Perception of English Lexical Stress: Some Insights for English Pronunciation Lessons for Iraqi ESL Learners

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ABSTRACT

One basic factor that influences perception of lexical stress is the number of syllables found in the word and the syllable weight as lexical stress is often assigned to heavy syllables. However, what is considered as a heavy syllable is language specific and this causes problems when two different language systems interact as in the case of second language learning. This paper reports the findings of a study that examined the identification of lexical stress by ESL learners to identify specific syllable structure in English that may pose difficulty to Iraqi learners of English. The results showed that Iraqi Arabic subjects performed poorer in trisyllabic words compared to disyllabic words. High error rates were obtained when the words had two superheavy syllables or two or more equally heavy syllable. Words with long vowels and final consonant clusters, considered as superheavy syllables, often attract stress in Iraqi Arabic but the distribution of such syllables is often more restricted in Arabic. However this is not the case in English and this difference in the distribution of heavy and superheavy syllables influences perception of lexical stress among Iraqi ESL learners. The results show that Iraqi Arabic learners' ability to correctly identify lexical stress is influenced by their native language experience, in particular the L1 stress patterns and strong dependence on syllable structure in lexical stress assignment in Iraqi Arabic.

Keywords: Multisyllabic words, perception of lexical stress, syllable structure

INTRODUCTION

Pronunciation is one of the most neglected components in English language teaching. Derwing and Munro (2005) reported in a survey on research focus in applied linguistics that grammatical skills received the most attention and was the largest area of investigation while the study of pronunciation had been ignored for many years. Most English language teachers get students to study grammar and vocabulary and practice using the language in communicative activities. Very few teachers devote much time to teach pronunciation, and when they do the focus is to ensure intelligibility of speech (Harmer, 2001) as Morley (1994) argues "intelligible pronunciation is an essential component of communicative competence". The recognition of intelligibility as an important component in competence development is also shared by other researchers such as Hişmanoğlu (2006), and Zhang and Yin (2009) who argued that listeners and speakers were unable to transform and decode messages efficiently without sufficient information of second language (L2) sound patterns, and this knowledge includes knowledge of lexical stress patterns in the target language.

In the last few decades, there has been greater awareness of the importance of pronunciation among researchers as well as ELT practitioners. Harmer (2001) claimed that a focus on pronunciation not only made students conscious of various sounds and their characteristics, but could help them improve their overall speaking skills and subsequently realize the aim of better comprehension and intelligibility. Yates (2002) further argued that learners who did not have good pronunciation skills were characterized as uneducated, even when listeners were able to comprehend them. Therefore, there is a clear advantage of focusing on pronunciation in the English language classroom. Fraser (2000) also suggested that L2 teachers and learners should rely on the use of modern technology and knowledge about pronunciation development to ensure the efficacy of teaching and learning of pronunciation in the classroom. With these issues on pronunciation development in mind, this paper hopes to shed some light on specific problems faced by Iraqi ESL learners in terms of assignment of lexical stress with the hope that it will provide some specific directions and suggestions on pronunciation lessons for Iraqi English language teaching contexts.

Major (2008) explained that Arab learners of English encounter various difficulties that obstructed their acquisition of English. Barrios, Namyst, Lau, Feldman, and Idsardi (2016) reported that in the perception and production of nonnative phonological contrast, adult second language learners, even among advanced learners who had been exposed to the target language for a long period of time, regularly encountered difficulties. They could not perceive L2 differences that were not found in their first language (L1). The prosodic and rhythmic complication of English language adds to this complexity for second

language learning, particularly with regards to the assignment of stress in English words because the location of stress in English is different from what is expected based on L1 stress assignment rules. Often this leads to incorrect stress assignment in the L2 (Swan & Smith, 2001). However, there are no specific suggestions in the literature on how to address such difficulties. Past studies on speech perception and production involving Iraqi ESL learners such as Al Abdely and Thai (2016) as well as Ammar Al-Abdely and Thai (2016) have focused on the perception and production at the segmental level and on vowel monophthongs in monosyllabic words except for the schwa in disyllabic words. Aziz (1980) reported that Arab learners of English often placed stress on the final syllable that contained a superheavy syllable. However, no study to our knowledge has systematically examined the consequence of conflicting stress assignment rules between Iraqi Arabic and English and the problems they pose on lexical stress perception in English by these learners. There are also no specific recommendations on how to teach lexical stress to ESL learners particularly Iraqi Arabic learners who may have to grapple with interference from their first language, as the lexical stress assignment rules in Iraqi Arabic is predictable, unlike the case in English. To address this gap in the literature, the study reported in this paper aimed to investigate how Iraqi ESL learners identified lexical stress in multisyllabic words. Specifically, the study examined how syllable structure of the words affected

performance in the perception of lexical stress in disyllabic and trisyllabic words in English. Implication for teaching and learning of lexical stress to Iraqi ESL learners can then be drawn from the results of the study to highlight specific problems presented by perception of lexical stress in disyllabic and trisyllabic English words.

