v/ was altered to [w] in IMI. Major attributed that to a phonological change to the low-friction articulation which had reached the point of the frictionless continuant [w]. Along the same lines, in the phrase '*my bicycle*' [mə'wæɪsɪkɪl], /b/ changed to [w] when it became a fricative. Hickey (1982) illustrated that the absence of /tʃ/ from the Irish phonemic inventory was the motive for its substitution with /ʃ/ as in *porch* [po:ɪʃ].

Morandini (2007) examined English loanwords in Italian, focusing on the phoneme substitution process, presenting evidence from Italian loanwords that lack the voiceless interdental consonant /θ/. Morandini (2007) showed that English loanwords in Italian such as *thermos* which lacks some foreign phonemes such as /θ/ were replaced with /t/ in ESL learners' production as [tɛr.mos], or with /v/ in this [.ɪs] which is produced as [vis] or /f/ as in thief [θi:f] produced as [fi:f], or delete it, as in the case of /h/ in *hanno* which is produced as ['an.no] '*they have*'.

Other studies have addressed ESL and EFL Saudi learners' pronunciation difficulties with English consonants (Alharbi, 2013; Alotaibi, 2013; Alqarni, 2013). Alharbi (2013) investigated Saudi learners' pronunciation of the English /p/ sound. He found that Saudi learners of English substituted /p/ with /b/ or approximated to the former. Alotaibi (2013) examined the production of the /v/ sound by Saudi speakers of English. His findings revealed that Saudi speakers had difficulty producing the voiceless labiodental fricative sound. The results showed that Saudi speakers of English mispronounced the /v/ sound and substituted it with its counterpart /f/. Similarly, Alqarni (2013) examined Saudis ESL learners' production of the English /tʃ/ sound. He observed that ESL learners substituted /tʃ/ with /ʃ/. These previous studies attributed the findings due to the absence of the English phonemes /p, v, and tʃ/ from Arabic phonemic inventory and due to its similarity to the Arabic /b, f, and ʃ/ phonemes which in turn resulted in

transfer of L1 values.

Many researchers investigated the integration of loanwords into different Arabic varieties such as Classical Arabic (Bueasa, 2015), Standard Arabic (Al-Qinai, 2000), Al-Hasa, Saudi Arabic (Smeaton, 1973), Moroccan Arabic (Heath, 2013), Jordanian Arabic (Al-Saidat, 2011; Alomoush & Al Fagara, 2010; Guba, 2016; Salem, 2015), Egyptian Arabic (Hafez, 1996), Kuwaiti Arabic (Dashti & Dashti, 2017), Iraqi Arabic (Mohammed, 2009). Since borrowing occurs at different linguistic levels, several studies examined loanwords from lexical, semantic, syntactic, morphological, and phonological perspectives. Within the scope of loanword phonology, both Salem (2015) and Guba (2016) investigated Jordanian and Ammani Arabic phonological adaption of English loanwords respectively.

Salem (2015) investigated the distribution, the frequency, and the semantic, phonological, and morphological adaptations of loanwords in Jordanian Arabic. He examined spoken and written loanwords in numerous kinds of sources such as newspapers, conversations, and social media website/app, namely Facebook. At the phonology level, his results revealed that the foreign phonemes are replaced with the homorganic Arabic counterparts, despite some variations. For instance, loanwords with /p/ are always produced with /b/, if they are established loanwords, or either with /p/ or /b/ if they are non-established loanwords. Regarding the phoneme /v/, it is preserved when spoken in established and non-established loanwords, but when written it is replaced with /f/ in the former. He attributes this pattern to the existence of /v/ in the spoken variety's inventory. In a similar pattern, the phoneme /tʃ/ is retained in some established loanwords in the spoken variety, because some colloquial varieties have /tʃ/ in their sound system. However, in writing, /tʃ/ is orthographically represented as /ʃ/. He concluded that phonemes substitutions that occur are to preserve the sound system of Jordanian Arabic.

