

How Are British English Vowels Perceived? Evidence from Yemeni EFL Learners

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Abstract

The current study examines the perception of the British English (BE) vowels by Yemeni EFL undergraduate learners. Specifically, all the BE vowels (except schwa) were investigated to explore the most misperceived English vowels by 67 EFL learners at different proficiency levels- beginners, intermediate and advanced. A perception test, which measured the learners' perception of the of BE vowels, and a questionnaire, which mainly measured participants' level of difficulty they experience in perceiving these English sounds, were used to collect data from the learners. Overall, the results revealed that the vowels of BE present a serious problem to Yemeni EFL learners as they could not identify these non-native speech sounds with high rates of correct perceptions. More specifically, it was found that lower- and higher-level learners showed similar misperception patterns of the BE vowels whereby they had the greatest difficulty in perceiving /eə/, /æ/, /e /, / v /, and /ʌ/. Generally, in addition to the learning context, the teaching aids and the perceptual training, the misperceptions of BE vowels might also be due to the closeness and similarity existing among these English vowel segments.

Keywords: perception, English vowels of British English, Yemeni EFL learners

1. Introduction

A very important stage in learning to communicate in an L2 or foreign language (FL) is to acquire its phonetic system well. Correct perception and production of the target speech sounds (e.g., English vowels) is considered the basis for clear pronunciation of words and effective speaking and listening skills that lead to effective oral communication (Ho, 2009). The identification of speech sounds, specifically vowels, is viewed as the first important phase "in the listener's task to decode the incoming speech signal into a meaningful representation of the speaker's intended message", and this phase might be "more difficult when the listeners come from a different language background" (e.g., Arab EFL learners) (Yang, 2006, p. 7). Consequently, inability to distinguish or discriminate speech sounds, particularly vowels, will decrease speech intelligibility and may lead to confusion or misperception, causing communication breakdown (Ho, 2009; Perkell et al., 2004). For instance, "if a non-native speaker, when looking at a work of art, comments: 'I like his use of callers', callers is likely to be interpreted as colours". By contrast, "if a similar expression was offered in the context of selecting a shirt ('I don't like the caller' where caller might be interpreted as either colour or collar" (Tench, 2003, p.148), then a communication breakdown might occur (Tench, 2003).

Vowels are the most difficult sounds for language learners to produce (Geoffrey et al., 2016 & Nikolova-Simic, 2010), particularly for EFL learners (Wang, 2008). The difficulty to pronounce non-native speech sounds correctly (e.g., English speech sounds as non-native speech sounds to Arab EFL learners) might be attributed to an inability to recognize these speech sounds (Evans & Alshangiti, 2018; Flege et al., 1997; Flege et al., 1999; Flege, 1999). In fact, speech without perceiving sounds accurately, particularly vowels, "will lower its intelligibility and comprehensibility and interfere with successful communication" (Ho, 2009, p. 2). For example, recognizing *coat* as *caught*, *sit* as *set*, *saw* as *so*, or *cut* as *cot*, etc., might cause confusion and impede the meaning being conveyed (Tajeldin Ali, 2013).

Apparently, vowels of English, particularly the vowels of British English (BE), might be problematic to acquire by Yemeni EFL learners when learning English as an FL. It has been observed by the researchers that many Yemeni EFL learners studying English, particularly at university beginning levels, find it difficult to differentiate between English vowels in an accurate manner. This difficulty might refer to the rich inventory vowel system of BE which seems difficult to master by EFL learners whose L1 has fewer vowels, i.e., BE has twenty vowels, whereas Arabic as learners' L1 has only six vowels (Nikolova-Simic, 2010). The difficulty may also be attributed to the teachers of English as an FL who might not pay more attention to the way in which their learners perceive these speech sounds; they may only focus somewhat on how these vowels are produced (i.e., Learners listen and repeat) rather than on how such sounds are perceived by their learners. Additionally, EFL teachers may neglect the role of perceptual training and the practice (e.g., testing or evaluating their learners' perception accuracy of these vowels) that may help their learners acquire these vowels accurately.

The current study thus set out to examine the perception of the BE vowels by Yemeni EFL learners. The purpose of this study was to

evaluate how the vowels of BE are recognized by Yemeni undergraduate EFL learners, i.e., identifying the most problematic vowels of BE misperceived by Yemeni EFL learners. It is expected that this research provides pronunciation/phonetics teachers with a valuable knowledge about which vowel sounds they need to give their learners more time to practice and/or to train them perceptually. It is hoped that this work will add to the field of L2 speech sounds perception studies and create a bridge that leads to having different perspective regarding the perception of the BE vowels by Yemeni EFL learners.