Syllable Structure and Syllable Weight

In general, identification of lexical stress is influenced by a number of basic factors such as syllable structure and lexical category, and these factors may exert different influences in different languages (Archibald, 1997; Guion, 2005; Guion, Harada, & Clark, 2004; Zhang, Nissen, & Francis, 2008; Jangjamras, 2011). As a result of similarities and differences across languages, learners from various backgrounds may experience different difficulties in perceiving and assigning lexical stress in the second language (Archibald, 1993, 1997, 2012; Flege & Bohn, 1989).

One of the basic factors, for example, is the syllable structure of the word. Languages differ in terms of the type of syllables that are acceptable in the language and the type of syllables that are considered as heavy. For example, Davenport and Hannahs (2010) reported that languages like English and Cayuvava (spoken in Bolivia) allowed the syllable to consist of only a vowel that formed the nucleus of the syllable. Other languages like Fijian and Senufo spoken in West Africa required the syllable to be minimally CV consisting of the nucleus and one consonant in the onset of the syllable.

While all languages have CV syllables, not all languages have closed syllables, syllables with one or more consonant in coda position. Some languages like Mandarin Chinese allow only nasals in the coda and only one coda consonant in the coda position (Li & Thompson, 1981). English, however, allows consonant clusters in both onset and coda positions (Roach, 2009). Arabic considers syllables with a sequence of consonants in coda position as superheavy syllables and such syllables often attract stress.

Chomsky & Halle (1968) and Hayes (1982) argued that syllable weight played an important role in stress identification. However, languages may also differ in terms of what they consider as heavy syllables. Syllables with a long vowel or a complex vowel, such as diphthongs or triphthongs are often considered heavy. Some languages also consider syllables with a coda consonant as heavy while others like English do not. Generally, a heavy syllable has one of the following syllable structure patterns: CVV or CVVC, and such syllables rather than the light syllable usually attract the primary stress. Long vowels and diphthongs attract the primary stress more than short vowels (Guion, Clark, Harada, & Wayland, 2003; Guion et al., 2004). The occurrence of one or more coda consonants in the syllable does not influence the weight of the syllable in English; but it does in Arabic. In addition to the class of light and heavy syllables, we have the category of superheavy syllables in Arabic which refers to CVVC and CVCC syllables (Watson, 2011).

Stress Assignment in English

Roach (2009) explained that assignment of lexical stress in English depended on a number of factors. First, the morphological structure of the word and the type of suffixes involved influence placement of stress. Some suffixes such as –ee in refugee/refjʊˈdʒiː/ and –eer in volunteer/vɑlənˈtɪə/ carry stress. Other suffixes however, such as –ic causes stress shift in the stem from climate/ˈklaɪmət/ to the syllable just before the suffix in climatic/klaɪˈmætɪk/. There are also suffixes in English that do not affect stress placement such as –al in refuse/rɪˈfjuːz/ and refusal/rɪˈfjuːzəl/. Second language and foreign language learners of English will have to learn about these suffixes and how they influence lexical stress assignment in English.

The other factor that influences lexical stress assignment is the grammatical category of the word and the notion of strong or weak syllables. Roach (2009) defined a strong syllable as a syllable with a long vowel or diphthong with or without a coda consonant, or a syllable with a short vowel and at least one coda consonant. Weak syllables, on the other hand, are open syllables with either one of these vowels /ə i u/. Roach (2009) reported that there was a general tendency for nouns to have primary stress in the initial syllable, while verbs and adjectives had stress in the final syllable, if the final syllable was strong. However, there are exceptions to this generalization. For example, adjectives like honest/ˈɑnɪst/ have strong final syllables but the primary stress

is assigned to the initial syllable. The above generalization works for most simple two-syllable words, but the description of stress assignment in larger words and complex words is more complicated.

Every English word has a fixed place for stress at the lexical level. For example, the English word 'Canada', which has the syllable structure /CVCVCV/, has primary stress on the first syllable, while another word such as 'banana' which has the same syllable structure has primary stress assigned on the second syllable. There is no justification for this difference and syllable structure is not a guide to stress assignment (Duanmu, 2009). If the wrong syllable is stressed in English, speech intelligibility could be affected as listeners may have problem retrieving the intended word in the conversation. For that reason, stress is an important quality of word identity in English, in addition to its semantic meanings and parts of speech (Bian, 2013; Roach, 2009; Trevian, 2007). Stress assignment in English, however is not completely non-predictable as discussed earlier. Nevertheless, when compared to Arabic, stress assignment in English is more arbitrary. Therefore, second language learners of English will need to learn the stress location of words. As discussed in the next section, stress assignment rules in Arabic depend a lot on syllable weight which is defined according to the syllable structure acceptable in the specific variety of Arabic spoken.

