EFFECTS OF AN ARABIC ACCENT
ON EFL LEARNERS' PRODUCTIVE INTELLIGIBILITY

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Abstract
This study aimed at investigating the effects of a foreign accent, namely the Iraqi Arabic accent, at the segmental level on the productive intelligibility of Iraqi EFL learners. Drawing on an intelligibility pronunciation principle, i.e. Gimson's (2001) Minimum General Intelligibility (MGI), the study applied a mixed-methods research approach to measure the extent to which features of this accent impede the productive intelligibility of these learners and to identify the communication strategies they use to overcome intelligibility failures. To achieve these aims, two data collection tools were used: a production intelligibility test and a speaking task. Although the overall quantitative findings revealed that Iraqi EFL learners' foreign-accented English was intelligible at the segmental level, most intelligibility failures were ascribed to the mispronunciation of non-existent English phonemes. The qualitative aspect of the study aimed at identifying the communication strategies Iraqi EFL learners use to overcome these intelligibility failures. In this respect, several strategies were identified, namely the let-it-pass strategy, the replacement strategy, the repetition strategy and the time gaining strategy. The article concludes with the implications and applications of the findings.

Keywords**:** intelligibility; foreign accent; communication strategies; mixed methods research in phonology

Introduction
When learning English, non-native English speakers are expected to produce new distinctive sound features, acquire new articulatory habits and create new sound categories. Failure to achieve these articulatory adjustments will result in a type of English speech identified as foreign-accented English (Sereno, Lammers, & Jongman, 2016, p. 303). Derwing and Munro (2009, p. 476) define a foreign accent as "the ways in which a foreign language speaker's speech differs from the local variety of English and the impact of that difference on speakers and

listeners." This means that a foreign accent can result from the sound differences between the native language and the target language. These sound differences occur at the segmental and suprasegmental levels of phonology. The present investigation is restricted to the effect of segmental deviations on the productive intelligibility of Iraqi EFL learners. This restriction is based on the widely held assertion that in EFL contexts segmental production is emphasized over suprasegmental (Hellmuth, 2014; Jenkins, 2000). According to Sereno et al. (2016, p. 304), segmental deviations refer to the substitution of a phoneme with another or the modification of a phoneme. For example, the substitution of the English /p/ phoneme with the Arabic /b/ is an instance of phonemic deviation, whereas an aspirated pronunciation variant of /p/ is an instance of allophonic or phonetic modification.

The term intelligibility refers to a non-native English targeted pronunciation level which can be understood by the listener with little effort (Gimson, 2001; Kim, 2008; Cruttenden, 2014). As used in this article, the term intelligibility refers to the production of English segmental phonemes in line with the permissible modifications of the English sound system as suggested by Gimson's (2001) MGI principle (see Cruttenden, 2014).

A great number of pronunciation studies conducted worldwide advocate intelligibility as the pronunciation goal for non-native English speakers (Trofimovich, 2016, p. 5). This shift of pronunciation research to intelligibility is yet to occur in Iraqi EFL classrooms and pronunciation research. According to Derwing and Munro (2005, p. 379), this type of intelligibility pronunciation research has much to offer teachers and students. The present study, hence, intends to fill a contextual gap in the literature by investigating the effect of a foreign accent at the segmental level on the productive intelligibility of Iraqi EFL learners. As a secondary objective, the study aims to identify the types of oral communication strategies employed by Iraqi EFL learners when encountering pronunciation problems. With the above in mind, the following research questions are addressed:

1. At the segmental level, to what extent is Iraqi EFL learners' foreign-accented English intelligible?
2. Which aspect of segmental deviations is responsible for most intelligibility failures that Iraqi EFL learners encounter?
3. What communication strategies do Iraqi EFL learners use to overcome productive intelligibility problems?

Literature Review

Whether based on native or non-native English speakers, most intelligibility pronunciation studies in EFL contexts emphasize the importance of segmental phonemes in intelligibility (Hellmuth, 2014). The overall effect of segmental phonemes on intelligibility was first examined by correlation studies (see, for example, Anderson-Hsieh, 1995). Subsequent studies then sought to identify which segmental phonemes (vowels or consonants) affected intelligibility the most and delved into the relationship between the intelligibility of segmental phonemes and foreign accents (see, for example, Rogers, 1997; Kirkova-Naskova, 2010).

Although some mispronunciations of consonants were reported to cause intelligibility failures, a considerable number of studies emphasized the effect of vowel production and perception on the intelligibility of non-native English speech. For instance, Kashiwagi and Snyder (2008) investigated the intelligibility of Japanese EFL accented English to both American and Japanese listeners. Japanese and American judges evaluated samples of speech from 20 intermediate Japanese students for intelligibility and foreign accent. Intelligibility was measured by comparing what the participants produced and what the judges orthographically wrote. The judges also rated the foreign accent of the participants impressionistically on a seven-point rating scale. Interviews were then conducted with the judges to find what pronunciation features caused misunderstanding. The researchers organized the segmental and suprasegmental errors into various categories. At the segmental level, the results revealed that vowels were more problematic than consonants in terms of understanding. At the suprasegmental level, stress was the error type which caused the most misunderstanding for both the American and Japanese listeners.

As far as the pronunciation studies conducted in the Arabic speaking contexts are concerned, Nikolova (2012) investigated the influence of a foreign accent on the acquisition of English vowels by Saudi EFL learners. The investigation was based on the predicted difficulty level which was determined by contrasting the sound systems of English and Arabic. The study was limited to the investigation of ten vowels in American English. The findings revealed that partially similar vowels were difficult to produce and perceive by most Saudi EFL learners.