Guba (2016) also looked into different adaptation levels such segmental, suprasegmental/prosodic aspects of loanwords. To do so, a corpus which contains 407 loanwords produced by 12 monolingual Ammani Arabic speakers was examined. At the segmental level, his findings show that Amman Arabic speakers replace the donor/source language's segments with the phonologically closest phonemes in Ammani Arabic. To specify, /p/ has been substituted (90%) with the voice counterpart /b/, whereas /v/ is an allophone of /f/ in Ammani Arabic, therefore /v/ was used (70%) of the observed loanwords, and (18.5%) loanwords with /v/ were devoiced. With respect to /tʃ/, Guba (2016) found that it either retained or substituted (de-affricated) with /ʃ/. These are not the only two studies, but to avoid redundancy, many other studies have discussed the integration of loanwords into Arabic and mostly found similar patterns to the abovementioned.

What pertains to the present study from the studies discussed above is that EFL and ESL learners usually have difficulty in producing L2/foreign phonemes and resort to substitute them with similar phonemes that exist in their L1. What is also relevant is that loanwords' foreign phonemes are either retained or replaced depending on the status of the loanwords, whether they are established or non-established in the lexicon of the recipient language. It also depends on the speakers, whether or not they are speakers of a spoken variety that includes some foreign phonemes. This brings us to the objective of the current study, which is to investigate if the lack of the foreign phonemes affects how loanwords are produced by EFL and ESL learners. In other words, will EFL and ESL learners retain or replace the foreign phonemes in loanwords? Thus, the present study seeks to fill in the gap where no previous studies tested the production of loanwords by ESL and EFL learners, to the best of the researcher's knowledge.

3. Methodology

The study employed two groups: a group of 15 EFL and a group of 15 ESL learners of English, a total of 30 participants. The participants aged between 20 and 35 years. The ESL learners were students at the Center of English as a Second Language (CESL) in Southern Illinois University, USA. The EFL group learners were undergraduate students in Salman bin Abdul-Aziz University, Saudi Arabia. Data collection for the ESL group was collected in the US while the research was on a scholarship in the US. Based on a previously agreed date and time, the researcher asked participants to individually meet in the Linguistics Department computer lab. Whereas data collection for EFL group was collected when the research was on a scholarship field trip in Saudi Arabia. Likewise, at a previously agreed date and time, the research asked participants to individually meet in the university listening and speaking lab. The participants were asked to read several sentences that are topically unrelated. To obtain the production data, participants were asked to take part in the study individually to get better recordings of the target phonemes. Recording sessions took place in a recording lab, where subjects were provided with high quality microphones connected to computers and asked to record sentences. The production task included 28 loanwords, comprising lexical nouns and brand names. Each sentence included one picture which depicts a single loanword. There were 32 additional sentences used as distractors, which brings the total number of sentences to 60.

Participants were asked and instructed on how to read the sentences with the loanwords' pictures. To practice, before

starting the actual production task, participants were given three sentences. To avoid getting native Arabic translations of the loanwords, they were instructed to read (pictures of) loanwords as they are normally pronounced in colloquial Arabic. Loanwords were not spelled out, instead pictures were used to not affect the participants' production, avoiding any potential influence due to orthography. Each loanword (with the exception of distractors) had at least one target phoneme that does not exist in the Arabic phonemic inventory. *Speech Analyzer 3.0.1* (2007) is a software, that allows users to record and conduct speech analysis, performing duration measurements, frequency, and spectrographic analyses, which was used to analyze the production data in this study.

3.1 Data Analysis

3.1.1 Measuring Phonemic Sounds

To differentiate between /p/ and /b/, *Speech Analyzer* was used to analyze and measure the features of each sound. Specifically, measuring Voice Onset Time (VOT) of these sounds in a spectrogram can help distinguish the two sounds, /p/ and /b/. VOT of /b/ is usually negative around -110 ms, while VOT of /p/, if aspirated, is usually positive around 30 ms, or less if unaspirated. In addition, voicing of the sounds was specified via waveform and vertical striations which correspond with voiced sounds (Rogers, 2014). In this study, if the phoneme /p/ was produced with a value less than 35 ms and 65 ms, then it was considered as an approximation to an English production.

By scrutinizing the spectrogram, the voicing bar can show the difference between /f/ and /v/ and /ʃ/ and /tʃ/, as well as /p/ and /b/. At a higher frequency, the voicing bar for voiced fricatives and affricates displays dark waveforms, whereas it displays vertical striations with weak waveforms for the voiceless ones (Rogers, 2014).