Syllable Structure and Lexical Stress in Arabic

The structure of the syllable in Arabic depends on the phonemic system of Arabic and its unique lexical and inflectional system. Most roots in Arabic words are triconsonantal, for example /f-ʔ-l/ (Ghalib, 1984). These roots have no lexical meaning without being merged with 'infixes' which consist of one or more vowels. For example, the vowels /-a-a-/ merged with the root /f-ʔ-l/ form the 'stem' /faˈʔal/ 'he did' and the main linguistic constituent that carries the lexical information in Arabic is the stem. Hence, the grammatical and semantic changes depend on the vowel distribution and the addition of certain prefixes and suffixes within the stem. For example, /faˈʔal/ refers to 'he did', but /faaˈʔil/ is a noun 'a doer', while /fiˈʔil/ refers to 'an action', and with /faˈʔaltu/ we have the sentence 'I did'.

We will begin our discussion of syllable structure in Classical Arabic before turning to Iraqi Arabic as this is the variety used in formal recitations of the Holy Quran. All educated Arab learners will be familiar with this variety and it may be important to determine if there are differences in the syllable structure and stress assignment in Classical Arabic and Iraqi Arabic. Syllables in Classical Arabic do not begin with a vowel; the vowel may be preceded by only one consonant but it may be followed by one or two consonants, identical or non-identical. The vowel is considered as the main component that determines the number of syllables in Classical Arabic. The type

of syllable found in Classical Arabic can be summarized in the following template: CV(V)(C)(C). The parenthesis indicates the optionality of the segment. The syllables in Classical Arabic can therefore consist of either a short or long vowel and there can be at most only two consonants in the coda position. Therefore, Classical Arabic has only CV, CVV, CVC, CVCC, CVVC, and CVVCC structures (Abushihab, 2010; Chentir, Guerti, & Hirst, 2009). See Table 1 for examples of words with these syllable types.

Iraqi Arabic, on the other hand, allows more types of syllables as shown in Table 2. It is important to note that all types of syllables possible in Classical Arabic are also acceptable in Iraqi Arabic. The additional syllable types found in Iraqi Arabic are examples listed in (7-10) in Table 2. These are syllables with a complex onset. Iraqi Arabic allows at most two consonants in the onset and two in the coda for a syllable. It is important to note that variations in syllable structure across Arabic dialects result in assignment of lexical stress on different syllables as reported in Kaye (1997) and Watson (2002). In varieties where the onset consonant cluster is not acceptable, vowel epenthesis occurs to break up the consonant cluster. This results in a monosyllabic word in one variety and a disyllabic word in another variety. For example, the word /ktaab/ is pronounced as a disyllabic word in Classical Arabic [kiˈtaab] but as a monosyllabic word in Iraqi Arabic [ˈktaab].

On the stress patterns in Arabic varieties, such as Egyptian Arabic, Syrian Arabic, Palestinian Arabie and Iraqi Arabic, Birkeland (1954) argued that the same stress placement rules could be applied to the classical varieties as well as all varieties of Arabic. Birkeland (1954) reported that primary stress in Classical Arabic was frequently associated with pitch variation when the word was said in isolation. However, secondary stress is not typically associated with a distinction of pitch. Since this study focuses only on primary stress, we will not discuss secondary stress assignment. The following rules were proposed for assignment of primary stress in Classical Arabic and other varieties of

Table 1
Syllable structures in classical Arabic

No.	Type	Syllable Structure	Examples
1	Simple	CV	as in /bi/ 'at'
2		CVV	as in /fii/ 'in'
3		CVC	as in /min/ 'from'
4		CVVC	as in /baab/ 'door'
5	Complex	CVCC	as in /dars/ 'lesson'
6		CVVCC	as in /maarr/ 'passer-by'

Source: (Al-Ani & May, 1973; Hassan, 1981)

Table 2
Syllable structures in Iraqi Arabic

No.	Type	Structure	Examples
1	Simple	CV	as in /la/ 'not'
2		CVV	as in /loo/ 'if'
3		CVC	as in /bas/ 'enough'
4		CVVC	as in /baab/ 'door'
5	Complex	CVCC	as in /fard/ 'individual'
6		CVVCC	as in /maarr/ 'passerby'
7		CCVV	as in /ʃfaa/ 'cure'
8		CCVC	as in /ʃfaah / 'cured him'
9		CCVVC	as in /ktaab/ 'book'
10		CCVCC	as in /ʃbint/ 'dill weed'

Source: (Hassan, 1981; Ghalib, 1984)

Arabic (Birkeland, 1954; Mitchell, 1975; Ghalib, 1977). Stress assignment in Iraqi Arabic is described in Erwin (1963, 1969) and the rules proposed in (1-4) apply for Classical Arabic and other varieties of Arabic as well as Iraqi Arabic. In addition, Fantazi (2003) and Mousa (1994) provided rules (5-7) for Modern Standard Arabic (MSA) which also held true for Iraqi Arabic.

