

## **FIRST LANGUAGE AND PROFICIENCY LEVEL EFFECTS ON ENGLISH VOWEL PERCEPTION BY IRAQI LEARNERS OF ENGLISH IN MALAYSIA**

**Ammar Abdul-Wahab Al Abdely  
Ilyana Jalaluddin  
Che An Abdul Ghani  
Yap Ngee Thai**

**Education College for Women, University of Anbar, Iraq  
Faculty of Modern Languages and Communication, Universiti Putra Malaysia**

### **Abstract**

Motivated by the assumptions that first language (L1) influence was found to be a very strong predictor of foreign accent degree in the pronunciation of second language learners and that increased experience in the second language (L2) may nurture improved recognition of the differences between the L1 and L2 segments, this study examines the effect of L1 and proficiency level on the perception of English monophthongs by Iraqi EFL learners. Iraqi learners of English who speak Baghdadi Arabic as their native language were recruited for the study. Their level of proficiency in English was measured with the Quick Placement Test (UCLES, 2001). Performance in the perception test revealed that Iraqi learners face different levels of difficulty in the perception of most monophthongs in English. The results showed prominent perceptual trends regardless of the learner's proficiency level for some vowels, suggesting strong L1 effect across all proficiency levels. The study also found that the perceptual abilities of EFL learners can be improved with more exposure to the L2. The errors made by Iraqi learners can be explained based on perceived similarity and distance between L2 and L1 vowel spaces.

**Keywords:** Speech perception, English monophthongs, Iraqi EFL learners, L1 influence.

### **INTRODUCTION**

Under the topic of non-native speech perception, two interconnected fields of research have developed: cross-language and second-language (L2) speech perception. The first accounts for the processing of the non-native speech signal based on one's native language and the latter target adult learners with different levels of proficiency in the L2 (Williams & Escudero, 2014). Rauber, Escudero, Bion and Baptista (2005) state that a comparison of the two vowel systems can help predict and explain the difficulties learners may encounter in the perception of vowels. Such comparison, they elaborate, may include perceived similarities and differences between L1 and L2 vowels, the various spectral and durational cues that identify vowel contrasts, differences in vowel inventories of L1 and L2, and the differences in the size of the vowel spaces of L1 and L2. All these aspects are potential sources of difficulties in the acquisition of L2 sounds. Thus, many researchers have investigated these influences.

L2 speech perception is often accounted for by several models. Of these models, are the Speech Learning Model (SLM) and the Perceptual Assimilation Model (PAM). SLM, proposed by Flege (1995), describes three potential influences that the L1 has towards the acquisition of L2 sounds. The first is that L2 segments that are entirely distinct from any L1 segments are expected to be easily acquired, assuming a highly positive L1 influence. The second is that segments that are found in both the L1 and L2 phonological systems are thought to be the easiest to acquire, also assuming a highly positive influence. The third argues for a high degree of difficulty when acquiring L2 speech sounds that are phonetically similar to the L1 segments; the segments have different phonological status in the two language systems. PAM proposed by Best (1994), assumes that difficulty in the perception of L2 sounds is highly associated with the phonetic-articulatory similarities and with the differences between the two L2 sounds along with the differences between L1 and L2 sounds. Thus, the process of deciding whether a particular L2 sound is similar or dissimilar to an L1 sound is not straightforward. It rather encompasses discerning differences between two L2 sound segments and discriminating between L2 and L1 segments. Accordingly, two non-native sounds may be assimilated in any of these four patterns; (1) both sounds may be mapped onto a single L1 category, (2) each sound may be mapped onto a different L1 category, (3) both may be mapped onto the same L1 category but with different degrees of goodness, or (4) both may be considered as uncategorizable as they are found outside the normal range of existing vowel space of the L1 (Best, 1994: Best & Tyler, 2007).

Previous investigations revealed that speech perception is influenced considerably by the phonological account of the languages spoken. Listeners might link both members of an L2 contrast to one L1 sound, if they are not familiar with the phonological contrast used in the L2 (Kuhl, Williams, Lacerda, Stevens & Lindblom, 1992). Listeners whose L1 vowel system is smaller than that of the L2 will probably perceive some L2 vowels as instances of the same L1 category. This generally leads to poor differentiation accuracy. Nikolova (2010) also observes that ESL learners from different linguistic backgrounds encounter difficulties in the acquisition of English vowels because most of the first languages that were investigated have a smaller vowel system than the English vowel system. Hence, negative language transfer is expected to happen as single category assimilation is highly likely to occur.

### **Perception Studies Targeting Arab Efl Learners Of English**

Smith (2001) argues that speaking English with an Arabic accent can be effortlessly detected due to a number of phonetic cues. Phonetically, Smith explains, Arabic has less clear vowel articulations, more stressed syllables and frequent use of a glottal stop before initial vowels to split up English consonant clusters. However, there are several variations among Arabic dialects such as Egyptian, Iraqi and Damascene which have different stress patterns, sound inventories, and syllabification rules (Asfoor, 1982). As illustrated by Flege and Port (1981), Joseph and Odisho (2005) and Smith (2001), problems in the pronunciation of English by Arab learners are recorded in the literature of L2 research. In most cases, these problems were thought to be the outcome of the negative influence of L1 phonology onto L2 pronunciation. Nevertheless, errors learners made in the perception and production of L2 cannot be solely interpreted as L1 influence.

A number of studies have focused on identifying difficulties Arab learners of English face in the perception and production of English segments. Almbark (2012) and Nikolova (2010) focused on both perception and production, while Ali (2013), Al-Tamimi (2007), Alzahrani (2014) and Munro (1993) focused on only speech production of Arab EFL learners. Nikolova (2010) investigated the impact of dissimilarities between the phonological systems of Arabic and American English on learning vowels by ESL learners from Saudi Arabia. Participants in Nikolova (2010) encountered difficulty with vowels that are similar sounds in addition to the sounds that do not exist in Arabic but are regularly used in English. The study did not report a positive influence of experience on the performance of Saudi learners in the perception and the production tests. Beginners and advanced learners made most errors in the perception of the vowel /ɛ/ and the production of /ɔ/.

To the best knowledge of the researchers, the perception of English vowels by Iraqi learners of English has not been examined before. Thus, this work is set to fill this gap in the literature. Baghdadi Arabic, henceforth Iraqi Arabic (IA), has been chosen for examination here as it is the dialect currently considered the lingua franca of Iraq (Al-Bazi, 2006). The study aims to account for difficulties encountered by Iraqi EFL learners in their perception of English monophthongs to identify L1 effect on Iraqi EFL learners' perception of English monophthongs. Differences in the performance of the participants were also examined according to their proficiency level in English to examine how experience interacts with first language effects.