2. Review of Literature

2.1 Vowels of British English (BE)

BE has a large number of speech sounds; it has forty-four sounds, of which twenty-four are consonants and twenty are vowels. The twenty vowels are mainly classified into two main groups: twelve pure or simple vowels and eight diphthongs (Jackson 1985; Roach, 2010). Many English phoneticians (e.g., Jackson, 1982; Kreidler, 2004; Roach, 2010) defined vowels in English in a similar way. For example, Roach (2010) defined English vowels as "sounds in which there is no obstruction to the flow of air in the mouth as it passes from the larynx to the lips" (p.10). Thus, the mouth passage is not obstructed in all vowels. Vowels, in other words, are the segments that are articulated without closing or narrowing the passage of air (Jackson, 1985; Roach, 2010). Vowels are usually described in term of three parameters, the height of the tongue, tongue backness and the lip rounding (Jackson, 1985). Thus, vowels are classified into pure vowels (short and long vowels) and diphthongs, which are discussed below.

2.1.1 Pure Vowels

Based on the general area of the mouth or the part of the tongue in which vowels are produced or made, BE pure vowels can be grouped into three types: front, central and back vowels. These vowels are called pure, monophthongs or single sounds as the speech organs do not usually change their position during articulation (Burlleigh & Skandera, 2005). Figure 2.1 below represents these three positions of the tongue (i.e., place of articulation) from which these English sounds are articulated (Roach 1999, pp. 14-16).

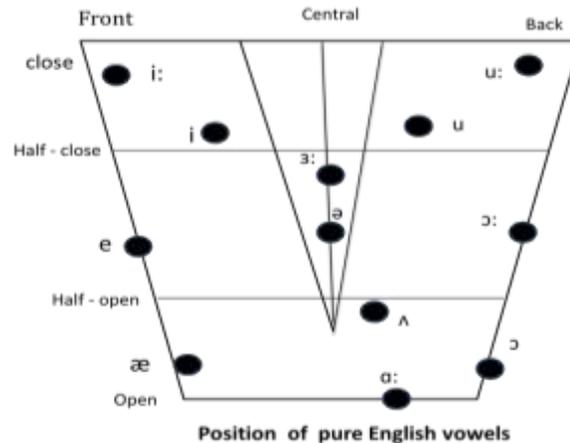


Figure 1. Place of Articulation of BE Pure Vowels

2.1.1.1 Front Vowels

At the front part of the tongue, there are four vowels of BE. These front vowels are produced with unrounded/spread lips. Two of them which are symbolized by / i: / and / ɪ / are in the close area (e.g., beat, sit). The third front vowel is commonly described as a mid-front spread vowel and it is symbolized by / e / (e.g., set). The fourth front vowel occurs in the open area, but it is not completely open, although it is described as an open front unrounded vowel; it is symbolized by / æ / (e.g., sat) (Jackson, 1985 Roach, 2010).

2.1.1.2 Central Vowels

The second group of the simple vowels refers to those vowels that are produced in the central area of the tongue. So there are three simple vowels made at the center of the tongue and they are produced with spread lips; they are also described as unrounded vowels according to the shape of the tongue. These three central vowel sounds are symbolized by / ʌ /, / ɜ: / and / ə / (e.g., up, bird, ahead).

2.1.1.3 Back Vowels

The final group of pure vowels of BE refers to back vowels. Thus, five vowels of BE could be recognized in the back area of the tongue. Four of them are not produced with spread lips (/ ʊ /, / u: /, / ɔ: / & / ɒ / or / ɔ /) and one with unrounded lips (/ ɑ: /). The vowels / ʊ / & / u: / fall in the close back area of the tongue; / u: / is a close back rounded vowel and symbolized by / u: / as in boot; similarly, / ʊ / is described as a close back and rounded vowel and symbolized by / ʊ / as in put. The third vowel of this group is the one which is represented by / ɔ: / and could be described as a mid-back rounded segment (e.g., caught). Additionally, two vowels are found in the open back part of the tongue; one of them is produced with rounded lips and the other with unrounded lips. The segment / ɔ /, the open back rounded one, might be described as an open back sound (e.g., dog). Finally, the vowel / ɑ: /, the open back unrounded segment, which tends to the central area, is not entirely back; it is represented by / ɑ: / (e.g., arm) (Roach, 2010).