Concerning rhotic sounds, formants and vertical striations were used to distinguish between the English retroflex /ɻ/ and the Arabic trill /r/. On spectrograms, a retroflex /ɻ/ can be identified when there is a slight distance between F2 and F3, but with huge distance between F4 and F5, and showing darker vertical striations at a lower frequency. A trill /r/ can usually be identified when there are two or more successive closures (Olsen, 2012; Rogers, 2014).

4. Results and Discussion

This study examined the pronunciation of English loanwords in Arabic and how two different groups EFL and ESL learners produced these such words. The EFL participants learned English only in their home country (Saudi Arabia), while the 15 ESL participants learned English in Saudi Arabia and in the US. This section presents the results and discusses the research findings in the light of relevant theories to explain the results and indicates some of the study's limitations.

The two variables, EFL and ESL environments, revealed mostly similar but also different productions of the loanwords. The first research question asked whether there are differences in the EFL and ESL learners' pronunciation of the English loanwords which have phonemes that does not exist in the Arabic phonemic inventory. Since there are two groups, EFL and ESL learners, a t-test for an independent sample was performed through SPSS version 21. The independent t-test showed significant differences for only the target phoneme /p/ but not for /ɻ/, /v/, or /tʃ/. Cohen's effect size *d* was calculated following the formula for independent t-tests, dividing the difference of means by the difference of Standard Deviations (Cohen, 2013).

4.1 Results for /p/

In Table 1, the results illustrate that ESL learners had significantly higher English production for the English phoneme /p/ than the EFL participants, $t(28) = -4.026$, $p < .001$, $d = 1.46$. Based on Cohen's proposition (2013) that effect size values, which are close, equal to, or higher than .80, considered to be large. Thus, the value of the effect size $d = 1.46$ provides further evidence that the target phoneme /p/ has a high significant difference in the production of the two groups.

Table 1. Results for an independent sample t-test for the target phoneme /p/

Target phoneme	Groups	N	Means	SD	t(28)	p	Effect size
/p/	EFL	15	1.07	1.10	-4.026	.000	1.46
	ESL	15	3.40	1.96			

The results present evidence of the effect of the L1 and support the Transfer Theory (Major, 2008), which suggest that the L1 and L2 cause transfer to occur. As previously mentioned, the absence of the English phoneme /p/ from the Arabic phonemic inventory caused English loanwords to be modified and produced using the Arabic phoneme /b/ as expected. EFL and ESL learners' productions varied. It was found that the ESL learners produced the English sound /p/ at a higher rate (37.33%) than the EFL learners (11.85%). This can be explained by the SLM (Flege, 1995) and PAM (Best, 1994). SLM postulates that those who just began to learn English (most of the EFL participants) classify

the L2 phoneme /p/ under the L1 category /b/. This is attributed to the similarity assumed by PAM, which also suggests that the similarity of the Arabic phoneme /b/ and the English phoneme /p/ led the EFL learners to replace /p/ with /b/. Again, according to SLM (Flege, 1995), some, not all, ESL learners less likely tend to replace /p/ with /b/ especially if they have more exposure to the L2 and reached to the point where they have created a new category for /p/, which cause them to articulate loanwords properly with the English target phoneme /p/.

The study also examined the degree of acceptance of loanwords into Arabic, the receiving language. The degree of acceptance was determined by how many times a loanword is pronounced with an Arabic phoneme by both EFL and ESL learners. If it was high for both groups, it meant that the Arabic pronunciation was more accepted than the English pronunciation. For example, the loanword *lamp* was always pronounced with the Arabic phoneme /b/ and never with the English phoneme /p/ by both EFL and ESL learners. It was always pronounced with the Arabic phoneme /b/as [lambah] /b/. This helps us understand how this loanword, and maybe others, is well-adapted and rooted in the borrowing language.

Other possibilities that could have led to producing loanwords with Arabic phoneme is the phonological environment of /p/. For example, the target phoneme /p/ appears in the final position in the English word *lamp* [læmp], but the sound appears in the medial position of the loanword [lambah], preceded by the voiced bilabial nasal /m/ and followed by a vowel [a], which cause difficulty on speakers to pronounce it as a voiceless bilabial stop /p/. This can also be assumed with the loanwords *shampoo*, and *computer*. This is supported by looking at loanwords that contain /p/ in the same phonological environment in both English and Arabic. When /p/ occurs word-finally, its pronunciation in loanwords still adapted but also varied based on speakers. For example, /p/ in the words *cup*, *telescope*, were sometimes produced with English phoneme /p/ [kəʊp] and [tɛləskʊp] and other times with Arabic phoneme /b/ [kəʊb] and [tɛləskʊb]. EFL learners produced the loanwords *cup*, and *telescope* with English phoneme /p/ only 20%, while ESL learners produced them with /p/ 53% and 80% respectively.