### **Vowel Systems In Arabic And English**

The English vowel system has been widely investigated (Chomsky & Halle, 1968; Hillenbrand, Getty, Cark & Wheeler, 1995; Watt, 2002; Labov, Ash, Baranowski, Nagy, Ravindranath & Weldon, 2006). Different varieties of English are often characterized by variations in the vowel system; therefore, the number of monophthongs can vary from one variety of English to another (see Davenport & Hannahs, 2009; Hughes, Trudgill and Watt, 2005 for a more detailed discussion of the vowel system in British varieties of English). Although, Arabic is much less studied, variation in the vowel system is also recorded in the literature (Al-Ani, 1970; Alghamdi, 1998; Alotaibi & Hussain, 2010). Arabic is spoken by hundreds of millions all over the world and it has various dialects and accents to the degree that, according to Ferguson (1971), some Arabic variants show differences greater than those found in separate languages.

Classical Arabic (CA) refers to the language of the Holy Quran, while Modern Standard Arabic (MSA) is the variety adopted as the medium of instruction at schools. Apart from these two formal varieties of Arabic, there are many regional varieties of Arabic which is used by people in their daily social interactions. Both Classical Arabic (CA) and Modern Standard Arabic (MSA) have a 6-vowel system with three pairs of vowels that contrasts for length. Munro (1993) and Alzahrani (2014) confirm that vowel length is a fundamental phonemic characteristic of Arabic vowels. Moreover, Kopczynski and Meliani (1993) claim that only length is distinctive in Arabic. A comparison of the acoustic measurements of English and Arabic vowels in Alghamdi (1998) and Hillenbrand et al. (1995) show that the F1 and F2 formants for Arabic vowels are somewhat lower than those found for English vowels. In addition, the duration of Arabic short vowels is shorter than English lax vowels, but the

length of the Arabic long vowels /i:/ and /u:/ are similar to the corresponding English tense vowels.

The vowel system of Received Pronunciation (RP), the standard variety of British English adopted in most pronunciation books, has twelve monophthongs including the schwa while the vowel system of IA has nine vowels (Erwin, 2004). The schwa is often not included in most English vowel charts as it is the unstressed vowel and not phonemic; however, we have included it in the vowel chart because the schwa was also included in the study. The vowel system in IA when compared to CA and MSA, which has only six vowels, is still smaller compared to the 12-vowel system in RP English (see Figure 1).

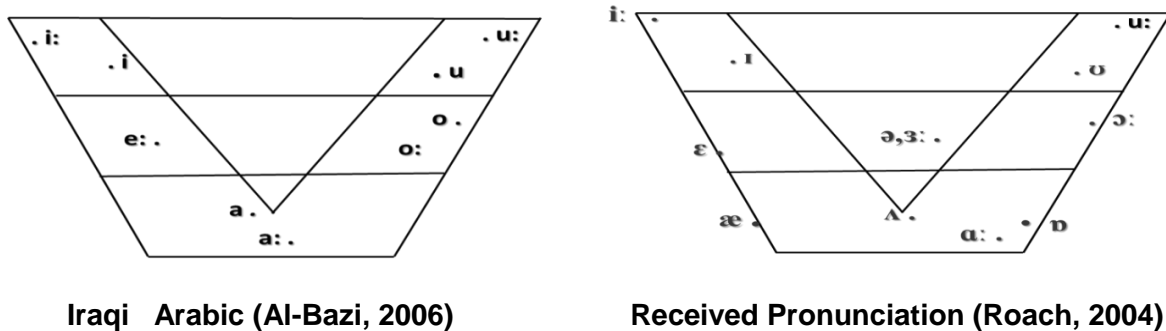


Figure 1: Vowels in Iraqi Arabic and Received Pronunciation

There are various challenges in comparing the two vowel systems using reports available from the literature. The choice of phonetic symbols used can often result in confusion about the implicit claims about the phonetic character of these vowels spoken in various parts of the world. Although the alphabet adopted by the International Phonetic Association (IPA) is the most widely used system in reporting speech sounds, Ogden (2009) reports that phonetics textbooks use slightly different versions of the IPA alphabet that represent the segments of various languages and the accents adopted for that particular book. For example, in English, both [ɛ] and [e] and are often used to refer to the mid front vowel in words like 'let, bet, set and pen' while [e] and [eɪ] are used for the vowel in words like 'bait' and 'made', with the former often used for General American and the latter for British RP. In this paper, to avoid confusion, we will use [ɛ] for the mid-front lax vowel following conservative descriptions of RP available in Davenport and Hannahs (2009).

The following decisions were made in comparing the two vowel systems to enable predictions to be made about possible first language effect on acquisition of L2 vowels following postulations provided in SLM. Vowels that are identical in terms of the phonetic symbols used and the phonetic description available in the literature are considered as identical. The high front and back vowels /i: u: ɪ ʊ/ fit this category as there is a match in the vowel space that is occupied by these four vowels in both English and Arabic. These vowels are expected to pose little difficulty for L2 perception as the English vowels can be assimilated with the existing Arabic vowel category. The L2 learners would not need to build a new category for these vowels as similar counterpart exists in the L1.

Next are L2 vowels that do not exist in the L1 inventory. There is a three-way distinction for mid vowels in RP but in IA there is only a distinction between front and back for mid vowels. Therefore, three English monophthongs (/ʌ/, /ə/, /ɜ:/) can be considered as not

found in IA on this basis. In addition, there is a distinction between low-front and low-back vowels in English, but there is only a distinction of length in low vowels in IA and the vowel space occupied by the low vowels is not front but probably centre or back. Following the same basis, two monophthongs can also be classified as uniquely found only in RP English: /æ/ and /ɒ/.

The final category of vowels refers to vowels that exist in both languages as they seem to occupy the same location in the vowel inventory but they may be phonetically different from how it is pronounced in English. The English mid-front and mid-back vowels (/ɛ/ and /ɔ:/) and the low-back vowel /ɑ:/ seem to fit this category. These vowels are expected to pose the greatest degree of difficulty as their counterparts in IA are similar in certain features but different in others. L2 learners may assimilate these categories to existing categories in the L1 resulting in poor discrimination between different vowel categories in the L2.