A further classification of pure vowels of BE is related to the length or duration which refers to the time during which a vowel is articulated (Burleigh & Skandera, 2005). According to this feature, pure vowels of English can be divided into two contrasting groups, short vs. long vowels. The short vowels which are shorter than long vowels include /ɪ/ as in bit, /e/ as in bet, /æ/ as in bat, /ʌ/ as in but, /ʊ/ as put and /ʌ/ as in pot. On the other hand, BE long vowels include /i:/ as in beat, /ɑ:/ as in part, /u:/ as boot, /ɜ:/ as in girl and /ɔ:/ as in court (Burleigh & Skandera, 2011). Figure 2.2 below shows all the pure vowels of BE with examples taken from Roach (2010) study.

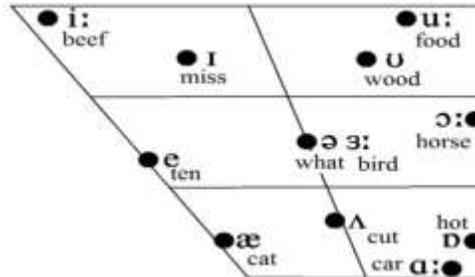


Figure 2. Examples on Pure Vowels (adapted from Roach, 1999/2010)

2.1.2 Diphthongs

Diphthongs, by contrast, are a combination of two vowels. These vowels can be defined as the "sounds that consist of a movement or glide from one vowel to another" (Roach, 1999, p. 20). In other words, unlike the pure vowels, which remain constant and do not move, diphthongs are also known as the vowel glides that are made or produced with a rapid tongue movement from one vowel position to another. Thus, diphthongs are of eight vowel sounds, they are symbolized as /aɪ/, /eɪ/, /ɔɪ/, /aʊ/, /əʊ/, /eə/, /ɪə/ and /ʊə/ (Jackson, 1985).

English diphthongs can be classified into two main groups, centering diphthongs and closing diphthongs. The centering vowel diphthongs usually move towards the central area of the tongue, namely to schwa position /ə/. There are three centering diphthongs vowels in BE. They are /eə/ as in air, /ɪə/ ear and /ʊə/ tour. On the other hand, the closing vowel diphthongs usually move towards high positions of the tongue, namely /ɪ/ and /ʊ/. BE has 5 closing vowel diphthongs; these are /aɪ/ as mine, /eɪ/ as main, /ɔɪ/ as in boil, /aʊ/ as in bout, and /əʊ/ as in boat (Burleigh & Skandera, 2011; Jackson, 1985). The simplest manner to remember diphthongs is to classify them into three categories as shown in figure 2.3 (Jackson, 1985, p. 24).