With regard to approximation, the results revealed some in stances in which participants approximated L2 values to L1 values. That is to say, some participants produced the English phoneme /p/ with no aspiration or 15 ms less or more than native speakers' VOT. In this study, EFL learners produced the phoneme /p/ in the loanwords *plastic*, *Pepsi*, and *pizza* with the Arabic phoneme /b/, whereas ESL learners showed 29 cases of approximation, which came in support to Flege and Eefting's (1987) study.

4.2 Results for /ɹ/

In Table 2, the results illustrate that ESL and EFL learners' pronunciation of the English phoneme /ɹ/ showed no significant difference, $t(14) = -1.871$, $p = .082$. Ahead of performing the t-test, Levene's test revealed that the assumption of homogeneity of variances between ESL and EFL learners' groups was not assumed.

Table 2. Results for an independent sample t-test for the target phoneme /ɹ/

Target phoneme	Groups	N	Means	SD	t(28)	p	Effect size
/ɹ/	EFL	15	.00	.000	-1.871	.082	-
	ESL	15	.20	.414			

Similar to the case of /p/, the Transfer Theory seemed to play a significant role in the EFL and ESL learners' productions of the voiced alveolar approximant /ɹ/. Even though ESL learners pronounced some loanwords with English /ɹ/, it did not show a significant difference from EFL learners' production. While ESL learners produced loanword with English production at only 2%, EFL learners provide no English production of the loanword, 0%. Therefore, the results showed a similar pattern for both groups to pronounce loanwords with an Arabic /r/, rather than an English /ɹ/. For that reason, it was not possible to obtain the value of the effect size for this t-test because of the low values for the means and standard deviation. Thus, the value of the effect size is not provided in the chart. Again, this pattern can be explained by the Transfer Theory (Major, 2008), which provides evidence of transferring L1 values to the L2. Besides that, it can be explained by the Markedness Hypothesis (Greenberg, 2010), which postulates that English /ɹ/ is more marked than Arabic trill /r/, this would explain why both EFL and ESL learner groups pronounced loanwords with the less marked /r/ rather than with more marked /ɹ/, besides the absence of /ɹ/ from Arabic phonemic inventory (Hago & Khan, 2015).

With respect to the degree of acceptance, loanwords with English /ɹ/ seemed to be well accepted in Arabic by both EFL and ESL learners' group based on the way they produced them with the English form but with the Arabic phoneme /r/. Both groups showed high percentages in pronouncing loanwords with an Arabic phoneme /r/, 77.33% for EFL learners and 82% for ESL learners. However, someone could question why ESL learners produced loanwords with Arabic pronunciation /r/ more than EFL learners. This is attributed to the fact that EFL resorted to use Arabic equivalent Arabic words of the targeted loanwords, which consequently reduced the number of the

counted instances of /t/ or /ɬ/. Resorting to equivalent Arabic words could be attributed to phonological aspects of the two languages. For example, the word *stereo* begins with an onset consonant cluster, which is not permitted in Standard Arabic; therefore, EFL learners tended to use the equivalent Arabic word [mosadzɔal] 60% of the time, whereas ESL learners only used this term 33.33% of the time. Other loanwords such as *radio* and *ice-cream* were always produced with the English adapted forms and were never produced with the Arabic equivalent words [boɔah] and [me ʔaʕ]. This indicates that these English loanwords are accepted more than the equivalent Arabic words.

4.3 Results for /v/

The results as shown in Table 3 revealed that there was no significant difference between ESL and EFL learners' groups in their production of the English phoneme /v/, $t(28) = -1.054, p = .301, d = 0.38$. Prior to carrying out the t-test, Levene's test revealed that the assumption of homogeneity of variances between ESL and EFL learners' groups was assumed.