A similar study on the perception and production of English segmental vowel sounds was conducted with Syrian EFL learners by Almbark (2012). The study was based on insights from speech perception and production theories such as the Speech Learning Model (SLM) (Flege, 1995). The researcher used a vowel discrimination task to identify the level of difficulty encountered by Syrian EFL learners. The findings revealed that these learners were able to produce some of the difficult vowels predicted by Flege's (1995) SLM. Although the Syrian EFL learners had little exposure to the target English vowels, the researcher claimed that direct teaching of the vowels was responsible for successful production and perception of these vowels.

Hassan (2014) investigated the aspects of segmental errors which caused intelligibility problems to Sudanese EFL learners. Fifty university students and 30 teachers of English participated in the study. The researcher used three data collection tools: observations, recordings, and a questionnaire. The data obtained were analyzed both quantitatively and qualitatively. The findings of the study showed that the mispronunciation of vowel phonemes was responsible for intelligibility failures. The researcher ascribed these failures to the differences between the sound systems of English and Arabic. L1 interference was the major reason for the pronunciation problems encountered by the Sudanese learners of English.

In the Iraqi EFL context, the principle of intelligibility has been largely ignored. In this respect, Rashid (2009, p. 43) confirms that intelligibility is absent in the Iraqi EFL context. She adds that pronunciation teaching and research should be reconsidered in the light of the intelligibility principle. Although Khudhair (2015) investigated intelligibility in the Iraqi EFL context, his

investigation was in line with the perfect mastery of the English RP accent. This was because the researcher used RP as a reference pronunciation norm to assess the speech of Iraqi EFL learners. The principle of intelligibility was suggested in the first place to equip non-native English speakers with a comfortably intelligible pronunciation. This requires modifying the sound system of RP to include features from other native English varieties like General American (Gimson, 2001). In his research, Khudhair (2015) focused on the intelligibility of 50 Iraqi university students and defined intelligibility about understanding. A list of isolated words containing potential pronunciation features was read by the Iraqi speakers. The listener was the researcher himself, who described himself as a semi-native English speaker with an RP accent. The researcher used a word dictation task to measure the intelligibility of Iraqi EFL learners. The findings of the study revealed several segmental and suprasegmental errors that Iraqi EFL learners made. At the segmental level, most of these errors were made in producing vowel phonemes.

Apart from the above, the bulk of pronunciation research conducted in Iraq clearly emphasizes the perfect mastery of an RP accent. For example, Mahud (2001) conducted a Ph.D. study comparing syllabic consonants in English and Arabic. The sample of the study consisted of thirty postgraduate Iraqi students from three different colleges at the University of Baghdad. Qualitative data were collected by comparing the syllabic consonants in English and Arabic. This comparison helped to identify the similarities and differences in the two contrasted languages regarding syllabic consonants. The findings of the contrastive study were later investigated quantitatively to measure Iraqi EFL learners' production of English syllabic consonants. The findings revealed that Iraqi EFL students were unable to produce English syllabic consonants. In a similar vein, Al-Abdely and Thai (2016) investigated the production of English vowels by Iraqi EFL speakers. The aim was to examine the effect of L1 interference and learners' proficiency levels on the production of English vowels. 85 Iraqi speakers were divided into four groups with different proficiency levels as decided by a production placement test. Data from the production test were descriptively and statistically analyzed, and the findings revealed that most of the Iraqi speakers faced a considerable degree of difficulty in producing English vowels. These vowel production errors were similar regardless of the speakers' proficiency level. The same line of investigation was conducted by most past and present researchers.

Based on Gimson's (2001) MGI, Flege's (1995) SLM and the findings of pronunciation studies carried out in Iraq (see Al-Hamash, 1969; Ahmed, 2000; Al-Abdely & Thai, 2016), the current researchers have summarised in three tables the segmental phonemic contrasts between Iraqi Arabic (IA) and English. In the following three tables, the red symbols refer to English phonemes not found in IA, the green symbols refer to English phonemes that have partial equivalents in IA and the black symbols refer to phonemes found in both English and IA. In the present research, these distinctions are taken as the basis of analysis for the segmental phonemes in the production intelligibility test.

Table 1. MGI and IA consonant phonemes

Manner of articulation	place of articulation								
	bilabial	labio-dental	dental	alveolar	post-alveolar	palatal	velar	labio-velar	glottal
stops	p b			t d			k g		
fricatives		f v	θ ð	s z		ʃ ʒ			h
affricates					ʧ ʤ				
nasals	M		N				ŋ		
lateral				l					
approximants				r		J		w	

Table 2. MGI and IA monophthongs

Type of Vowel		front	Central	Back
high	Long	iː		uː
	short	ɪ		ʊ
mid	Long		ɜː	ɔː
	Short	e	ə	ɒ
low	Long	ɑː		
	Short	æ	ʌ	

Table 3. MGI and IA diphthongs

Diphthongs	glide to ɪ	glide to ʊ	glide to ə
	ɑɪ	ɑʊ	eə
	ɔɪ	əʊ	ɪə
	eɪ		ʊə

Whether they were based on the intelligibility or the perfect mastery of RP, what the above pronunciation studies have in common is the fact that most of the identified segmental deviations as features of a foreign accent are difficult to overcome. These features of a foreign accent have been described as non-pathological by Munro and Derwing (1995, p. 290) and fossilized by Jenkins (2000). This begs the question as to what strategies are available to EFL learners to resolve such intelligibility failures. In this respect, Kaur and Singh (2009), based on Jenkins' (2000) study, explored the type of communication strategies used by non-native English speakers to overcome intelligibility failures. They conducted a study to locate instances of miscommunication due to pronunciation features in face-to-face interactions in English among Malaysian speakers. Accordingly, the researchers identified the types of strategies used by the speakers to avoid these miscommunications. Twenty-three hours of interaction in English were used. The researchers adopted Jenkins' (2000) methodology to identify the miscommunications and the strategies. Four information gap tasks were used to collect data. The findings of the study identified some phonological features important for communication. These findings supported the findings arrived at by Jenkins' (2000) study. The study also revealed several communication strategies used by the interlocutors such as lexical anticipation, phonological anticipation, spelling, and mime. Kaur and Singh (2009) emphasize that few studies have been conducted linking the use of communication strategies to pronunciation problems. Most other studies investigating communication strategies were based on lexical