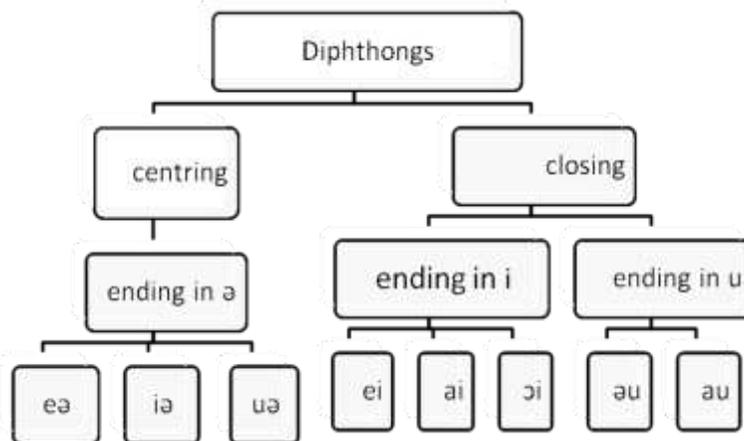


Figure 3. Classification of BE Diphthongs

2.3 Previous Research

Examining English vowels perception has been the goal of many studies conducted to find out how different L1 learners perceive English vowel sounds (e.g., Al-Homaidhi, 2015; Cenoz & Lecumberri, 1999; Escudero et al., 2012; Evans and Alshangiti, 2018; Fridland & Kendall, 2012; Ho, 2009; Hoopingarner, 2004; Hung, 2008; Iverson & Evans, (2007); Lambacher et al., 2005; Mokari & Werner, 2017; Munro, 1993; Nikolova-Simic, 2010; Nishi & Kewley, 2007; Tajeldin Ali, 2013; Yang, 2006). In general, most of the results of the above studies indicated that learners whose L1 has a large and complex vowel system (e.g., German & Norwegian) can acquire the English vowels better than those learners with a smaller and simple L1 system (e.g., French, Arabic & Spanish) (e.g., Iverson & Evans, 2007; Mokari & Werner, 2017; Nikolova-Simic, 2010). Iverson and Evans (2007) found that German learners of English were able to acquire English vowels faster than Spanish learners of English.

Previous research investigating L2/FL speech sounds perception found that the difficulty to pronounce non-native speech sounds (e.g., English vowels to Italian, Spanish or Arab learners) accurately might be related to an inability to discriminate such speech sounds (e.g.,

Flege et al., 1997; Flege et al., 1999; Fu, 2010; Hung, 2008). This means that accurate production of speech sounds, particularly vowels, mainly depends on accurate perception of these sounds (Perkell et al., 2004). For example, if the sounds of two languages (i.e., L1 & L2) are different, learners might not perceive the differences and therefore produce the sound of L2 incorrectly due to their inability to perceive these differences between the two sounds (Nikolova-Simic, 2010). So the more precisely a learner distinguishes a vowel contrast, the more accurately he or she produces that contrast (Perkell et al., 2004). For adults or children learning an FL or L2 after the critical period, the most suitable age of learning L2 or FL ranging from six to twelve years (Lenneberg, 1967), some researchers indicated that it seems difficult to achieve a native-speaker's level of perception and production accuracy of L2 speech sounds.)

Although previous research has offered some insights into the perception of English vowels by EFL learners, it is obvious that most of the past studies mostly concentrated on examining the perception of American English (AE) vowels rather than the BE vowels which is more comprehensive than the American English ones (e.g., Ho, 2009; Nikolova-Simic, 2010; Nishi & Kewley, 2008; Strange et al., 1998; Tsukada et al., 2005). Additionally, the participants of the studies mentioned above were often ESL learners rather than EFL ones. Further, most of these studies did not investigate all the vowels of English. Instead, they focused on examining some specific English segments such as vowel contrasts or vowel pairs (e.g., Fabra, 2012; Perkell et al., 2004; Yang, 2006), front vowels (e.g., Escudero et al., 2012; Ho, 2009; Lambacher et al., 2005) or pure vowels (e.g., Strange et al., 1998; Tsukada et al., 2005). Markovic's (2009) study, for example, examined the perception and production accuracy of only two English vowels / e / & / æ / by Serbian ESL learners. Such previous investigations may not give a complete picture of how such types of English speech sounds are acquired by EFL learners, particularly by Yemeni EFL learners.

The current investigation, therefore, is different from the previous studies in terms of the types and number of English vowel sounds that were examined (i.e. all the vowels of BE rather than AE ones; all the vowels rather than only some specific sounds as front, low or vowel contrasts), context and the type of participants (i.e., EFL learners of Arabic background rather than ESL or EFL learners of different L1 backgrounds). Accordingly, it seems, according to the reviewed literature, that no previous studies have investigated how BE vowels are perceived by Yemeni EFL learners across English proficiency levels (beginners, intermediate and advanced learners). In light of this lack in literature, our focus is to test the perception of the BE vowels by these Arabic-speaking learners in order to find out how these English sounds are perceived and to compare how different and similar they are in their performance based on their proficiency levels. Therefore, this study attempts to fill in this gap in literature, answering the following research questions:

1. Which vowels of BE are the most difficult for Yemeni undergraduate EFL learners to perceive?
2. Does the proficiency level affect the learners' perception of the BE vowels? In other words, Are the same vowels mis/perceived by beginning, intermediate and advanced learners?

3. Methodology

3.1 Participants

The participants of this study were Sixty-seven Yemeni EFL learners (mean age: 22.47; 20 – 26 years old), whose native language is Arabic. All of them were selected from the College of Languages, Amran University, in Yemen. They were selected through convenience sampling from various university English levels: level 3, 4, 5, 6, 7 and 8 in the academic year 2021/2022. Students of the beginning levels 1 and 2 were not chosen to participate in the present study because they were considered fresh learners of English at the time of the study; it was also found that the vowel perception test was beyond their proficiency level of English. However, the university English level of participants was not considered for the purpose of this study because sometimes university English levels might not reflect their actual proficiency level. Therefore, to subject all the participants to the same criterion, the Michigan English test (MET) was used as an English proficiency test.