## **MATERIAL AND METHODS**

### **Participants**

Eighty five Iraqi EFL learners of English studying in various universities in Malaysia were first recruited via purposive sampling method making use of a demographic questionnaire adapted from Lai (2008) and Nikolova (2010). Participants responded to the questionnaire providing information about their personal and linguistic backgrounds. This questionnaire was necessary to eliminate learners who were not native speakers of IA, and learners who had the opportunity to spend several years in an English speaking country. Participants who had been substantially exposed to a third language other than Arabic and English were also excluded to avoid any additional influences in the study. The recruited participants were later classified into groups depending on their results in the Oxford Placement Test (OPT). Participants were grouped based on their performance in the OPT: elementary (A2), lower intermediate (B1), upper intermediate (B2) and advanced (C1) following the common European framework for language proficiency (Council of Europe, 2001). The age range of the participants were from 22-42 years with a mean of 32 years. The nature of the exposure to English language these participants had is institutional and mostly from English language classes. Only male participants were selected to take part in the study to set aside any influence of gender on the results. The number of female Iraqi EFL learners who were willing to participate in this study was very limited; hence they were excluded. Only Iraqi learners of English were allowed to take part in this work, because of differences found in different dialects of Arabic. Furthermore, only Baghdadi speakers were selected to be the informants of this study to avoid any effect of dialectal variation on the reliability of the results.

### **Material and Task Design**

The list of words used in the perception task comprised 48 English words that presented the twelve English monophthongs with four different words for each vowel category. The list was adapted from Nikolova (2012) and Almbark (2012). The schwa /ə/ which was excluded by Nikolova and Almbark were included in this study because it appears in multisyllabic words. The words used in the task were all monosyllabic except for the disyllabic words that contained the schwa. The schwa does not occur in monosyllabic words except in function

words which are weakened in continuous speech. A native female RP speaker, who is an EFL tutor in an English Language Centre in a University in the United Kingdom recorded these words. The reason that a speaker of RP was selected as the native model for the perception test is that RP is the accent targeted by the English Language Departments in all Iraqi universities. This is reflected in the text books that are adopted in the teaching of English pronunciation in Iraq where books like “Better English Pronunciation” by O’Conner (1980) and “English Phonetics and Phonology” by Roach (2009) are both based on RP English. The recording was done in a phonetics laboratory using PRAAT (Boersma & Weenink, 2009). The recording provided by the native speaker was also analyzed using PRAAT. Average measurements for F1 and F2 of the twelve English monophthongs as produced by the native speech provider of the study were mapped as shown in Figure 2. Moreover, the recording was piloted on two native listeners who completed the perception task with ease. They were asked to identify any major issue in the recording that may make it not representative of RP, and they referred to none.

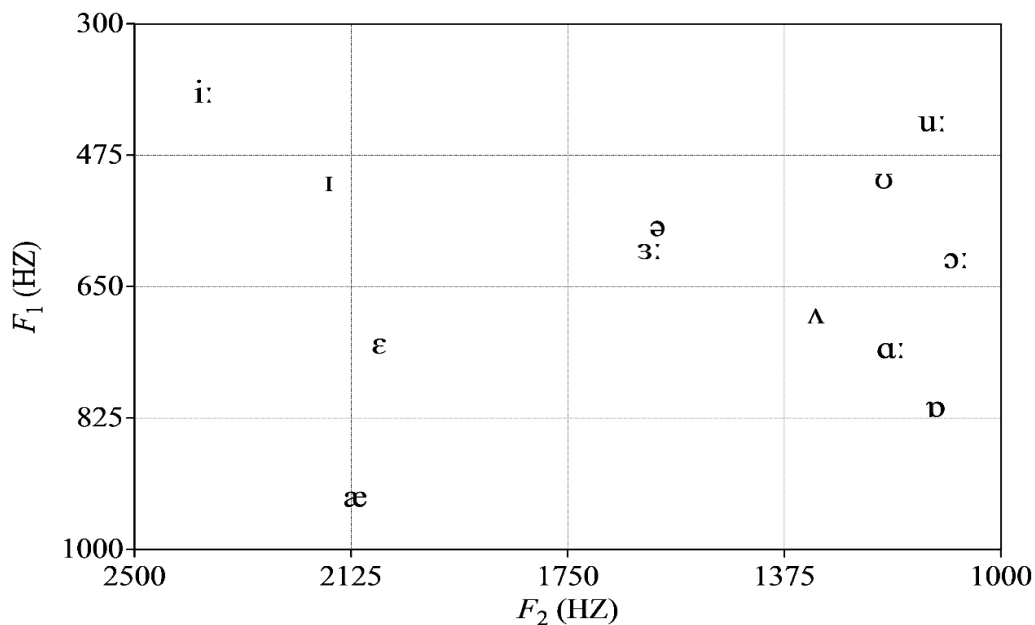


Figure 2: Vowel formants of the native speech provider

The task conducted in this study was a 48-item listening task where four words containing each of the 12 English vowels were presented with three distracting options in the answer. The perception task was intended to measure learners' perception of English monophthongs. The experiment was designed using Psychopy V.1.81 (Peirce, 2007). In each trial, participants listened to a word via a set of headphones and they were presented with four choices. They had to choose the word they heard over the headphone by selecting the letter of the option for the word chosen. Participants paced the task themselves as the next trial only began after they had selected an answer for the previous trial with a 2 second interval to allow them to be prepared to listen to the next item.

## Procedure

The speech perception task was conducted in quiet halls in libraries of various institutions of higher learning in Malaysia. Instructions were given to participants on how to start the task on their computers in addition to a trial test of five words which were not words used in the actual task. Repetition of the task was not allowed; none of the participants had requested for it. On the average, each participant spent about five minutes on the perception task.

## RESULTS

### Overview of performance in the perception task

Table 1 shows the rank order of vowels in terms of difficulty level as identified by error percentages. The number of participants for each group are specified on top of the table. On the average, /ɒ/ recorded the highest number of errors while the schwa recorded the least. Lax vowels appear to be more difficult compared to tense vowels.