1. All monosyllablic words are assigned primary stress. For example /ˈhuut/ 'whale' and /ˈxawf/ 'fear'.

2. Words with ultimate or final long syllables are assigned primary stress on the final syllable. For example, /sikˈkiir/ 'drunkard', /sidʒˈdʒaad/ 'carpets' and /masˈruur/ 'delighted'.

3. Initial syllables are assigned primary stress in words with penultimate (one before the last) syllables. For example /ˈsaahir/ 'wizard', /ˈmuuhiʃ/, 'deserted', /ˈwadʒhak/ 'your face' and /ˈkallam/ 'he talked to'.

4. Initial syllables are assigned primary stress in words with the final two syllables following the structures of either CV + CVC or CV + CVV, as in /ˈsaaʔadak/ 'he helped you' and /ˈqaddamak/ 'he introduced you'.

5. If the word comprises two or more CV syllables, the first syllable of the word receives the primary stress, as in /ˈkataba/ 'he wrote', and /ˈdarasa/ 'he studied'.

6. In polysyllabic words with an initial CVC syllable, the second syllable receives the stress as in /musˈtash fa/ 'hospital'.

7. The first syllable is stressed in a word that comprises of CVC followed by light syllables, as in /ˈmuntada/ 'ruler'.

METHODS

The study reported in this paper is part of a larger study which included both perception and production of lexical stress among Iraqi Arabic ESL and Chinese Malaysian ESL learners. However, this paper will focus only on the results pertaining to perception of real English words among Iraqi Arabic ESL learners. Please see Al Thalab (2018) on the comparison of performance between Iraqi Arabic ESL and Chinese Malaysian ESL learners and results of the perception task for both real and nonce words.

Participants

The study involved 87 participants (80 male and 7 female) who speak Iraqi Arabic as their first language and are second language learners of English. There were only 5 undergraduate students while the rest were all postgraduate students enrolled in three Malaysian universities. The age of the participants ranged from 21 to 50 years of age (M=34.13) as summarized in Table 3. All the participants began learning English as their second language after 10 years of age. They had normal hearing, speech, and language ability according to their self-report. All the participants were given an honorarium of RM 10 for taking part in the study. They were interviewed about their background in learning English following a demographic survey questionnaire provided in Al Thalab (2018).

Stress Identification Task

Participants in the study completed a stress identification task. The stimulus in the task consists of disyllabic and trisyllabic English words that represent twenty-two different Iraqi Arabic syllable structure patterns. The location of stress in the words was chosen to either match or mismatch the expected stress pattern in Iraqi Arabic words. Forty four words were chosen for the task. They were all nouns (see Appendix A). There were two tokens for each syllable structure: one word to match the stress pattern in Iraqi Arabic and one that did not match the stress pattern in Iraqi Arabic. The words were also selected after a familiarity test and a pilot study was conducted. The words were recorded by one male native English speaker who was an academic staff in the English Language department in a public university in Malaysia. He speaks the British variety of English perceived to be close to Received Pronunciation.

The stress identification task was constructed using PsychoPy, an open source software programme developed by Peirce (2007). The task began with

Table 3
Demographic information of participants in the perception task

Language Groups	Number	Age		Years of English Instruction
Iraqi Arabic	87	Range	21-50	9-11
		Mean	34.13	10.74

instruction given on the main page. When the participants were ready, they press the space bar to begin the task. Each trial began with an aural presentation of either a disyllabic or trisyllabic word. The stimulus items were presented in a random order for each participant. At the same time, a series of numbers were presented on the computer screen to indicate the number of syllable of the word presented: 1 and 2 for disyllabic words and 1, 2, and 3 for trisyllabic words. Participants were required to indicate the syllable with the primary stress by pressing the corresponding key on the computer keyboard. Once the response is registered by the computer, the next trial was presented. The subjects were told to use their dominant hand to press the computer keys. The subjects were also requested to respond as quickly as they could. The perception task took approximately 15 minutes. Each token was presented only once. If the subjects could not identify the stress location, they were told to guess by pressing any key. Stress perception performance was analysed using the error rates calculated from the responses captured for each participant.