Learners, based on their performance on the MET test, were grouped into three proficiency levels (Beginners; n=26, Intermediate; n=25 and Advance; n=17). Specifically, as Table1 shows, the participants who scored 0 to 39 marks (equals 0-49%) were classified as beginners; the participants who scored 40 to 63 marks (equals 50%-79%) were grouped as intermediate learners, and the participants who scored 64 to 80 marks (equals 80%-100%) were categorized as advanced learners.

Table 1. Distribution of the participants across the proficiency levels

Participants' Prof. levels	Beginners	Intermediate	Advanced	Total	
No. of participants	26	25	16	67	100%
MET cut scores	0-39 (0-49%)	40-63 (50-79%)	64-80 (80-100%)		

The mean length of English instruction learners received was 8.67 years for all participants ranging from 4 to 15 years (8 years for beginners ranging from 7 to11 years, 8.39 years for intermediate learners ranging from 4 to 12 years, and 9.69 years for advanced learners ranging from 7 to 15 years). Furthermore, all the participants reported no hearing difficulty.

3.2 Instruments and Procedures

To address the research questions, two instruments were employed to collect data from the participants: a questionnaire and an English vowel perception test. The questionnaire was used to elicit personal background information. Additionally, it included other items related to learning and teaching English language as an FL (e.g., the number of English listening and speaking courses, the number of phonetics

courses the participants studied and the level to which teachers use aids when teaching English vowels). Furthermore, participants were asked in the questionnaire to state the extent to which English teachers in Yemen use vowel perception techniques in the classrooms when teaching English vowels, e.g., perceptual training (see Appendix A).

The second data collection instrument was the vowel perception whose purpose was to find out to what extent the participants at the three proficiency levels could identify the vowels of BE and to measure their ability in perceiving such segments. It included 57 multiple choice questions with four options for each question. So, it consisted of 228 words (4 choices/words x 57 questions = 228). There was only one correct answer, i.e., the participants choose only the word they hear. Each target vowel of BE appeared three times often in medial positions in monosyllabic words, i.e., the vowels were mostly embodied in a /CVC/ context. This means that there were three stimulus words on each vowel the participants heard and identified on the test (i.e., 19 English vowels x 3 words = 57 words, schwa was not included as it cannot be used in isolation) (See Appendix B). These three stimulus words were randomly organized and typed on the perception test handout as they are similar in the vowels they contain. The items below are examples of the vowel perception test (the underlined words included the target sounds).

- | | | | | |
|----|---------------|---------------|----------------|----------------|
| 1. | a. <u>bit</u> | b. bet | c. beat | d. bate |
| 2. | a. bet | b. bate | c. bit | d. <u>beat</u> |
| 3. | a. <u>pat</u> | b. pet | c. part | d. putt |
| 4. | a. beat | b. <u>bat</u> | c. bit | d. bet |
| 5. | a. meal | b. mill | c. <u>male</u> | d. mile |

The perception test underwent two main phases. The first phase was concerned with the audio recording of the stimulus words used in the vowel perception test. In this phase, a British English native speaker was invited and given a handout containing 57 monosyllabic words, and then he was asked to read these words in a natural speech rate and style (not too fast, not too slow). The role of the researchers in this phase was to record these words produced by the native English speaker in a quiet study room using Sony Stereo IC recorder (ICD-UX560F) of high sensitivity and low noise S-mic System. The recordings of the stimulus words the participants listened to and identified at a later stage were transferred from the Sony Stereo IC recorder into a lab computer and USB device in order to be used easily. The recording was about six minutes long. There were a few steps for each question. The speaker said the corresponding number and left a pause of 5 seconds in order for the participants to look at the four choices of each question. Then, the word was pronounced by the native speaker and the participants circled the answer on their perception test answer sheet. After the word was pronounced by the native speaker, there was also a pause of 5 seconds after which the second number of second question was said.