Table 1: Rank order and error percentages of the perception test for the four groups

Vowel	Overall		A2 (N=25)		B1 (N= 25)		B2 (N= 24)		C1 (N = 11)	
	Rank	%	Rank	%	Rank	%	Rank	%	Rank	%
/ɒ/	1	69	1	73	1	69	1	69	1	66
/ɪ/	2	37	3	57	2	42	3	29	5	20
/ʌ/	3	37	2	63	3	41	4	27	6	16
/ɔ:/	4	35	5	49	4	33	2	31	3	27
/ʊ/	5	30	8	39	5	31	6	21	2	30
/æ/	6	27	10	34	6	27	5	24	4	25
/ɛ/	7	25	7	49	8	24	7	17	7	12
/ɜ:/	8	24	4	53	10	19	8	15	8	9
/u:/	9	24	6	49	7	26	9	13	9	7
/ɑ:/	10	19	9	36	9	24	10	10	10	7
/i:/	11	12	11	30	12	6	11	7	11	5
/ə/	12	6	12	12	11	9	12	0	12	2

A comparison across the groups show that the performance of the learners in the four groups was not very different as all groups committed the most errors in /ɒ/ with error percentages 73, 69, 69 and 66 for groups A2, B1, B2 and C1 respectively. Apart from the vowel /ɒ/, A2, B1 and B2 groups have slightly varying degrees of difficulties in the perception of the vowels /ɪ/, /ʌ/ and /ɔ:/ which are ranked in 2<sup>nd</sup>, 3<sup>rd</sup> and 5<sup>th</sup> for A2, 3<sup>rd</sup>, 2<sup>nd</sup> and 4<sup>th</sup> for B1, and 4<sup>th</sup>, 3<sup>rd</sup>, and 2<sup>nd</sup> for B2. The rank order is somehow different for the group C1 where /ʊ/, /ɜ:/ and /æ/ occupied the 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> ranks respectively. On the other hand, the patterns of errors for the four groups were very similar with the least difficult vowel. The two vowels /ə/ and /i:/ were always at the bottom of the rank order list for the four groups with error percentages of 12 and 30, 9 and 6, 0 and 7, 29 and 2, 5 for the groups A2, B1, B2 and C1 respectively.

An overview showing the numbers of errors made together with the distribution of the errors in terms of the vowels perceived instead of the target vowel is provided in Table 2. Perceptual trends were identified and then compared among the four groups to pin point any possible effect of proficiency level on these trends. The results showed that vowels such as /ə/ and /i:/ were perceived with a considerable degree of success; however, several other vowels were perceived with low identification rates. The vowel /ɒ/, was the most difficult with an overall error percentage of 69.7%. Vowels that recorded second and third highest percentage of error were /ʌ/ and /ɪ/ with 40.3% and 40% errors respectively. The participants' perceptual behaviour showed some prominent perceptual trends which were sometimes bi-directional. Three bi-directional misperception relations were identified in the confusion matrix presented in Table 2. The first was between /æ/ and /ʌ/ which were bi-directionally misperceived for one another. More specifically, /æ/ accounted for 46.0% of the errors for /ʌ/, while /ʌ/ accounted for 74.7% of the errors for /æ/. The second relation was between /ɑ:/ and /ɜ:/, where /ɑ:/ accounted for 30% of the errors for /ɜ:/, while /ɜ:/ accounted for 46.6% of the errors for /ɑ:/. The third relation was between /ɒ/ and /ɔ:/, where /ɒ/ was mistakenly perceived as /ɔ:/ 18.5% of the time, and /ɔ:/ accounted for 38.4% of the errors for /ɒ/.

**Table 2: Confusion matrix for the perception of English vowels**

Target Perceived	/ɪ/	/æ/	/ʌ/	/ʊ/	/ɒ/	/ɑ:/	/ɛ/	/i:/	/ɜ:/	/ɔ:/	/u:/	/ə/
/ɪ/	<b>204</b>	5	5				12	11				1
/æ/	20	<b>245</b>	63	2	2	20	65	2	8			5
/ʌ/	3	71	<b>203</b>	14	18	3				13	36	
/ʊ/				<b>237</b>	54					28	25	1
/ɒ/		12	17	14	<b>103</b>	4	1		2	23	8	5
/ɑ:/			23			<b>267</b>			27			
/ɛ/	93		3	7		1	<b>245</b>	31	15			
/i:/	20						6	<b>295</b>	1			7
/ɜ:/					38	34			<b>250</b>	50		
/ɔ:/			8	6	91	11			31	<b>216</b>	5	
/u:/				11	1						<b>250</b>	
/ə/												<b>318</b>
/eɪ/		7	18				11	1	5			1
/aʊ/				31						5	16	
/əʊ/				18	33				1	5		
/aɪ/												<b>2</b>



Table 3 shows the distribution of perception errors made by subjects based on the most frequently perceived vowel instead of the target vowel. This table is meant to identify similarities and differences in the perceptual trends of Iraqi EFL learners of English, who differ in their level of proficiency in English, in the perception of English vowels. As shown in

Table 3, the four groups of Iraqi EFL learners of English revealed very similar perceptual trends except for very few cases in which the vowel perceived instead of the intended one might be the second choice in the perception frequency list. The most frequent error for /ɜ:/ in A2 group is /ɑ:/ but for the other three groups it was /ɔ:/; however, /ɔ:/ in A2 group was the second most frequent error. The perception of the vowel /ɑ:/ showed a considerable perceptual variation among the four groups, as it was incorrectly perceived as /ɜ:/ by the A2 and B1 groups but as /ɔ:/ and /æ/ by the B2 and C1 groups respectively. The /ə/ was also differently perceived by the A2, B1 and C1 groups (no incorrect perception for this vowel in B2) as /æ/, /i:/ and /ɒ/ respectively. However, no accurate assumption can be made out of this variation, because the number of incorrect instances of the schwa was very limited. Subjects did not just show very similar perceptual trends in the perception of vowels, but they also showed similar bi-directional misperception relations, as all groups had (/ɔ:/- /ɜ:/ and /ɒ/- /æ/) bi-directional relations, where /ɔ:/ was usually perceived as /ɜ:/ and /ɜ:/ as /ɔ:/, and /ɒ/ was usually perceived as /æ/ and /æ/ as /ɒ/.

Table 3: Perceptual trends of English vowels by proficiency groups

Vowel	Mostly perceived as			
	A2	B1	B2	C1
/ɪ/	/ɛ/	/ɛ/	/ɛ/	/ɛ/
/æ/	/ɒ/	/ɒ/	/ɒ/	/ɒ/
/ɒ/	/æ/	/æ/	/æ/	/æ/
/ʊ/	/əʊ/	/əʊ/	/əʊ/	/əʊ/
/ɒ/	/ɔ:/	/ɔ:/	/ɔ:/	/ɔ:/
/ɑ:/	/ɜ:/	/ɜ:/	/ɔ:/	/æ/
/ɛ/	/æ/	/æ/	/æ/	/æ/
/i:/	/ɛ/	/ɛ/	/ɛ/	/ɛ/
/ɜ:/	/ɑ:/	/ɔ:/	/ɔ:/	/ɔ:/
/ɔ:/	/ɜ:/	/ɜ:/	/ɜ:/	/ɜ:/
/u:/	/ɒ/	/ɒ/	/ɒ/	/ɒ/
/ə/	/æ/	/i:/	-----	/ɒ/