rather than pronunciation causes (see, for example, Yanny, 2006; Skold, 2008). In the Iraqi EFL context, studies on communication strategies were also lexically motivated (see, for example, Dhea, 2011). In the present study, the investigation of communication strategies follows the approach used by Kaur and Singh's (2009) study. The focus is on the type of strategy used when the main motive is to overcome pronunciation difficulty. The difference between the present study and Kaur and Singh's (2009) is the use of semi-free speech rather than face-to-face interaction.

Method

The researchers collected and analyzed both quantitative and qualitative data to investigate the effect of a foreign accent at the segmental level on intelligibility. The use of mixed-method research was to provide a better understanding of the research topic, which could not be achieved if one method was used only (Gronmo, 2020). Moreover, the mixed methods research would expand qualitatively the quantitative findings by exploring the communication strategies Iraqi EFL learners use to overcome pronunciation problems. Therefore, two data collection tools were used: a production intelligibility test and a speaking task, as described below.

The Production Intelligibility Test

The production intelligibility test aimed to measure the impact of a foreign accent on the productive intelligibility of Iraqi EFL learners. The test was constructed based on related works done by Bent and Bradlow (2003), Kim (2008), Almbark (2012) and Sereno et al. (2016). The test consisted of the participants (speakers), the stimulus material and the measurement tools, as described in the following sections.

The Participants (Speakers)

The speakers were 60 Iraqi EFL university students both males and females. The age range varied from 23 to 25. The speakers were all third-year university students studying in the English Departments of three colleges in Baghdad. These speakers were advanced university learners at the final stage of their academic study. They had been tested regularly by their lecturers until they reached this level. Moreover, they had been taught English phonetics and phonology in the first and second years of their university study. In other words, they were likely to have explicit phonetic and phonological knowledge of the sound system of English. When graduating, these students were expected to be teachers of English at intermediate and secondary schools. Thus, it was necessary to check that their productive intelligibility would be a good model to follow by their students.

The Stimulus Material

The material used was a reading passage in English developed by Deterding (2006). The passage contained the distinctive segmental phonemic features in English. In other words, it could be used to measure the productive intelligibility of Iraqi EFL learners and examine this intelligibility about a foreign accent as conceptualized by Flege's (1995) SLM. The researchers made sure that the passage contained words reflecting the three potential levels of difficulty set by

Flege's (1995) SLM: identical phonemes, partially similar phonemes, and different phonemes. In this study, the choice of a reading passage in the productive intelligibility test was made for two reasons. The first reason was to ensure that all words containing the three tested difficulty levels were present. This was confirmed by Deterding (2006). The second reason was to control the lexical and grammatical factors which might influence the measurement of productive intelligibility. Thus, we decided to limit the use of spontaneous speech to the qualitative aspect of the study.

The Measurement Tools

An orthographic word transcription was used to measure the productive intelligibility of Iraqi EFL learners. All the transcriptions were done by the researchers. Two procedures were followed during the transcription process. Firstly, all content words in the reading passage were transcribed using the Oxford and Merriam-Webster Dictionaries. The reason for choosing British and American English dictionaries was in line with Gimson's (2001) MGI principle. The sound modifications, proposed by Gimson, were based on a comparison between the sound system of British English and General American. Secondly, all the mispronunciations found in the speech of Iraqi EFL learners were assessed based on their deviations from the native English pronunciation norms as set by Gimson's (2001) MGI principle. For example, the word 'go' can be pronounced as /gɔː/ because this variant in pronunciation is found in other native English varieties. The use of word dictation to assess intelligibility was suitable as it allowed the researchers to observe "the extent to which a word or utterance is recognized at the level of finer acoustic-phonetic detail" (Moyer, 2013, p. 93). A dichotomous scoring scheme was adopted. A speech sample received one score if all the content words in it were correctly produced by the speaker, whereas it received no score if one content word was inaccurately produced resulting in a change in meaning (Atechi, 2004). After scoring all the speech samples, the mispronounced words were categorized into the three difficulty levels set by Flege (1995).

The Speaking Task

For the qualitative aspect of the study, the speaking task was used to elicit speech samples from 12 Iraqi EFL students. These 12 students were selected from the above 60 speakers. They were chosen based on their performance in the speech intelligibility test. Since we observed frequent segmental deviations in their reading of the passage, we asked them to participate in the speaking task. The task aimed to examine the communication strategies Iraqi EFL learners used to overcome pronunciation problems. A list of topics of general interest was used as a speaking prompt to elicit the speech for the study. These topics were related to travel, shopping, education, health, technology, friendship and so on. According to Clark (1979, p. 36), two of the ways of eliciting speech samples for an investigation are a semi-free speech and a direct free speech. This investigation used the semi-free speech to generate the speech data. These speech data were described as not completely natural because the choice of topics was already decided by the researchers, and this might affect the types of words used.

However, such elicited speech data were not as artificial as the speech data generated by using already prepared reading passages or a list of words. Moreover, to mitigate the above limitation, when using the speaking task in this study, the 12 Iraqi EFL learners were not restricted from using the topics given as speaking prompts. They were free to use their topics if they felt that they could express themselves better and thus produce enough speech data for the study. In fact, on a considerable number of occasions, the speakers preferred to select their topics to talk about. Thus, the speech data elicited by the speaking task should not be considered completely inauthentic and artificial. In this respect, Cruz-Ferreira (2006, p. 43) mentions that "any collection of data, of course, involves a set of choices, which constrain the ways of querying the data according to the purposes that the data will serve."