3.2.1 Validity and Reliability of the Instruments

The questionnaire's most items of it were adapted from the previous literature including some modifications to meet the purpose of the study (e.g., Jung, 2016; Levey & Cruz, 2004; Tajeldin Ali, 2011). Since few items were added by the researchers, three experts were consulted to review this instrument and give judgments about the whole questionnaire as well as the vowel perception test which is described below. Then necessary amendments were made.

Concerning the validity of the perception test, most of the test items were also adapted from Evans and Alshangiti (2018), Ho (2009), Hung (2008), Munro et al. (2013), Murno and Derwing (2008), Nikolova-Simic (2010), Tajeldin Ali (2011) and Tench (2003). Because some of the test items were modified to meet the objective of the present study, all the test items were given to three experts for validation. So before starting the data collection, the vowel perception test and the questionnaire were reviewed and judged by three highly experienced English instructors. Finally, concerning the instruments consistency reliability, the results revealed that the items of the perception test and questionnaire were reliable as the values of Cronbach's Alpha were 0.7 indicating that all the instruments' items were consistent.

3.3 Data Analysis

The data collected from each instrument (the questionnaire and the vowel perception task) conducted in this study was analyzed separately. First, the data from the vowel perception task which were corrected by the researchers were entered into excel sheets, and then were transferred into the SPSS program for a statistical analysis. There were 57 questions with four possible answers A, B, C & D. Since there were three items on each vowel on the perception test, there were three ratings of the correct perceptions for each vowel of BE; these three ratings were collected and divided by three in order to find out the overall rating, mean and standard deviations of the correct identifications for each vowel. For example, when the vowel /ɒ/ is perceived correctly with percentages of 44% (as in pot), 58% (as in cot) and 66% (as in hot), the average percentage of the correct perception of the vowel /ɒ/ will be 56%. In more detail, the following procedures and steps were carried out for the vowel perception test:

- (a) Correcting participants' English vowel perception responses, (b) Assigning a score of 1 for a correct vowel perception (for a correct answer) and a score of 0 for a vowel misperception (for a wrong answer) (d) Entering all the participants' vowel perception coded responses into excel sheets for further statistical analysis using SPSS software (20.0), (e) Calculating the percentages, the overall ratings and the overall means of the correct vowel perceptions for each vowel (g) Establishing a rank order based on difficulty and ease of vowels, i.e. the vowels of BE were ranked from the most difficult vowels to perceive by the participants to the easiest ones in accordance with the ratings of the correct perception for each English vowel, (h) Determining which vowels were substituted (i.e., misperceived, confused) with which ones. For example, the vowel /ɪ/ (as in

bit) was most often confused with /e / (as in bet) and / i : / (as in beat). Moreover, One-Way ANOVA was conducted to find out the difference in English vowel perception among the participants' groups. In other words, such a statistical method was employed to determine the statistical significant differences between the learners' groups (independent variables: beginners intermediate and advanced learners) and within groups in terms of English vowel perception (the dependent variable) at the significance level of 0.05. Similarly, a Scheffe comparison test was performed to compare students' English vowel perception performance through their proficiency levels. Finally, descriptive statistics was performed to calculate the frequencies, percentages and the overall percentages of the participants' responses for each item.

4. Results

4.1 The Questionnaire

The majority of learners at all levels reported that they studied only one course of English phonetics (n = 39, 65% learners). Some advanced participants stated that they studied more than one course of English phonetics (5 advanced learners, 31.3%). It was also found that 3 learners (4.5%) have never taken any English phonetics course before.

With respect to the English listening and speaking courses taken by the participants, 21 of them (30.3%) reported having studied more than two English listening & speaking courses (three beginners [11.5%], six intermediate learners [24%], and 12 advanced learners [75.1%]). Besides, it was found that most of the participants who studied more than three listening/speaking courses were advanced learners (7 learners).

The participants were asked to state the extent to which the teaching aids like laboratories and recorders were used by their teachers when teaching English vowels. Learners who reported that their English teachers often used these teaching aids were only three (4.5%: one beginner, one intermediate and one advanced learner). Additionally, most learners (47.8%, n=32) reported that their teachers sometimes used these teaching aids. Furthermore, many participants reported that their English teachers never (or rarely) used the aforementioned aids (26.9 % & 17.9 %). These responses suggest that teaching aids such as recorders or labs are not always used by the Yemeni EFL teachers and this indicates that they do not pay adequate attention to the use of the teaching aids that may help their English learners to acquire these nonnative speech sounds more accurately.