### English Proficiency Level and Perceptual Performance

A one-way analysis of variance (ANOVA) was conducted to examine the effect of proficiency level in English on performance in the speech perception task. The ANOVA results showed that there was a statistically significant difference in the perception scores for the four levels of proficiency,  $F(3,81) = 26.84$ ,  $p = .00$ ,  $\eta^2 = .499$ . The magnitude of the difference in the means and the effect size was strong, with group factor accounting for 50% of the variance of the dependent variable (see Table 4). A post-hoc Tukey HSD was performed to evaluate pairwise differences among the means. The Tukey HSD revealed significant differences in the means for subjects in group A2 and the three other groups: B1, B2 and C1, with  $p < .05$ . A significant difference was also found between group B1 and C1; the difference between B2 and C1 was not statistically significant, with  $p > .05$ . Table 5 summarizes the results of multiple comparisons with the Tukey HSD post hoc test. Twelve one-way ANOVA tests were also conducted to examine the effect of proficiency level on the perception of specific vowels in the task (see Table 6). The results showed no significant differences based on group factor in the perception of /æ/, /ɔ:/ and /ɒ/; thus, they were not included in Table 6.

Table 4: One-Way ANOVA for Perception Scores by Group

Group	N	Mean	Std. Deviation	F	df	P	Eta
A2	25	26.24	5.380	26.840	84	.000	.499
B1	25	33.96	5.256				
B2	24	37.50	4.969				
C1	11	38.91	3.360				
<b>Total</b>	85						

Table 5: Multiple Comparisons, Tukey post hoc test

Comparison		MD	Std. Error	P
A2	B1	-7.72*	1.419	.000
A2	B2	-11.26*	1.434	.000
A2	C1	-12.67*	1.815	.000
B1	B2	-3.54-	1.434	.073
B1	C1	-4.95*	1.815	.038
B2	C1	-1.41-	1.827	.867

Table 6: One-Way ANOVA for Perception Scores by Vowels

Vowel	(I) Group	(J) Group	MD	Std. Error	P value
/ɛ/	A2	B1	-1.000*	.285	.004
		B2	-1.293*	.287	.000
		C1	-1.415*	.364	.001
/i:/	A2	B1	-.960*	.175	.000
		B2	-.908*	.177	.000
		C1	-1.018*	.224	.000
/ɜ:/	A2	B1	-1.360*	.291	.000
		B2	-1.537*	.294	.000
		C1	-1.756*	.372	.000
/u:/	A2	B1	-.920*	.256	.003
		B2	-1.460*	.258	.000
		C1	-1.687*	.327	.000
/ɪ/	A2	B1	-.600	.287	.165
		B2	-1.113*	.290	.001
		C1	-1.462*	.367	.001
/ʌ/	A2	B1	-.880	.356	.072
		B2	-1.437*	.360	.001
		C1	-1.884*	.456	.000
/ɑ:/	A2	B1	-.480	.220	.138
		B2	-1.023*	.223	.000
		C1	-1.167*	.282	.000
/ʊ/	A2	B1	-.320	.239	.540
		B2	-.727*	.241	.018
		C1	-.378	.305	.604
/ə/	A2	B1	-.120	.137	.816
		B2	-.480*	.138	.004
		C1	-.389	.175	.125

The tests showed statistically significant differences between A2 group in one hand and B1, B2 and C1 groups on the other hand in the mean scores of the perception of the vowels /u:/, /ɛ/, /i:/, /ɜ:/ and /ɔ:/. These differences were in favour of the groups with higher levels of proficiency in English. Statistically significant differences were identified among A2 group, in one hand, and B2 and C1 groups, on the other hand, in the mean scores of the perception of /ɑ:/, /ɪ/ and /ʌ/. Furthermore, statistically significant differences were found between groups for A2 and B2 for the mean scores of /ə/ and /ʊ/, with participants in B2 performing better compared to those in A2. It is worth noting that no significant differences in the mean scores of the perception of English monophthongs were found among groups for B1, B2 and C1.

## DISCUSSION

### Influence from the First Language

Being attuned to their native language phonological systems, adult non-native speakers normally face difficulty perceiving L2 phonological contrasts (Flege, 1995); Iraqi EFL learners are not exception in this respect as the results in this study shows. In the following sections, we discuss the results based on the predictions that were made by comparing the vowel systems in IA and RP English.

### **Vowel Categories Shared in both L1 and L2**

The long vowels, (/i:/, /u:/) are vowels that were predicted to pose little difficulty for Iraqi EFL learners as they are found in IA as well as RP English. Phonetically, these vowels are found in very similar positions in the vowel space and the duration of these vowels are also very similar. The results of the perception test supported the prediction as postulated in SLM as /i:/ and /u:/ were ranked 11 and 9 on the basis of the errors made in the perception task.

Participants, however, made more errors with the lax vowels /ɪ/ and /ʊ/ when compared to their tense counterpart (/i:/ and /u:/), probably because perception of these lax vowels requires sensitivity to spectral cues, while the latter two vowels can be identified based on durational cues. Iraqi EFL learners just like many other EFL learners who have long-short vowel distinction as a basic cue, manage to perceive tense vowels but face greater difficulty with lax vowels which are spectrally identified. (Flege, 1987; Hubais & Pillai, 2010; Mitleb, 1981). The high-front lax vowel was often confused with the mid-front lax vowel, /ɛ/. Although IA has a mid-front vowel category, phonetically the vowel is long. We can conclude from the results that in Arabic, IA listeners probably use durational cues to distinguish the Arabic /i/ from /e:/ and spectral cues to distinguish /i:/ from /e:/. However, durational cues would not be able to help distinguish the English /ɪ/ and /ɛ/. The difficulty faced by Iraqi EFL learners, however, may be explained by the Perceptual Magnet Effect proposed by Kuhl et al. (1992) where the vowel /ɛ/ may be treated as a non-prototypical form of the vowel /ɪ/. As English vowels are closer to one another with regard to their phonetic distance, this creates extra perceptual and articulatory challenges for EFL/ESL learners.