As far as the speech elicitation procedures were concerned, each speaker was asked to choose a topic from a suggested list of topics and speak about it for 2 to 3 minutes. The speakers were given time to formulate their ideas before speaking. Recording started when the speakers were ready to talk. All speech recordings were done in a quiet room to ensure that clear and noise-free recording was obtained. Although there were some hesitant speech phenomena, the speaking task ran smoothly. We felt that showing signs of interest in the speech by nodding the head and keeping eye contact raised the speaker's confidence to complete the task. As already mentioned, some speakers wanted to speak on topics of their own choice. We agreed to this since we were interested in having a speech sample large enough for the investigation.

The quantitative data obtained from the productive intelligibility test and the qualitative data obtained from the speaking task were analyzed by two different approaches. These are explained in the following sections.

Analysis of the Production Intelligibility Test

The quantitative data from the speech intelligibility test were analyzed in descriptive and inferential statistic terms using the Statistical Package for Social Sciences (Field, 2013). The productive intelligibility test was used to measure the intelligibility of Iraqi EFL learners about a foreign accent. Two types of inferential tests were used: one-sample t-test and one-way ANOVA. The one-sample t-test was used first to measure the overall productive intelligibility of Iraqi EFL learners' accented English. Second, the test was used to measure the productive intelligibility of Iraqi EFL learners to every level of a foreign accent. A one-way ANOVA examined whether there were differences in the mean scores of the three levels of a foreign accent when assessing the productive intelligibility. If significant differences were detected, a Scheffe post hoc test was conducted to tell where these differences occurred.

Analysis of the Speaking Task

Data analysis is considered the procedure of "bringing order, structure, and meaning to the mass of collected data" (DeVos et al., 2002, p. 339). For this investigation, a qualitative content analysis was used to identify the various communication strategies used by Iraqi EFL learners. The identification of the initial categories relied partly on the work done by Kaur and Singh (2009).

Qualitative content analysis is defined as "a research method for subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns" (Hsieh and Shannon, 2005, p. 1278). There are three approaches to qualitative content analysis: directed, conventional and summative. The present study used a directed qualitative content analysis approach. According to Hsieh and Shannon (2005, p. 1281), the goal of a directed approach to content analysis is to validate or extend conceptually a theoretical framework or theory. Existing theory or research can help focus the research question. It can provide predictions about the variables of interest or about the relationships among variables, thus helping to determine the initial coding scheme or relationships between codes. This has been referred to as deductive category application.

Findings and Discussion
Quantitative Results
This section introduces productive intelligibility results. To measure the overall productive intelligibility, the researchers conducted a one-sample t-test using IBM SPSS statistics version 25. The result of the overall productive intelligibility of Iraqi EFL learners to native English listeners is shown in table (4).

Table 4. The overall productive intelligibility of Iraqi EFL learners

One-Sample Statistics			
N	Mean	Std. Deviation	Std. Error Mean
180	2.9169	.70899	.05284

One-Sample Test Test Value = 2.5					
				95% Confidence Interval of the Difference	
T	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
7.889	179	.000	.41689	.3126	.5212

The above statistics revealed that the mean score of Iraqi EFL learners was (2.9169) with a SD (.70899), and the calculated t-value was (7.889), which was larger than the tabulated value (1.960) at an alpha level of (0.05). When comparing the sample mean (2.9169) with the hypothesized mean (2.5), the difference was statistically significant for the sample mean, t(179) = 7.889, p < 0.05. Thus, Iraqi EFL learners' accented English was intelligible with a mean difference (.41689) to native English listeners. The overall result of productive intelligibility suggested that Iraqi EFL learners could produce accurately most of the English words following Gimson's (2001) MGI principle. To determine which aspect of the English sound system caused this significant difference, Iraqi EFL learners' productive intelligibility was measured according to each of the three levels of sound production difficulty proposed by Flege's (1995) SLM. The

results of a one-sample t-test about the level of sound production difficulty experienced by Iraqi EFL learners were as follows.

Iraqi EFL Learners' Production of Identical Phonemes

The researchers conducted a one-sample t-test using SPSS version 25. The result of the intelligibility of Iraqi EFL learners regarding the production of identical phonemes is shown in Table 5.

Table 5. The intelligibility of identical phonemes

One-Sample Statistics

N	Mean	Std. Deviation	Std. Error Mean
60	3.4252	.54588	.07047

One-Sample T-Test
Test Value = 2.5

T	Df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
				Lower	Upper
13.128	59	.000	.92517	.7842	1.0662

The above SPSS statistics revealed that the mean score of Iraqi EFL learners' production of identical English phonemes was (3.425) with a SD (0.545), and the calculated t-value was (13.128), which was larger than the tabulated value (2) at the df (59) and an alpha level of (0.05). When comparing the sample mean (3.425) with the hypothesized population mean (2.5), the difference was statistically significant for the sample mean, $t(59) = 13.128$, $p< 0.05$. Thus, Iraqi EFL learners' production of identical English phonemes was intelligible with a mean difference (.92517).

Iraqi EFL Learners' Production of Partially Similar Phonemes

The researchers conducted a one-sample t-test using SPSS version 25. The result of the intelligibility of Iraqi EFL learners' production of partially similar English phonemes is shown in table (6).