Research Procedure

All the participants were tested individually in a sound proof room. Prior to the actual task, the participants completed a training session which required them to identify the location of lexical stress in 6 words presented one at a time. They listened to the pre-recorded words using a Logitech headset at a self-adjusted comfortable listening level and they were individually tested in a quiet room at their respective universities. Each word had a different stress position and no feedback was provided on the correctness of the answer. These words were not used in the actual test phase. The purpose of the training session was to familiarize the participants with the task and for them to set the volume level on the computer. They were also encouraged to ask questions to get clarification about the task during the training phase. In the test phase, each participant was given a unique ID. They listened to a total of 106 words which comprised of 88 target aural stimuli (44 real words and 44 nonce words) and 18 fillers. We will only focus on the results of the real words in this paper. The ratio of the correctly identified stimuli for each word was calculated for each subject to identify the rank order of each syllabic structure. Conclusions are then drawn on the stress pattern associated with the respective syllable structure.

RESULTS

Disyllabic Words

The results of the perception test presented in Table 4 showed that the Iraqi Arabic subjects performed worst in the perception of lexical stress with two superheavy syllables such as CVVC.CVVC with an error percentage of 52.87%. Better performance was found for words with the following syllable structure: CV.CV and CV.CVVC, with error percentages of 25.86% and 25.28% respectively. Incidentally, these English words have the same stress pattern that is found in Iraqi Arabic.

Table 4
Error rates of disyllabic words

No.	Syllable Structures	Error (Count)	Error (Percentage, %)
1	CVVC.CVVC	92	52.87
2	CVC.CVVC	85	48.85
3	CVC.CVC	77	44.25
4	CV.CVC	76	43.67
5	CVV.CVC	73	41.95
6	CVV.CV	64	36.78
7	CV.CVCC	63	36.20
8	CVV.CVVC	59	33.90
9	CVC.CV	53	30.45
10	CV.CV	45	25.86
11	CV.CVVC	44	25.28

The results showed that the error rates of the Iraqi subjects follow from the predictions about the basic rule of syllabic structure that the heavy syllable are more likely to be stressed. Words that end with CVC syllables such as CVC.CVC, CV.CVC and CVV.CVC have higher error rates (44.25%, 43.67% and 41.95% respectively) compared to words that end with open syllables such as CVV.CV and CV.CV (36.78% and 25.86% respectively). The results also show that long vowels are more likely to be stressed; the most difficult words are those with two heavy syllables within the same word.

Syllables with more than one consonant in the coda are more likely to be stressed in Arabic than those with only one coda consonant or open syllables. The results show that Iraqi Arabic ESL learners would apply the Arabic stress assignment rule for English words with such syllables. Therefore, the accuracy score of words with the structure CV.CVCC was high (63.79%) as the expected stress in the English word

matched the Iraqi stress assignment rule as in the case for the word machine /məˈʃiːn/. In contrast, when the English words had two superheavy syllables such as CVVC. CVVC as in nineteen or two equally heavy syllable such as CVC.CVC as in rocket and palace, and CVV.CVC as in nursing and raising, higher error rates were recorded.

Trisyllabic Words

The results showed that the Iraqi Arabic participants performed worse in the perception of lexical stress in trisyllabic words compared to disyllabic words. The highest error rates were obtained for words with the syllable structure CVV.CVC. CVVC and CV.CV.CVVC with error rates of 76.43% and 72.41% respectively, while the error rate for the syllable structure CVC. CV.CVC was 67.81% and for CV.CVC. CVVC was 65.51%. Words with only open syllables such as CV.CV.CV also had high error rates (63.79%). Performance was

only relatively better for words with the following structure: CVV.CV.CV, CV.CVV.CVC, CV.CVC.CV and CV.CV.CVC with

error rates below 50% at 47.12%, 47.70%, 50.57% and 58.62% respectively (see Table 5).

Table 5
Error rates of trisyllabic words

No.	Syllable Structures	Error (Count)	Error (Percentage, %)
1	CVV.CVC.CVVC	133	76.43
2	CV.CV.CVVC	126	72.41
3	CVC.CV.CVC	118	67.81
4	CV.CVC.CVVC	114	65.51
5	CV.CV.CV	111	63.79
6	CVV.CV.CVC	109	62.64
7	CVC.CV.CV	108	62.06
8	CV.CV.CVC	102	58.62
9	CV.CVC.CV	88	50.57
10	CV.CVV.CVC	83	47.70
11	CVV.CV.CV	82	47.12

DISCUSSION

The main purpose of this paper was to determine the type of syllable patterns in English that may be problematic to Iraqi ESL learners in terms of lexical stress perception. The results show that perception of lexical stress in trisyllabic words was more difficult than disyllabic words, with an average of error rate of 61% for trisyllabic words and 38% for disyllabic words.