With respect to whether Yemeni EFL teachers test their learners' vowel perception accuracy, it was found that these English teachers sometimes tested the accurate perception of these sounds to ensure that their learners could correctly identify these English segments. Around 65.7% of Yemeni EFL learners reported that their English vowel perception accuracy was sometimes tested by their teachers in the classroom. Also, 31.5% of the learners reported that their teachers *never (or rarely)* tested their English vowel perception accuracy in the classroom. Further, learners who indicated that their perception accuracy of English vowels was *often* checked in the classroom by their teachers were only two learners. These responses suggest that many English Yemeni EFL teachers do not pay adequate attention to how their English learners differentiate and distinguish between English vowels.

4.2 Learners' Overall Performance on the Vowel Perception Test

Yemeni EFL learners, as shown in Table 2, perceived the BE vowels with a total rate of 51% of the correct perception. Specifically, the mean correct perception of the English vowels was the highest by advanced learners (63%), followed by intermediate learners (50%), and the lowest by beginners (45%), indicating that the higher the participants' proficiency level, the higher the rate of their correct English vowel perception performance was and vice versa. Thus, the correct perception of English vowels increased gradually across learners' levels.

Table 2. Total Rates of the Correct Perception of the 19 BE Vowels for all Participants across Proficiency Levels

Prof. levels	Beginners (26)		Intermediate (25)		Advanced (16)		Total (67)	
	%	SD	%	SD	%	SD	%	SD
	45	0.10	50	0.11	63	0.13	51	0.12

() = number of participants

4.2.1 One-Way ANOVA and Scheffe Test

As seen in Table 3, all the results of the ANOVA test show significant differences between groups; there was a significant difference in vowel perception performance among participants' levels. More specifically, there was a significant difference among Yemeni learners across the three levels, $F(2, 64) = 16.314, P = 0.000 (< .05)$.

Table 3. One-Way ANOVA Results for the Difference among Participants' Groups

ANOVA	Sum of squares	df	Mean square	F	Sig.
Between Groups	0.328	2	0.164	16.314	0.000
Within Groups	0.644	64	0.010		
Total	0.972	66			

Table 4 below shows the results obtained from a Scheffe multiple comparison test performed to determine the significant differences among participants' proficiency levels in terms of their vowel perception performance. The results of the Scheffe test showed that there was a significant difference between the vowel perception scores of the beginning and advanced levels, $P < 0.05$. Thus, no significant difference was found in English vowel perception performance between Yemeni learners of the beginning and intermediate levels, $P > 0.05 (P = 0.155)$. There was also a significant difference between the BE vowels perception of the intermediate and the advanced learners, $P < 0.05 (P = 0.001)$.

Table 4. Scheffe Test Results for the Mean Difference among Participants' Proficiency Levels

(I) Level	(J) Level	Mean difference (I-J)	Sig.
Beginners	intermediate	-0.05503	0.155
	advanced	-0.18117*	0.000
Intermediate	beginners	0.05503	0.155
	advanced	-0.12614*	0.001
Advanced	beginners	0.18117*	0.000
	intermediate	0.12614*	0.001

4.3 Learners' Perception of the BE Vowels (Short and Long vowels, and Diphthongs)

4.3.1 Perception of Short Vowels

Table 5 below reveals that the short vowels /ɪ/ and /ʊ/, whose overall percentages of the accurate performance were over 50%, appeared to be the easiest short vowels to perceive by all levels. The total rates of the correct perception of the other short vowels were below 50% [/e/ (41.6%), /æ/ (37.9%), /ʌ/ (35.9%) and /ɒ/ (43.3%), respectively]. Thus, Yemeni learners had the greatest difficulty in perceiving the short vowels /ʌ/ and /æ/ as the rates of the correct perception for these two segments were the lowest ones (35.9% and 37.9%). Additionally, the results revealed that the English short vowels that were found difficult for the beginning or intermediate levels were also found difficult for higher levels, the short vowels /e/ /ʌ/ and /æ/ were found to be problematic in perception across the three levels.