Table 6. The intelligibility of partially similar phonemes

One-Sample Statistics

N	Mean	Std. Deviation	Std. Error Mean
60	2.9175	.62047	.08010

Test Value = 2.5

T	Df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
				Lower	Upper
5.212	59	.000	.41750	.2572	.5778

The above statistics revealed that the mean score of Iraqi EFL learners' production was (2.917) with a SD (0.6204), and the calculated t-value was (5.212), which was larger than the tabulated value (2) at the df (59) and an alpha level of (0.05). When comparing the sample mean (2.917) with the hypothesized population mean (2.5), the difference was statistically significant for the sample mean, $t(59) = 5.212, p < 0.05$. Thus, Iraqi EFL learners' production was intelligible with a mean difference (.4175).

Iraqi EFL Learners' Production of Different Phonemes
The researchers conducted a one-sample t-test using SPSS version 25. The result of the productive intelligibility of Iraqi EFL concerning different phonemes is shown in table (7).

Table 7. The intelligibility of different phonemes

One-Sample Statistics			
N	Mean	Std. Deviation	Std. Error Mean
60	2.4080	.56212	.07257

One-Sample Test Test Value = 2.5					
				95% Confidence Interval of the Difference	
T	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
1.268	59	.210	.09200	.2372	.0532

The above statistics showed that the mean score of Iraqi EFL learners was (2.4080) with a SD (0.56212), and the calculated t-value was (1.268), which was smaller than the tabulated value (2) at the df (59) and an alpha level of (0.05). When comparing the sample mean (2.4080) with the hypothesized population mean (2.5), the difference was statistically significant for the hypothesized mean, $t(59) = 1.268, p > 0.05$. Thus, Iraqi EFL accented English was unintelligible with a mean difference (.09200). The results about the three levels of difficulty in sound production showed that Iraqi EFL learners varied in the mean scores of each level. To determine whether these differences in mean scores of the three levels of difficulty were statistically significant, a one-way ANOVA was conducted. The results about the means differences of intelligibility among the three levels of difficulty are shown in table (8).

Table 8. Production intelligibility among the three difficulty levels

One-way ANOVA INTELLIGIBLITY					
	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	31.039	2	15.519	46.607	.000
Within Groups	58.938	177	0.34		
Total	89.977	179			

The above statistics showed that the calculated F-value was (46.607), which was larger than the tabulated value (3.04) at the two df (2 – 177) and an alpha significant level (0.05). There were statistically significant differences among the mean scores of the three levels of difficulty, $f(2, 177)= 46.607, p < 0.05$. To indicate where these significant differences occurred, a Scheffe post hoc test for multiple comparisons was conducted for which the results are shown in table (9).

Table 9. Scheffe test among the three difficulty level

Multiple comparison		Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Identical	partially similar	.50767*	.10780	.000	.2416	.7738
	Different	1.14233*	.10780	.000	.8762	1.4084
partially similar	Identical	.50767*	.10780	.000	.7738	.2416
	Different	.63467*	.10780	.000	.3686	.9008
Different	Identical	1.14233*	.10780	.000	1.4084	.8762
	partially similar	.63467*	.10780	.000	.9008	.3686

The critical value of Scheffe test was (0.26). When it was compared with the observed differences among the three levels of difficulty, the significance was for the first and second levels of production difficulty.

Qualitative Results
The qualitative analysis aimed to expand the quantitative findings by exploring the communication strategies used by Iraqi EFL learners to overcome intelligibility problems. The following is an account of the communication strategies used by Iraqi EFL learners.

Let-it-pass Strategy
The "let-it-pass" strategy was first introduced by Firth (1996) to describe a strategy that the speaker/hearer adopts when facing problems in speech and "lets the unknown or unclear action, word or utterance pass on the (common-sense) assumption that it will either become clear or redundant as talk progresses" (1996, p. 243). Out of the twelve Iraqi EFL speakers, the let-it-pass strategy was frequently observed in the speech of two speakers, Sadiq and Kamal (the participants' names in this article are pseudonyms). Although the speech samples produced by these speakers contained several pronunciation errors, these Iraqi EFL speakers did not bother to resolve these mispronunciations. They simply let them pass. When following Sadiq's speech, the only single communication strategy used was the let-it-pass strategy. Throughout his speech, Sadiq was indifferent to the frequent pronunciation errors he made. The following is an extract from Sadiq's speech with the mispronounced words either underlined or missed completely.

> I am a citizen. I live in Iraq, Baghdad. I wish to serve my country and develop my skills in learning English language. Speaking……. A lot of people ask me how to improve themselves in English. So, I advise them

> to <u>watch</u> movies in English. I advise them to use their ears to listen to the ……… I also encourage them to speak with their <u>colleagues</u> and to read in English. At the end, I wish <u>luck </u> to my friends.

In the above extract, several words were mispronounced by Sadiq. For example, the word 'luck' was mispronounced as /lɒk/. The speaker substituted the vowel /ʌ/ with /ɒ/. The substitution affected the phonemic status of the vowel, a change in quality. This effect brought about a lexical change in having two different lexical words. When discussing the vowel /ʌ/ in the word 'luck', Gimson (2001) mentions that this vowel could be substituted with /ə/ without affecting intelligibility. However, Sadiq used a different interlanguage variant for the vowel /ʌ/.

Similarly, Kamal used the let-it-pass strategy in his speech, especially when he mispronounced the words 'park' as /bɑːk/, 'audience' as /ɔːdɪniːs/ and 'buy' as /beɪ/. The following is an extract from Kamal's speech with mispronounced words underlined.

> Last week I had a nice day with my friend. We had a small <u>picnic</u>. First, we went to Al Mansur Mall. We <u>buy</u> many things from the mall. We bought clothes and ate our lunch. I also played some games like discovery which I like it very much. After that we decided to watch a football match. I like the way the <u>audience</u> expressed their joy by singing and dancing.