The results show that words that pose most difficulty for Iraqi ESL learners are words with two superheavy syllables or two or more equally heavy syllable in a word. The occurrence of superheavy syllables in non final word context is rare in Arabic, and when they do exist they often attract stress. In learning lexical stress in English, Iraqi Arabic learners will have to learn that

superheavy syllables such as CV(V)CC are not restricted to word final position and these superheavy syllables need not attract stress in English as shown in words like pesticide/ˈpestɪsaɪd/ and valentine/ˈvæləntaɪn / where the superheavy syllable in the word final position is not assigned primary stress in English. Instead primary stress is assigned to the initial syllable which is an open or light syllable in the case of Valentine. In Iraqi Arabic, light syllables do not attract stress in the company of a superheavy syllable. In Iraqi Arabic, syllables with long vowels usually attract stress particularly in the company of syllables with short vowels. However this is not the case in English as shown in examples like vanguard/ˈvænɡɑːd/ and caffeine/ˈkæfiːn/ where stress is assigned to the light syllable instead of the superheavy syllable.

The results in this study also support findings in previous studies about the influence of L1 stress assignment rules (e.g. Archibald, 1997; Guion et al. 2003; Ghaith, 1993; Watson, 2002; Xiaohan, 2008). When the lexical stress patterns matches what is expected in their L1, the performance of the subjects are better. The performance is more chance-like or poorer when the syllable shape of the word is different from what is available in their first language, and when no clear decisions can be made as in the case of multiple superheavy syllables in a word.

The study also showed that L1 interference was not the only factor influencing identification of L2 lexical stress. For example, the results show that the participants incorrectly identified the location of stress for words with the syllabic structure CVC.CVC and CV.CVC even when the stress assigned for these words matched what is available in Iraqi Arabic. In Al Thalab (2018), results on the proficiency level in English and performance of Chinese Malaysian participants in the same task were presented to argue for exposure to the language as another predictor for better performance. Chinese Malaysian participants who did not have exposure to stress rules in Chinese and Iraqi Arabic performed rather similarly to Iraqi participants.

The results in the study also support previous studies that differences in stress patterns and syllable structure of the L1 and the L2 may make L2 stress assignment difficult to predict. Ou (2006) found that L1 syllabic structure did not always predict L2 stress preference. Chinese and Vietnamese ESL learners were found to display preference in allocating stress on a syllable closed by a sonorant rather than a syllable closed by an obstruent. Since the latter syllable type does not exist in Chinese, words with such syllable structures were assumed to exert an unclear preference pattern. However, Chinese speakers presented a preference for stress on syllables with sonorant codas. Ou (2007) argued that this finding supports the phonological universal hypothesis that sonorous codas tended to contribute more to syllable weight linguistically. Guion (2005) also pointed out that L2 learners of English committed more mistakes when learning stress patterns based on the syllabic structure than patterns which were linked with the lexical class.

CONCLUSION

The present study confirmed the influence of L1 stress patterns on the performance of Iraqi Arabic L2 learners as they seem to be focusing on heavy syllables in their identification of lexical stress in both trisyllabic and disyllabic words. As a result, they face difficulty in correctly perceiving lexical stress locations in English words. Therefore, Iraqi English teachers should create awareness among Iraqi ESL learners about the difference in stress assignment in Iraqi Arabic and English and get the students to be cautious of the tendency to apply Arabic stress rule to English words. The results of the current study have identified some syllable patterns in English that may

pose difficulty for Iraqi ESL learners. For example, sequences of superheavy syllables and assignment of stress to light syllables in the company of superheavy syllables are some word structure that can be the focus of pronunciation lessons for Iraqi ESL learners. Pronunciation lessons that pick out words with primary stress that have match and mismatch patterns in the L1 may prove to be beneficial to Iraqi ESL learners as well.

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REFERENCES

Abushihab, I. (2010). Phonological contrastive analysis of Arabic, Turkish and English. *Journal of Language and Literature, 4*, 16-24.

Al-Ani S. H., & May D. R., (1973). The phonological structure of the syllable in Arabic. *Readings in Arabic linguistics*, 113-125.

Al Abdely, A.A-W, & Thai, Y.N. (2016). Learning english vowels by Iraqi EFL learners: Perceived difficulty versus actual performance. *3L: The Southeast Asian Journal of English Language Studies, 22* (1), 1-18.

Al Thalab, H.S.A. (2018). Perception of English lexical stress by Iraqi Arabic and Chinese Malaysian ESL learners. (Unpublished doctoral dissertation), Universiti Putra Malaysia, Malaysia.

Ammar, Al Abdely & Thai, Y.N. (2016). The Interrelation between the Perception and Production of English Monophthongs by Speakers of Iraqi Arabic. *Pertanika Journal of Social Sciences and Humanities, 24*(S), 1-10.

Archibald, J. (1993). The learnability of English metrical parameters by adult Spanish speakers. *IRAL: International Review of Applied Linguistics in Language Teaching, 31*(2), 129.

Archibald, J. (1997). The acquisition of English stress by speakers of nonaccentual languages: Lexical storage versus computation of stress. *Linguistics*, 35, 167-181.