Table 3. Results for an independent sample t-test for the target phoneme /v/

Target phoneme	Groups	N	Means	SD	t(28)	p	Effect size
/v/	EFL	15	1.27	1.03	-1.054	.301	0.38
	ESL	15	1.67	1.05			

ESL learners produced loanwords with English target phoneme /v/ at a higher rate (27.77%) than EFL learners who produced loanwords with English target phoneme less often 21.11%, which is not a huge difference. Therefore, the effect size $d = 0.38$ is a small, which indicates further evidence that there was no significant difference between EFL and ESL learners' groups in producing the target phoneme /v/.

As previously discussed, Transfer Theory can explain the effect of the L1 on the L2 which is also applicable here to the EFL and ESL learners' production of the voiced labiodental fricative /v/. The results support the assumption that the absence of the English phoneme /v/ had an influence on both EFL and ESL groups' production. In spite of the fact that the t-test showed no significant difference in the production of the EFL and ESL groups, the results showed a slight difference. Based on Greenberg's (2010) Markedness Hypothesis and Eckman's (2008) Markedness Differential Hypothesis, the English phoneme /v/ is more marked relative to the Arabic voiceless fricative /f/, which can explain the study's results. Both EFL and ESL groups had higher percentages and tendency to substitute the English phoneme /v/ with the Arabic phoneme /f/, with 73.33% and 64.44% for EFL and ESL learners respectively. For example, the loanword *archive* was always produced as [ʔarʕif] and never was pronounced with the English phoneme /v/, regardless of the substitution of /k/ to /j/. This can be attributed to either the absence of /v/ from Arabic, the markedness of /v/ (Greenberg, 2010), the phonological environment of /v/ in the coda position, which is considered to be difficult compared to the initial and word-medial positions. A loanword, such as *video*, that contains /v/ in initial position was sometimes pronounced with the English phoneme /v/, which could explain the phonological environment and the markedness assumptions. It is also attributed to the word's familiarity and how frequently it is used in daily life. Regarding the acceptance of loanwords, the loanword *archive* appeared to be accepted and therefore always pronounced as [ʔarʕif] by EFL and ESL groups. This seems to reflect how long this word was adopted into Arabic. I assume that if the word was adopted long ago, it may conform more to Arabic phonology as with the loanword *archive*, while if it was adopted recently, it may conform more to English phonology as with the loanword *Avalon*, which was produced with the English phoneme /v/ with 40% and 60% for EFL and ESL learners respectively. Therefore, it is worth investigating recently adapted loanwords in Arabic in future studies.

4.4 Results for /tʃ/

Prior to carrying out the t-test, Levene's test revealed that the assumption of homogeneity of variances between ESL and EFL learners' groups was assumed. The results in Table 4 showed that there was no significant difference between ESL and EFL learners' groups in their production of the English phoneme /tʃ/, at $\alpha = .05$; however, the effect size was high $t(28) = -2.009, p = .054, d = 0.73$.

Table 4. Results for an independent sample t-test for the target phoneme /tʃ/

Target phoneme	Groups	N	Means	SD	t(28)	p	Effect size
/tʃ/	EFL	15	.80	.676	-2.009	.054	0.73
	ESL	15	1.27	.594			

ESL learners produced loanwords with English target phoneme /tʃ/ at a higher rate (42.22%) than EFL learners who produced loanwords with English target phoneme less often 26%. Although the t-test showed no significant difference, the effect size value of $d = 0.73$ is approaching to large value. According to Cohen's (2013) assumption, the effect size values with a value close to, equal to, or higher than .80 could be interpreted and considered to be a large value. Thus, the observed effect size value for the target phoneme /tʃ/ provided further evidence that there is a remarkable

difference in the ESL and EFL production of the phoneme /tʃ/.