### **Vowel Categories Found only in the L2**

The second group of monophthongs that were predicted to pose little difficulty are those that are found in the L2 but not in the L1. These include central vowels such as /ʌ/, /ə/ and /ɜ:/. The results show that the prediction was borne out with /ə/, as it recorded the lowest error percentage in all groups. However, very high error percentage was found for /ʌ/, and there appeared to be an influence of experience on the perception of /ɜ:/. Error percentages were considerably lower as the level of proficiency of the participants increased. The findings suggest that Iraqi EFL learners were probably able to establish a new vowel category for /ɜ:/. However, the vowel /ʌ/ is found in a crowded vowel space where two other IA vowels (/a/ and /a:/) are present and are considered counterparts of the English low-back vowel /ɑ:/. Hence, this vowel could have been easily confused with the low vowels in English. RP English has four low vowels: one front, one central and two back whereas IA has only two. The results from the error analysis shown in Table 2 also support this further as the vowel /ʌ/ was often confused with /æ/ and /ɑ:/ while /æ/ was often confused with /ɒ/ and /ʌ/.

### **L2 Vowels that are Similar to L1 Vowels**

English monophthongs that were expected to be difficult for Iraqi EFL learners were those that were similar to vowels in Iraqi Arabic. These vowels include /ɔ:/, /ɑ:/ and /ɛ/. Participants were found to have the most difficulty in the perception of /ɒ/, a result which goes in line with SLM's postulation about perception of vowels that are considered similar between the L1 and L2. The vowel /ɒ/ is half close in IA but open in RP. The two vowels are neither entirely

dissimilar nor matching, but similar. As stated by SLM, both L1 and L2 sounds co-occur within a single phonological space and L1 sounds filter L2 sounds. Equivalence classification mechanism allocates a new category to a new L2 sound, but fails to do so for a similar sound which is commonly categorised as some L1 vowel (Flege, 1987; Flege, 1995). Similarly, the vowel /ɔ:/ was found in both IA and RP English, but the vowel space occupied by these vowels are different. In RP, this vowel is open, but it is only produced with the mouth half open in IA. Consequently, problems in perception are anticipated and explained within SLM as well. Temporal cues alone did not aid learners to perceive the vowel /ɔ:/ which is also a tense vowel. The results showed that /ɔ:/ was the only long tense vowel found to be difficult. There are two other tense vowels, /ɑ:/ and /ɜ:/, in this study which were found to be comparatively accurately perceived. In terms of difficulty, these two vowels ranked low at 10 and 8 respectively as shown in Table 1. This result also indicated learners' heavy employment of durational cues which enabled them to discriminate tense English vowels which are not exactly matched in their L1 (Munro, 1993; Alzahrani, 2014).

### Learners' Perception Assimilation Patterns

Single and bi-directional confusion relations detected and tabulated in Table 2 showed that three L2 vowels were assimilated to one L1 vowel. The vowels /ʌ/, /ə/ and /ɛ/ were assimilated to the vowel /æ/. The three L2 vowels /ʌ/, /ə/ and /ɛ/ are low central, mid central and mid front respectively. Because all three vowels are not long, they occupy the same space that is already occupied by the IA low vowel /a/ which is low central. More specifically, the position of /a/ in the L1 vowel space is exactly the same as that of the L2 vowel /ʌ/, and somehow close to the English vowels /ə/ and /ɛ/. As stated by Best and Tyler (2007), the ability of a language learner to establish new phonological categories is based, in part, on the perceived similarities and differences of the L1 and L2 sounds; specifically how the tokens of an L2 contrast assimilate onto L1 segments. The perceived similarity between these L2 vowels and the L1 /a/ is large enough to cause confusion. In addition to the fact that mid-central vowels do not exist in IA, they either share all or some phonetic features with the L1 /a/. This result can be accounted for through PAM-L2 which postulates that the L1 and L2 sound systems interact on both the phonetic and phonological levels (Best & Tyler 2007; Antoniou, Best, Tyler & Kroos, 2010). It also supported the assumption that adult learners perceptually categorize L2 vowels according to the closest first language L1 vowels (Flege, Frieda & Nozawa, 1997). Butcher (1976), cited in Bohn and Flege (1997) indicated that English vowels are acoustically close to each other in the low-front area of the vowel space where the English vowels /ɛ/ and /æ/ lie. It is worth noting that the vowel /ə/ was mostly perceived correctly and the vowel /ɛ/ was perceived with medium difficulty, while the vowel /ʌ/ was often confused with /æ/, /ɒ/ or /ɑ:/. This means that Iraqi learners may have established a new category for the /ə/ and /ɛ/, but were still unable to assign the vowel /ʌ/ a separate category. L1 transfer can effectively predict the difficulties encountered in the perception of these vowels.

The L2 lax-tense contrast /ɪ-/i:/ is well established as confusion between the two vowels was not found. Perhaps, this is due to the fact that these vowels are both found in the L1 phonological system and they are phonetically similar as well. The tense-lax distinction in L2 could be perceived by IA learners as long-short distinction. However, both vowels, especially the lax one, tend to be perceived as the L2 vowel /ɛ/. The two IA vowels /ɪ-/i:/ and the L2 /ɛ/ share the feature of being front. Difficulty encountered in the categorization of /i:/

was very limited compared to /ɪ/. The confusion matrix also showed that Iraqi EFL learners had more difficulty with lax vowels. Durational cues heavily employed by non-native listeners enable them to discriminate tense vowels, but contrast between different lax vowels which depend on finer spectral differences appear to be more challenging.

Another confusion was found between the tense-lax contrast /ɒ/ and /ɔ:/, which was the only lax-tense contrast which was difficult to perceive. This distinction is found in IA, yet it is based on length rather than quality. These two vowels are so close to each other in the vowel space of L1 with perceived difference not big enough for accurate discrimination, yet, they are spread far away from each other in the L2 vowel space. The Arabic /o/ is closer to the English /ɔ:/, hence this may explain the confusion caused in discriminating English /ɒ/ and /ɔ:/. Moreover, these two vowels were closer to each other in the stimuli vowel space (see Figure 2). Another possible reason for this result could be related to target and task variables rather than L1 influence. Bohn and Flege (1997) refer to the interaction between subject variables and other clusters of variables in a complicated way in experiments concerned with cross-language speech perception. Familiarity of words could affect participants' choice in the perception test as learners may have a preference for familiar words as the answer when faced with an unfamiliar word.

Predictions provided by PAM-L2 and SLM, which are based on the phonetic distance among vowels in the vowel spaces of the two languages being examined, were unable to account for some difficulties encountered in the perception of /u:/ and /ɔ:/. The vowel /u:/ was perceived as /ʌ/, which is not existent in the phonemic inventory of the L1. Such a confusion is not supposed to happen as the vowel /u:/ was not perceived as one of its adjacent or close vowels in the vowel space. Moreover, the distance between these vowels should have made discriminating them much easier. The same is true with the confusion between /ɔ:/ and /ɜ:/ which are back and central vowels respectively. The distance between /ɔ:/ in the L2 and /e:/, which is similar to /ɜ:/, in the L1 is even bigger. The perceived similarity and difference between each pair of these vowels would have made their categorization easier and confusing them for one another less likely; however this was not the case in our data.