Archibald, J. (2012). *Language learnability and L2 phonology: The acquisition of metrical parameters* (Vol. 19). Berlin, Germany: Springer Science & Business Media.

Aziz, Y. Y. (1980). Some problems of English word-stress for the Iraqi learner. *English Language Teaching Journal, 34*(2), 104-109.

Barrios, S. L., Namyst, A. M., Lau, E. F., Feldman, N. H., & Idsardi, W. J. (2016). Establishing new mappings between familiar phones: Neural and behavioral evidence for early automatic processing of nonnative contrasts. *Frontiers in Psychology*, 7. https://doi.org/10.3389/fpsyg.2016.00995

Bian, F. (2013). The influence of Chinese stress on English pronunciation teaching and learning. *English Language Teaching*, 6(11), 199-211.

Birkeland, H. (1954). *Stress patterns in Arabic*. Oslo, Norway: I kommisjon hos J. Dybwad.

Chentir, A., Guerti, M., & Hirst, D. J. (2009). Discriminant Analysis for Classification of Stressed Syllables in Arabic. *Proceedings of the World Congress on Engineering, 1,* 1-4.

Chomsky, N., & Halle, M. (1968). *The sound pattern of English*. New York, USA: Harper and Row.

Davenport, M., & Hannahs, S. (2010). *Introducing phonetics and phonology.* London, England: Arnold.

Derwing, T. M., & Munro, M. J. (2005). Second language accent and pronunciation teaching:

A research-based approach. *TESOL Quarterly, 39*(3), 379-397.

Duanmu, S. (2009). *Syllable structure: The limits of variation*. Oxford, England: Oxford University Press.

Erwin, W. M. (1963). *A short reference grammar of Iraqi Arabic*. Washington, USA: Georgetown University Press.

Erwin, W. M. (1969). *A basic course in Iraqi Arabic* (Vol. 1). Washington, USA: Georgetown University Press.

Fantazi, G. M. G. (2003). Perception and production of syllable structure and stress by adult Libyan Arabic speaker acquiring English in the UK. (Unpublished doctoral dissertation), Durham University, England.

Flege, J. E., & Bohn, O. S. (1989). An instrumental study of vowel reduction and stress placement in Spanish-accented English. *Studies in Second Language Acquisition*, *11*, 35-62.

Fraser, H. (2000). *Coordinating improvements in pronunciation teaching for adult learners of English as a second language.* Retrieved March 13, 2018, from https://helenfraser.com.au/wp-content/uploads/ANTA-REPORT-FINAL.pdf

Ghaith, S. (1993). The assignment of primary stress to words by some Arab speakers. *System, 21*(3), 381-390.

Ghalib, G. B. M., (1977). *The intonation of colloquial Iraqi spoken Arabic* (Unpublished master thesis), University of Leeds, England.

Ghalib, G. B. M. (1984). *An experimental study of consonant gemination in Iraqi Colloquial Arabic* (Unpublished doctoral dissertation), University of Leeds, England.

Guion, S. G. (2005). Knowledge of English word stress patterns in early and late Korean-English bilinguals. *Studies in Second Language Acquisition*, *27*(4), 503-533.

Guion, S. G., Clark, J. J., Harada, T., & Wayland, R. P. (2003). Factors affecting stress placement for English nonwords include syllabic structure, lexical class, and stress patterns of phonologically similar words. *Language and Speech*, *46*(4), 403-426.

Guion, S. G., Harada, T., & Clark, J. J. (2004). Early and late Spanish–English bilinguals' acquisition of English word stress patterns. *Bilingualism: Language and Cognition*, *7*(03), 207-226.

Harmer, J. (2001). *The practice of English language teaching*. Essex, England: Longman.

Hassan, Z. M. (1981). *An experimental study of vowel duration in Iraqi spoken Arabic* (Unpublished doctoral dissertation)*,* University of Leeds, England.

Hayes, B. (1982). Extrametricality and English stress. *Linguistic Inquiry*, *13*(2), 227-276.

Hişmanoğlu, M. (2006). Current perspectives on pronunciation learning and teaching. *Journal of Language and Linguistic Studies, 2*(1), 101-110. Retrieved March 13, 2018, from http://www.jlls.org/index.php/jlls/article/view/26

Jangjamras, J. (2011). Perception and production of English lexical stress by Thai speakers (Unpublished doctoral dissertation). University of Florida.

Kaye, A. S. (1997). Arabic phonology. In A. S. Kaye (Ed.), *Phonologies of Asia and Africa* (Vol. 1, pp. 187-204). Winona Lake, USA: Eisenbrauns.

Li, C., & Thompson, S. (1981). *Mandarin Chinese: A functional reference grammar*. Berkeley, USA: University of California Press.

Major, R. C. (2008). Transfer in second language phonology. *Phonology and Second Language Acquisition, 36,* 63-94.