As discussed above, the absence of /tʃ/ from the Arabic phonemic inventory plus the similarity of /tʃ/ and /ʃ/ has led both EFL and ESL learners to substitute /tʃ/ with /ʃ/ which supports Transfer Theory. Thus, it is an indication of the L1 effect on the L2, in which speakers transfer L1 values to the L2 values, producing loanwords with /ʃ/ rather than with /tʃ/ (Major, 2008). However, substitution, the most common strategy, was not the only one. Some EFL learners, 3 participants, produced the loanword *sandwich* with metathesis as [səndwɪʃt]. This shows that participants, namely EFL learners, were not able to identify the phonological difference between /tʃ/ and /ʃ/, rather categorized /ʃ/ and /tʃ/ in the same category. This is attested when participants treated /tʃ/ as two separate phonemes, /t/ and /ʃ/ thus applied metathesis in producing the loanword *sandwich*, supporting the findings of Hickey (1982) which explain why the participants pronounced /tʃ/ with metathesis. In contrary, ESL learners did not resort to metathesis rather they employed the substitution strategy. With respect the acceptance of the foreign form, most loanwords that contained /tʃ/ seemed to be accepted with the English form adapted into Arabic regardless of the pronunciation. That's is to say, when loanwords such as *check* and *sandwich* were presented to the participants in pictures, they were never produced with the equivalent Arabic words [sakkmas^ʕrefi], [fat^ʕerah], while *chips* was only once produced with the equivalent Arabic word [bət^ʕæt^ʕes].

5. Limitations

The results of this study reinforced findings and provided empirical evidence for the concept of phonemic substitution in the field of loanword phonology. It supports the L1 effect on the L2 and the roles of Transfer Theory, MDH, PAM, and SLM. The study showed a significant difference between EFL and EFL in one dependent linguistics variables /p/ but revealed no significant difference between EFL and ESL learners in producing /ɪ, v, tʃ/.

However, results of the current study should not be generalized to all EFL and ESL learners due to limitations in the study. The first limitation of the study is that not all English loanwords were tested which is attributed to the notion of the matrix sentences which require pictures to avoid the effect of the orthography on the participants production. Therefore, the study was limited to nouns that represent concrete objects that can be illustrated in pictures because abstract nouns are hard to illustrate in pictures. For example, the words *standard*, *strategies*, *music*, *bachelor* are abstract loanwords adapted into Arabic which cause difficulties for the current study methodology.

The second limitation of the study is the existence of equivalent Arabic words for the English loanwords. In order to produce English loanwords, EFL and ESL participants were instructed to speak colloquial Arabic. Yet, participants in many cases used equivalent Arabic words instead. For example, participants were anticipated to produce the word computer as [kombjuter]; however, they produced it as [ħasəb], which is the equivalent word in Arabic. This had an impact on the sample of loanwords and the number of the target phonemes to analyze, which may have led to the no significance difference between EFL and ESL learner's production in current study.

6. Conclusion

In this study, the absence of the English consonants /p/, /v/, /ɪ/, and /tʃ/ from the phonemic inventory of Arabic was investigated indirectly via loanwords. The study used acoustic measurements to test the production of the EFL and ESL learners of loanwords to find out whether they substituted or approximated phonemes. The results revealed that the closest phonemes /b/, /f/, /r/, and /ʃ/ in Arabic were used to substitute /p/, /v/, /ɪ/, and /tʃ/. Both EFL and ESL learners showed transfer for L1 values to L2 values, substituting /v, ɪ, tʃ/ with /f, r, ʃ/, but they showed different pattern in their production of /p/. EFL learners substituted /p/ with /b/, but only ESL learners produced approximated sounds to /p/. That's to say, while participants in the EFL group produced the phoneme /p/ in the word *plastic* with a small VOT as in [balastik] using the Arabic phonetic values, ESL learners compromised sounds that don't belong to neither to the L1 nor to the L2, producing a sound with an intermediate VOT. These results come in support of Transfer Theory, MDH, PAM, and SLM which explain the absence and the similarity of the targeted phonemes and their effect on the participants' production of the loanwords.

Unlike previous studies, in the current study substitution of English phonemes with Arabic phonemes is not considered an error, a problem, nor a difficulty. Rather, phonemic substitution in the current study is considered as a medium to implicitly inform us about how rooted and the degree of acceptance of these loanwords in Arabic. The results showed that most of these English loanwords were produced with Arabic phonemes by both EFL and ESL groups, which tells us that these loanwords are entrenched in Arabic and more accepted with the Arabic pronunciation than with the English pronunciation. This definitely implies that these English loanwords are adapted and not adopted, so they have undergone linguistic changes, namely phonological modifications. This presents contributes to a better understanding of how loanwords in general are integrated in Arabic. Further studies could look

into most recent integrated loanwords to test whether they are adopted or adapted to the sound system of Arabic.

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