In the above extract, all the underlined mispronunciations resulted in different words. One might argue that the correct form of the words could be deduced from context. For example, the word 'audience' could be inferred by the presence of a lexical item like 'football', due to the co-text effect (Jenkins, 2000) or lexical anticipation (Kirkpatrick, 2007). Although the present researchers do not deny the effect of context and co-text on speech intelligibility, they were more interested in finding out whether the speaker used or did not use a communication strategy when s/he made a pronunciation error. For example, the word 'park' was mispronounced as /bɑːk/ by Kamal. Kamal substituted the consonant /p/ with /b/. The substitution affected the phonemic status of the consonant, a change in place of articulation and voicing. This effect brought about a lexical change in having two different lexical words. When discussing the /p/ in the word 'park', Gimson (2001) mentions that the consonant /p/ could be produced without aspiration and that production would not affect the intelligibility of the word. However, Kamal pronounced the consonant by modifying its voicing feature as well. By examining Kamal's speech, the researchers conclude that the only communication strategy used by Kamal was the let-it-pass strategy. Interestingly, none of the other ten speakers employed the let-it-pass strategy. In contrast, they used other types of achievement or risk-taking strategies, such as the repetition strategy.

Repetition Strategy

Another communication strategy used was when the speaker was aware of his mispronunciations and repeated the problematic pronunciation which caused intelligibility problems (Kirkpatrick 2007, p. 125). The strategy of repetition was

observed in the speech of Iraqi EFL speakers. However, there were some differences in their use. The data analysis of the speech samples revealed two issues concerning this phonological adjustment of mispronounced words. The first one was when the speaker repeated the mispronounced word, but the mispronunciation was still unresolved. This incident indicated a likely deficiency in the speakers' phonological competence. For example, the mispronunciation of the words 'sixth' and 'materials' was repeated by Rasha and the same mispronunciations were still heard. The following is an extract from Rasha's speech:

> When I was in the sixth, sixth, sixth class, I loved to study English very much. I wanted to enter this department. I watched lots of movies and tried to translate without even looking at the writings. I tried hard to develop my English and my listening skills. Also, I wanted to enter the English department because there are many opportunities. After I graduate, I want to be a teacher and learn many things and know how to put the materials, materials in their right place.

In Rasha's speech, the word 'enter' was mispronounced as /inter/. The speaker substituted the vowel /e/ with /ɪ/. The substitution affected the phonemic status of the vowel, a change in the quality of the vowel. This effect would bring about a lexical change in having two different lexical words, the word 'enter' is different from 'inter'. When discussing the vowel /e/ in the word 'enter', Gimson (2001) proposes that the vowel /e/ could be produced in the area of cardinal vowels [e], but it should not be confused with another vowel. However, Rasha used the vowel /ɪ/ as a different interlanguage variant for /e/. By examining Rasha's speech, the researchers observed that the word was repeated several times with the same mispronunciation. Thus, Rasha was not successful in her use of the repetition strategy.

Similarly, Kawther's repetition of the word 'drawing' was unsuccessful. Kawther substituted the vowel /ɔ:/ with /au/. The following is an extract from Kawther's speech:

> My favourite hobby is painting. I love painting very much. I find it fun and comfortable. I like drawings since I was a child. I used to spend my spare time drawings. My friends and teachers encouraged me to complete my dream. I also love reading long novels and long stories which contain drawings.

In Kawther's speech, the word 'drawing' was mispronounced as 'drowning' /drauning/. The speaker substituted the vowel /ɔ:/ with /aʊ/. The substitution affected the phonemic status of the vowel, a change in the quantity and quality of the vowel. This effect would bring about a lexical change in having two different lexical words: the word 'drawing' is different from 'drowning'. By examining Kawther's speech, the researchers observed that the word was repeated several times with the same mispronunciation. Thus, the use of repetition strategy was not successful by Kawther.

However, the repetition strategy was successfully employed by Yasir who repeated the correct pronunciation of the mispronounced word 'improve'. The following is an extract from Yasir's speech:

> English is an international language. It is spoken by millions of people in all countries. I would like to study English in Britain. There are many advantages to do that. I am thinking to do a course there this summer. I believe that I could improve my English language. Therefore, I intend to pursue my higher studies in English at this college.

In Yasir's speech, the word 'improve' was initially mispronounced as /ɪmˈpruːf/. The speaker substituted the consonant /v/ with /f/. The substitution affected the phonemic status of the consonant, a change in voicing. This substitution would bring about a lexical change in having two different lexical words. However, the speaker was able to repeat the mispronounced consonant successfully the second time. Although the consonant phoneme /v/ is not part of the sound system of IA, it occurs in some loan words such as 'television' and 'video', and the adjustment made by Yasir to pronounce the correct form of the word could be due to the occurrence of this vowel in loan words. Likewise, another successful use of the repetition strategy was employed by Eanas, who repeated a correct pronunciation of the initially mispronounced word 'Facebook'. The following is an extract from Eanas' speech:

> I met my best friend yesterday. I saw her when we were in the mall. We talked about everything and she asked about each one of you. She was talking about herself. She is studying now in the History department and have many friends. She gave me her number and asked me to keep in touch. She also asked me to make a group on Facebook. If you have time please do the Facebook Facebook group because I have a lot of work.

Replacement Strategy

Replacement refers to the use of an alternative lexical item instead of a mispronounced one. Although this strategy can be motivated by lexical choice, its use in the data was associated with a previously mispronounced word. For example, Hasan used the word 'funny' instead of 'weird'. The following is an extract from Hasan's speech:

> I had something weird today or something funny. I was going to work driving my car. Suddenly my car broke down. I could not repair it because I had little experience in car motor. I called my assistant and then my brother whose cars were broken too. When we remember what happened we all laughed.