Mitchell, T. F. (1975). *Principles of Firthian linguistics* (Vol. 19). London, England: Longman Publishing Group.

Morley, J. (1994). *Pronunciation pedagogy and theory: New views, new directions*. Alexandria, Egypt: Teachers of English to Speakers of Other Languages.

Mousa, A. (1994). *The interlanguage of Saudi Learners of English* (Unpublished doctoral dissertation), University of Essex, England.

Ou, S. C. (2006). *Factors and mechanisms in L2 word stress acquisition: Evidence from Chinese-English interlanguage* (Unpublished Doctoral dissertation), University of Edinburgh, Scotland.

Peirce, J. W. (2007). PsychoPy-psychophysics software in Python. *Journal of neuroscience methods, 162*(1), 8-13.

Roach, P. (2009). *English phonetics and phonology*. Cambridge, England: Cambridge University Press.

Swan, M., & Smith, B. (2001). *Learner English: A teacher's guide to interference and other problems*. Cambridge, England: Cambridge University Press. http://dx.doi.org/10.1017/CBO9780511667121

Trevian, I. (2007). Stress-neutral endings in contemporary British English: An updated overview. *Language Sciences, 29*(2), 426-450.

Watson, J. C. (2002). *The phonology and morphology of Arabic*. Oxford, England: Oxford University Press.

Watson, J. C. E. (2011). Word stress in Arabic. In M. V. Oostendorp, C. J. Ewen, E. Hume, & K. Rice. *The Blackwell companion to phonology*. Oxford, England: Wiley-Blackwell.

Xiaohan, Z. (2008). *Stress patterns in Chinese ESL* (Unpublished doctoral dissertation)*,* The Chinese University of Hong Kong, Hong Kong.

Yates, L. (2002). Fact sheet-What is pronunciation. *AMEP Research Centre. Retrieved March 13, 2018, from http://www.ameprc.mq.edu.au/docs/fact_sheets/01Pronunciation.pdf*

Zhang, F., & Yin, P. (2009). A study of pronunciation problems of English learners in China. *Asian Social Science*, *5*(6), 141-146.

Zhang, Y., Nissen, S. L., & Francis, A. L. (2008). Acoustic characteristics of English lexical stress produced by native Mandarin speakers. *The Journal of the Acoustical Society of America, 123*(6), 4498-4513.

APPENDIX

Real words used as stimuli in the perception experiment

No.	Stimulus words	Transcription	No.	Stimulus words	Transcription
1	Valley	/ˈvæli /	23	Vaseline	/ˈvæsəli:n/
2	Merchandise	/ˈmɜ:tʃəndaɪs /	24	Recording	/ rɪˈkɔ:dɪŋ/
3	Money	/ˈmʌni/	25	Palace	/ˈpæləs/
4	Pacific	/ pəˈsɪfɪk/	26	Defender	/dɪˈfendə(r)/
5	Rocket	/ˈrɒkɪt/	27	Nursing	/ˈnɜ:sɪŋ/
6	Valance	/ˈvæləns/	28	Pesticide	/ˈpestɪsaɪd/
7	Defect	/ dɪˈfekt/	29	Racing	/ˈreɪsɪŋ/
8	Keyboard	/ˈki:bɔ:d/	30	Valentine	/ˈvæləntaɪn/
9	Leadership	/ˈli:dəʃɪp/	31	Vanilla	/vəˈnɪlə/
10	Vanguard	/ˈvæŋɡɑ:d/	32	Dignity	/ˈdɪɡnəti/
11	Sardine	/sɑ:ˈdi:n/	33	Benefit	/ˈbenɪfɪt/
12	Magnetic	/mæɡˈnetɪk/	34	Pharmacy	/ˈfɑ:məsi/
13	Nitrate	/ˈnaɪtreɪt/	35	Delighted	/dɪˈlaɪtɪd/
14	Scenery	/ˈsi:nəri/	36	Byzantine	/baɪˈzæntaɪn/
15	Data	/ˈdeɪtə/	37	Campaign	/kæmˈpeɪn/
16	Lemonade	/ˌləməˈneɪd/	38	Fortunate	/ˈfɔ:tʃənət/
17	Candy	/ˈkændi/	39	Melting	/ˈmeltɪŋ/
18	Nineteen	/ˌnaɪnˈti:n /	40	Machine	/məˈʃi:n/
19	Thunder	/ˈθʌndə(r)/	41	Captain	/ˈkæptɪn/
20	Peroxide	/pəˈrɒksaɪd/	42	Melody	/ˈmelədi/
21	Galaxy	/ˈɡæləksi/	43	Journey	/ˈdʒɜ:ni/
22	Signature	/ˈsɪɡnətʃə(r)/	44	Caffeine	/ˈkæfi:n/