### **Proficiency Level Impact on Vowel Perception**

Generally, the perception test results revealed significant differences among the four groups. The group with the lowest proficiency level, A2, was significantly different from the other groups in terms of the vowels /u:/, /ɛ/, /i:/, /ɔ:/ and /ɜ:/. The elementary group (A2) also statistically differed from B1 and C1, but not from B2, in terms of their perception of the vowels /ɑ:/, /ɪ/ and /ʌ/. These results indicated significant influence of proficiency level on the perception skills of the participants. This finding supports Flege's (1995) idea that perceptual ability continues to develop over a lifetime. Moreover, Best (1995) remarks that, within the scope of the Direct Realist Theory, additional exposure to the L2 towards adulthood increases the possibility of category modification and reallocation. Hence, the capacity to allocate an L2 sound a discrete category can progress with more exposure to the L2. The vowels mentioned above can be better perceived with more learning and training; therefore, teachers can identify more specific teaching materials and methods to improve performance of EFL learners. However, proficiency effects were not present for two categories of low vowels: /ɒ/ and /æ/. Both numerical and statistical analyses showed no significant differences

among the four groups in the perception of these vowels. SLM and PAM, both fell short in accounting for the performance, as proficiency effects on learners' perception abilities did not have the same impact on the perception of all vowels.

Significant differences in the perception of two vowels, /ə/ and /u/, were only found between two groups: A2 and B2. This means that proficiency effects are no longer active for these vowels when learners reach a certain level of proficiency in the L2. This can be explained by L1 influence and by the phonetic distance between these vowels within the L2 vowel space. Another possible explanation is fossilized errors in pronunciation learners obtained from their non-native English teachers. The similarities in the patterns of perception errors across groups refer to the high probability that the exposure learners had to L2 does not result in improving their perceptual abilities for some vowel categories, despite the fact that their performance in other skills is improving based on the results of the general proficiency test conducted in this study.

### **General Conclusions and Future Research**

The examination of the perception test results revealed that Iraqi EFL learners of English with different levels of proficiency faced substantial problems in the perception of several vowels. High levels of accuracy was only attained in the perception of the schwa and by the group with the highest level of proficiency in English. Conversely, the vowel /b/ was the most difficult regardless of their proficiency level in English. Patterns of errors made by learners indicated considerable similarities among the four groups. Learners behaved in very similar ways in terms of the vowels perceived instead of the targeted ones. Bi-directional misperception relations were also identified for all groups, which refer to a systematic perceptual behavior shown by learners at the four levels of proficiency.

Statistical analysis conducted in this study indicated an overall significant difference in the analysis of variance of the performance of the four groups of learners in the perception task based on their level of proficiency in English. It can be concluded that more experience in the L2 may improve perceptual ability. Yet, pairwise tests revealed that a significant difference was found only between the elementary group (A2) and the other three high proficiency groups. For some vowels, for example /b/, was equally difficult for all groups of learners. It can be concluded that the perception of certain L2 segments may not improve in accordance to increase in general proficiency in the L2.

The assumption that L1 influence is the main predictor of difficulties encountered by EFL learners in the perception of L2 segments was partially supported in the present study. The perception of the vowels /ɪ/, /ʊ/, /b/, /ʌ/ and /æ/ was not accounted for under SLM; yet, the levels of difficulty in the perception of the vowels /i:/, /u:/, /ə/, /ɜ:/, /ɔ:/, /ɑ:/ and /ɛ/ were accounted for under SLM with a reasonable degree of accuracy. The conclusion that the perception of some vowels was beyond the framework of the SLM could be ascribed to limitations in the nature of the task used to measure learners' perception in this study.

This perception task was concerned with identifying words that carry certain vowels. However, learners' choices could be directed by their lexical awareness which might lead to identifications which are not necessarily founded on phonetic awareness. According to Darcy and Krüger (2012), bilinguals may have set the contrasts lexically first, without having

generalized the difference to an abstract category. This suggests the need for an assimilation task, for instance, to be conducted to verify the results found in this study. Assimilation patterns are usually identified via an assimilation task; however, tentative conclusions were made on the basis of an identification task in this study. These non-native contrasts can be further investigated in an assimilation task designed to examine specific pairs of vowels. Specific single and bi-directional perceptual confusions identified in this study can also be further investigated by researchers in tasks designed for the identification and assimilation of these confusions in contrastive pairs. Orthography, which is very transparent in Arabic except for short vowels, may have played a role in making certain items in the test more difficult than it should be. A study which examines the effect of spelling on learners' perception abilities is also recommended. Future studies on English vowel perception by Iraqi EFL learners may include instrumental analysis which consider both vowel duration and spectral qualities of IA vowels and English vowels produced by the Iraqi ESL learners in order to measure the perceptual similarity between RP English and IA vowels. This may increase the predictive power of the analysis.

## REFERENCES

- Al-Ani, SH. 1970. *Arabic phonology: An acoustical and physiological investigation*. Paris: The Hague.
- Al-Bazi, MP. 2006. *Iraqi dialect versus standard Arabic*. United States: Medius Corporation.
- Alghamdi, M. M. 1998. A spectrographic analysis of Arabic vowels: A cross-dialect study. *Journal of King Saud University*, 10(1), 3-24.
- Ali, E. M. T. 2013. Pronunciation problems: Acoustic analysis of the English vowels produced by Sudanese learners of English. *International Journal of English and Literature*, 4(10), 495-507.
- Almbark, R. 2008. *The perception and production of SSBE vowels by Syrian Arabic learners: The foreign language model* (Unpublished PhD Thesis). University of York, UK.
- Alotaibi, Y. A. & Hussain, A. 2010. Comparative analysis of Arabic vowels using formants and an automatic speech recognition system. *International Journal of Signal Processing, Image Processing and Pattern Recognition*, 3 (2), 11-22.
- Al-Tamimi, J. 2007. *Static and dynamic cues in vowel production: A cross dialectal study in Jordanian and Moroccan Arabic*. Paper presented at 16th International Congress of Phonetic Sciences (ICPhS), Saarbrücken, Germany. Paper retrieved from [www.ddl.ish-lyon.cnrs.fr/fulltext/al.../al-tamimi\\_2007\\_icphs\\_draft.pdf](http://www.ddl.ish-lyon.cnrs.fr/fulltext/al.../al-tamimi_2007_icphs_draft.pdf)
- Alzahrani, D. S. M. 2014. *The acquisition of tense/lax distinction by Arabic speakers learning English as a second language*. United States: Ann Arbor.