In Hasan's speech, the word 'weird' /wɪəd/ was mispronounced as /weəd/. The speaker substituted the vowel /ɪə/ with /eə/. The substitution affected the phonemic status of the vowel accompanied by having two different lexical words respectively. In discussing the diphthong /ɪə/, Gimson (2001) suggests that the centering diphthongs /ɪə, eə, ʊə/ could be simplified as vowel+r, by the retention

of postvocalic r. This would result in producing /i:(r), eɪr and u:r/ respectively in words like 'peer' /pi:r/, 'pair' /peɪr/ and 'poor' /pu:r/ or /pɔ:r/. Having determined the type of confusion, the researchers examined the type of communication strategy used by Hasan in this situation. By examining Hasan's speech, the researchers observed that the mispronounced word 'weird' was replaced with the word 'funny'.

Likewise, Sajaad used the word 'risk' instead of 'trouble'. The following is an extract from Sajaad's speech:

> I am married and have one kid. I want to talk a little bit about the challenges I faced as a family man and I believe also most of our families in Iraq face. The use of technology, the internet. This device constitutes a <u>trouble</u> I mean a risk to people if misused. It contained ideas which could affect especially the teenagers.

In Sajjad's speech, the word 'risk' was used instead of 'trouble' /trʌbl/. In the word trouble, the speaker substituted the vowel /ʌ/ with /a:/. The substitution affected the phonemic status of the vowel. In the above extract, Sajaad managed to replace the mispronounced word with a semantically similar lexical item.

Time Gaining Strategy

Dornyei and Scott (1995, p. 194) suggest an extension to the communication strategies to include stalling or time taking strategies (the use of pause fillers and hesitation gambits). These strategies were not used as a result of language deficiency, but rather to help the speaker gain time to keep the communication channel open when a problem is encountered. Pause fillers and hesitations were labeled as indirect strategies. According to Dornyei and Scott (1995, p. 194), these provide conditions for preventing breakdowns in communication. In our research, the data analysis of the speech samples revealed two opposite situations. These fillers were successfully used by Ali to facilitate the flow of thoughts and complete the task. For example, Ali said:

> A true friend is rare and hard to find nowadays. A true friend should be near you and make you feel that <u>err</u> you are not alone especially in difficult times. A good friend will not be afraid to tell you when you are wrong. He <u>mm</u> shares your pain and grief. We cannot dispense with friends even if we have brothers and sisters.

In Ali's speech, we were interested in finding out whether the speaker continued his speech after using the time gaining strategy or not. As the speech extract shows, the use of time gaining strategy helped Ali to form his ideas and express himself in a good way. The strategy helped him to finish the task successfully.

By contrast, Mahdi employed the time to gain strategy too much. The excessive use of these time gaining strategies made Mahdi stumble at every word of his speech. The frequent pauses and hesitations distorted the meaning he wanted to convey. This resulted in the researchers having trouble coping with the

message delivered or the speaker finally abandoning the task. The following is an extract from Mahdi's speech:

> I am a citizen. I live in Iraq, Baghdad. I err the sole brother of my family. I am divided err I am divided [long pause] between work or comp… (the speaker did not finish the word) [pause] study. [Long pause] I wish to develop my language skills.

Discussion

The findings of this study will be discussed with the findings of related studies and the theoretical principles guiding their investigation. The first finding is related to the measurement of the productive intelligibility of Iraqi EFL learners' accented English. The finding revealed that Iraqi EFL learners' speech production was intelligible to native English listeners [t(179) = 7.889, p < 0.05, with a mean difference of (.41689)]. This finding contrasted with the findings arrived at by other pronunciation studies conducted in the Iraqi EFL context. It was shown in the review of related studies that Iraqi EFL learners were always regarded as incompetent as far as speech production was concerned (see, for example, Ahmed, 2000; Mahud, 2001; Al-Abdely and Thai, 2016). The main reason for that negative judgment was not a defect in their performance. It was because the pronunciation model used as a reference point emphasized perfect mastery of an English RP accent, a goal impossible to achieve in a large number of EFL contexts (Derwing and Munro, 2005). For example, Mahud's (2001) thesis investigated Iraqi EFL learners' production of English syllabic consonants. Although the study revealed interesting contrasting results, it failed to provide an accurate assessment of Iraqi EFL learners' performance because it was based on the native-likeness principle. Additionally, the phonological feature investigated by Mahud was of less importance in maintaining communication as suggested by Gimson (2001). In commenting on syllabic consonants, Gimson (ibid, p. 320) asserts that modifying the pronunciation of syllabic consonants by inserting a schwa before them will not affect understanding. Thus, the syllabic [ḷ] in the word little can be pronounced as /litəl/. The above finding supports the theoretical assumption of Gimson's (2001) MGI. According to Gimson's (2001, p. 298) MGI, an EFL learner's performance in English will be understandable if the learner "possesses a set of distinctive elements which correspond in some measure to the inventory of the RP phonemic system." The overall productive intelligibility finding of Iraqi EFL learners can be justified by the pronunciation principle adopted in the identification of the words and utterances produced by Iraqi EFL speakers. These words and utterances were identified based on the intelligibility principle. A researcher who adopts this principle will be interested in identifying only the deviant pronunciations which interfere with understanding, overlooking others with less communicative values or recognized due to the context of discourse (Kim, 2008; Gimson, 2001; Brown, 1988).