- Antoniou, M., Best, C. T., Tyler, M. D. & Kroos, C. 2010. Language context elicits native-like stop voicing in early bilinguals' productions in both L1 and L2. *Journal of Phonetics*, 38(4), 640-653.
- Asfoor, M. A. 1982. *Difficulties English speakers encounter in Arabic phonology* (Unpublished PhD Thesis). The University of San Francisco, United States.
- Best, C. T. 1994. A direct realist view of cross-language speech perception. *Speech perception and linguistic experience: Issues in cross-language research*, 171-204.
- Best, C. T. 1995. Learning to perceive the sound pattern of English. *Advances in Infancy Research*, 9, 217-217.
- Best, C. T. & Tyler, M. D. 2007. Nonnative and second-language speech perception: Commonalities and complementarities. In Munro, MJ & Bohn, OS (Eds.), *The Role of Language experience in speech learning* (pp.13-34). Amsterdam: John Benjamins.
- Boersma, P. & Weenink, D. 2009. *Praat: Doing phonetics by computer (Version 5.1.19)* [Computer program]. Retrieved from <http://www.praat.org/>
- Bohn, O. S. & Flege, J. E. 1990. Interlingual identification and the role of foreign language experience in L2 vowel perception. *Applied Psycholinguistics*, 11(3), 303-328.
- Bohn, O. S. & Flege, J. E. 1997. Perception and production of a new vowel category by adult second language learners. In J. Leather, & A. James (Eds.), *Second language speech: structure and process* (pp.53-74). Berlin: Mouton de Gruyter.
- Chomsky, N. & Halle, M. 1968. *The sound pattern of English*. New York & Evanston & London: Harper & Row.
- Council of Europe. 2001. Common European Framework of Reference for Languages: Learning, Teaching, Assessment. Retrieved from [http://www.coe.int/t/dg4/linguistic/Source/Framework\\_EN.pdf](http://www.coe.int/t/dg4/linguistic/Source/Framework_EN.pdf)
- Darcy, I. & Krüger, F. 2012. Vowel perception and production in Turkish children acquiring L2 German. *Journal of Phonetics*, 40(4), 568-581.
- Davenport, M. & Hannahs, S. J. 2010. *Introducing phonetics and phonology*. New York: Hodder Arnold.
- Erwin, W. M. 2004. *A short reference grammar of Iraqi Arabic*. United States: Georgetown University Press.
- Flege, J. E. 1986. The production of "new" and "similar" phones in a foreign language: Evidence for the effect of equivalence classification. *Journal of Phonetics*, 15(1), 47-65.

- Flege, J. E. 1995. Second language speech learning: Theory, findings, and problems. In Winifred Strange (Ed.), *Speech perception and linguistic experience: Issues in cross-language research* (pp.233-277). Timonium, MD: York Press.
- Flege, J. E. & Port, R. 1981. Cross-language phonetic interference: Arabic to English. *Language and Speech*, 24(2), 125-146.
- Gimson, A. C. 1989. An introduction to the pronunciation of English. (Revised by S. Ramsaran). *London: Edward Arnold*.
- Hillenbrand, J., Getty, L. A., Clark, M. J. & Wheeler, K. 1995. Acoustic characteristics of American English vowels. *The Journal of the Acoustical Society of America*, 97(5), 3099-111.
- Hubais, A., & Pillai, S. 2010. An instrumental analysis of English vowels produced by Omanis. *Journal of Modern Languages*, 20, 1-18.
- Joseph, M. & Odisho, E. 2005. *Techniques of teaching comparative pronunciation in Arabic and English*. Piscataway, NJ: Gorgias Press LLC.
- Kopczynski, A. & Meliani, R. 1993. The vowels of Arabic and English. *Papers and Studies in Contrastive Linguistics*, 27, 183-192.
- Kuhl, P. K., Williams, K. A., Lacerda, F., Stevens, K. N. & Lindblom, B. 1992. Linguistic experience alters phonetic perception in infants by 6 months age. *Science*, 255(5044), 606-608.
- Labov, W., Ash, S., Baranowski, M., Nagy, N., Ravindranath, M. & Weldon, T. 2006. Listeners' sensitivity to the frequency of sociolinguistic variables. *University of Pennsylvania Working Papers in Linguistics*, 12(2), 105-129.
- Lai, Y. 2008. Acoustic realization and perception of English lexical stress by Mandarin learners (Unpublished PhD Thesis). University of Kansas, USA.
- Mitleb, F. 1981. Timing of English vowels spoken with an Arabic accent. *Research in Phonetics*, 2, 193-226.
- Munro, M. J. 1993. Productions of English vowels by native speakers of Arabic: Acoustic measurements and accentedness ratings. *Language and Speech*, 36(1), 39-66.
- Nikolova, A. 2010. L1 interference in the perception and production of English vowels by Arabic speakers (Unpublished PhD Thesis). Alliant International University. San Diego, USA.
- O'Connor, J. D. 1980. *Better English pronunciation*. Cambridge: Cambridge University Press.
- Ogden, R. 2009. *An introduction to English phonetics*. Edinburgh: Edinburgh University Press.

- Peirce, J. W. 2007. PsychoPy-Psychophysics software in Python. *Journal of Neuroscience Methods*, 162(1-2), 8-13.
- Rauber A. S, Escudero P, Bion R. A. H., & Baptista, B. O. 2005. The interrelation between the perception and production of English vowels by native speakers of Brazilian Portuguese. *Interspeech*, 2913-2916.
- Roach, P. 2004. British English: Received Pronunciation. *Journal of the International Phonetic Association*, 34, 239-245.
- Roach, P. 2009. *English Phonetics and Phonology*. Cambridge: Cambridge University Press.
- Swan, M. 2001. *Learner English: A teacher's guide to interference and other problems*. Cambridge: Cambridge University Press.
- UCLES 2001. *Quick Placement Test: Version 2 by Oxford University Press and University of Cambridge Local Examinations Syndicate*.
- Watt, D. 2002. I don't speak with a Geordie accent, I speak, like, the Northern accent: contact-induced levelling in the Tyneside vowel system. *Journal of Sociolinguistics*, 6(1), 44-63.
- Williams, D. & Escudero, P. 2014. Influences of listeners' native and other dialects on cross-language vowel perception. *Frontiers in Psychology*, 5 (1065), 1-10.