The second finding of the study is related to the identification of the segmental features of a foreign accent which negatively influences the productive intelligibility of Iraqi EFL learners. The analysis was based on the three difficulty levels of segmental production proposed by Flege (1995). According to Flege (1995), the learning of English vowel sounds can take three routes: different

phonemes are thought to be easy to learn, identical phonemes are thought to be the easiest to learn and partially similar phonemes are thought to be the most difficult to learn. The finding of the present study revealed that non-existent phonemes in IA and MGI were responsible for most intelligibility failures with [t(59) = 1.268, p> 0.05] compared to the production of identical phonemes [t(59) = 13.128, p < 0.05] and partially similar phonemes [t(59) = 5.212,p < 0.05]. Although the finding of the present study supports other findings confirming the importance of vowel production in intelligibility (Al-Abdely and Thai, 2016; Hassan, 2014; Nikolova, 2012), it differs from them in the types of vowels identified as causing production difficulty. The present study revealed that non-existent vowels in IA and MGI were the major cause of intelligibility failures. This finding contrasts with the findings arrived at by Al-Abdely and Thai (2016) and Almbark (2012) which emphasize that partially similar vowels cause most of the production difficulties. Again, the reason for the differences in the findings can be due to the pronunciation principle adopted. Furthermore, the ability of Iraqi EFL learners to produce some of the different vowels can be justified by having linguistic knowledge and enough exposure to English. This effect was supported by Almbark (2012) when justifying the accurate production of partially similar phonemes.

The third finding of the present study is qualitative. This study did not only determine the deviant pronunciations causing intelligibility failures, but it also identified the various communication strategies Iraqi EFL learners used to overcome pronunciation problems, like the let-it-pass strategy, the repetition strategy, the replacement strategy and the time gaining strategy. Although the finding supports the ones arrived at by related studies, it differs from them in terms of the purpose intended, the methodology adopted and the speech data elicited. The purpose of the qualitative aspect of the present study was to suggest alternative ways to assess the productive intelligibility of Iraqi EFL learners. This means that these learners can use various communication strategies to convey their messages when they face difficulty in producing some English words. Thus, the quantitative findings can be expanded by qualitative data (Gronmo, 2020). For example, the extract from Hasan (see the 'Replacement Strategy' section above) showed a successful use of the replacement strategy by using the word 'funny' instead of the mispronounced word 'weird'.

Concerning the methodology used, the communication strategies were identified based on pronunciation rather than lexical incompetency. In this regard, the findings contrasted with those of Dhea (2011), Skold (2008) and Yanny (2006), all of whom emphasized the use of communication strategies based on the lack of lexical knowledge. Regarding the speech data elicited, the findings of this study were based on semi-free speeches produced by Iraqi EFL learners rather than speech data derived from face-to-face interaction used by Kaur and Singh (2009) and Jenkins (2000).

Conclusion

This study investigated the productive intelligibility (being understood while speaking) of Iraqi EFL learners concerning segmental deviations as a foreign accent. The purpose of the study was to measure quantitatively the impact of the segmental features of a foreign accent on the productive intelligibility of Iraqi

EFL learners and to examine qualitatively how these learners used communication strategies to overcome intelligibility failures. For this purpose, a mixed-methods research approach was adopted. The purpose of the approach was to collect different but complementary data on the same topic to expand quantitative findings with qualitative data. Thus, the quantitative data obtained from the speech intelligibility test were triangulated qualitatively with a speaking task that elicited speech data from 12 Iraqi EFL learners.

The quantitative findings revealed that Iraqi EFL learners' speech production was intelligible [$t(179) = 7.889$, $p < 0.05$, with a mean difference of (.41689)]. When examining the overall productive intelligibility concerning the three levels of sound difficulty in a foreign accent, significant differences were revealed that indicated a foreign accent had a relative impact on productive intelligibility. The qualitative findings were concerned with exploring how Iraqi EFL learners used various types of communication strategies to overcome intelligibility failures caused by deviations in pronunciation. The communication strategies used by the participants included the let-it-pass strategy, the replacement strategy, the repetition strategy, and the time gaining strategy.

The assessment of non-native English pronunciation has sidelined the requirement of an RP perfection goal on the part of non-native English speakers. Instead, intelligibility is proposed as a more practical and achievable performance target for non-native English speakers (Isaacs and Trofimovich, 2016, p. 5). Thus, the present study combined pronunciation studies in Iraq with up to date theoretical and research practice in English pronunciation by adopting an intelligibility approach to the investigation of the productive intelligibility of Iraqi EFL accented English. On the one hand, the findings of the current investigation seem to be restricted to the Iraqi EFL context because the phonemic contrasts made by Iraqi EFL speakers are likely not to be the same as other Arab speakers in other EFL contexts. On the other hand, the productive intelligibility principle used in this study to research Iraqi EFL learners, namely Gimson's (2001) MGI, can be utilized in other contexts because it is based on an intelligibility pronunciation level of universal validity. In other words, similar studies based on Gimson's (2001) MGI principle can be carried out in other EFL contexts. To this end, the methodology adopted in the present investigation can be replicated in other EFL milieux.

The implications of the study for the learning and teaching of English pronunciation at the speech production level are threefold. Firstly, realistic and achievable pronunciation goals should be set for non-native English speakers. This can be achieved by adopting intelligibility rather than the perfect mastery of the English RP accent. Secondly, a foreign accent is highly likely to be unavoidable. Everyone, whether native or non-native, speaks with a distinct accent. For teaching and learning purposes, the main concern is to identify the features of a foreign accent which negatively affect intelligibility, while overlooking others of less or no importance in maintaining communication. Although these identified features of a foreign accent are often described as non-pathological and fossilized, some researchers assert that explicit phonetic instructions and language exposure can improve learners' production intelligibility (see Browne, 2016; Almbark, 2012; Flege, 1995). If these features of a foreign accent persistently reoccur, alternative oral communication strategies

should be employed, as described in this investigation. Thirdly, most researchers assert that perception can improve speech production; hence, it is recommended that a variety of native and non-native English accents should be introduced into EFL classrooms.

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