Table 5. Correct perceptions of the short vowels

	Beginners n=26	Intermediate n=25	Advanced n=16	Total N= 67	
	%	%	%	M	SD
/ɪ/	43.6	48	58.3	50.0	.330
/e/	25.6	38.7	60.4	41.6	.321
/æ/	36	42.3	35.4	37.9	.303
/ʌ/	29.5	38.7	39.6	35.9	.245
/ɒ/	38.5	37.3	54.2	43.3	.286
/ʊ/	60.3	50.7	58.3	56.4	.280

4.3.2 Perception of Long Vowels

Table 6 shows that Yemeni learners perceived the long vowels with total percentages of 77.6% for /i:/, 52% for /ɑ:/, 54.6% for /ɜ:/, 48% for /ɔ:/ and 53% for /u:/. The long vowels /ɑ:/ and /ɔ:/ were found to be the most difficult long vowels for Yemeni to recognize. Additionally, the vowel /i:/ was found the easiest long vowel in perception for learners across the three levels.

Table 6. Correct Perceptions of the Long Vowels

	Beginners n=26	Intermediate n=25	Advanced n=16	Total n= 67	
	%	%	%	M	SD
/i:/	59.0	80.0	93.8	77.6	.286
/ɑ:/	37.2	52.0	66.7	52.0	.350
/ɜ:/	51.3	52.0	60.4	54.6	.290
/ɔ:/	38.5	49.3	56.3	48.0	.307
/u:/	48.7	52.0	58.3	53.0	.261

4.3.3 Perception of Diphthongs

Based on what has been shown in Table 7 below, it is generally noticed that English diphthongs, except /eə/, appeared less problematic in perception for all levels than many English short and long vowels such as /ʌ/, /ɔ/, /e/, /ɑ:/ & /ɪ/. Totally, Yemeni learners perceived the diphthong /eə/ and /eɪ/ with the lowest percentages of the correct perception (27.3%, 56.4%). These two vowel diphthongs were found the most problematic vowels in perception. The diphthongs /aɪ/ (66.1%) and /aʊ/ (65.9%), by contrast, appeared to be perceived easier than the other diphthongs.

Table 7. Correct Perceptions of English Diphthongs

	Beg. n=26	Int. n=25	Adv. n=16	Total N= 67	
	%	%	%	M%	SD
/eɪ/	43.6	50.7	75.0	56.4	.328
/aɪ/	55.1	56.0	87.5	66.1	.372
/ɔɪ/	50.0	72.0	70.8	64.3	.297
/aʊ/	59.0	57.3	81.3	65.9	.258
/əʊ/	47.4	50.7	75.0	57.7	.310
/eə/	21.8	22.7	37.5	27.3	.271
/ɪə/	50.0	56.0	77.1	61.0	.279
/ʊə/	56.4	57.3	45.8	53.2	.283

5. Discussion

The questions of this study centered on mis/perceptions of the BE vowels by Yemeni EFL learners and the influence of proficiency level on the learners' misperceptions of these vowels. Thus, the discussion of findings of the second question is incorporated into the interpretations of the first question. The perception test's results revealed that /eə/, /ʌ/, /ʊ/, /æ/ and /e/ were found the most difficult English vowels for all learners at the three levels to perceive. Some English vowels were found somewhat difficult to perceive, especially those vowels whose rates of the correct perception were over 50%, e.g., /ɪə/, /ɔɪ/ and /ɜ:/ for beginners, /ɑ:/, /ɜ:/ & /ɪə/ for intermediate learners and /ɔ:/, /u:/ & /ɑ:/ for advanced learners. By contrast, the least difficult English vowels which were perceived with the highest rates were /ʊ/ (60.3%), /i:/ (59%) & /aʊ/ (59%) for beginners, /i:/ (80%), /ɔɪ/ (72%) & /aʊ/ (57.3%) for intermediate learners and /i:/ (93.8%), /aɪ/ (87.5%) & /aʊ/ (81.3%) for advanced learners, respectively.

The difficulty of perceiving these English vowels by participants in the present study may be attributed to different factors. One of these factors may be related to the closeness of these vowels, i.e., the large and crowded inventory vowel system of BE. Thus, the results revealed that some vowels which were found difficult in perception were confused with one another when perceived, particularly those vowels which are close in the articulation area of the mouth, neighbors, immediate neighbors or contrasts. For example, the following vowels which appeared to be problematic in perception for participants were perceived as their immediate neighbors or neighbors, e.g., /eə/ as /ɪə/ (*fare* as *fear* and vice versa), /e/ as /ɪ/ (*set* as *sit*), /æ/ as /ʌ/ or /ɑ:/ (*pat* as *putt-part*), /ʊ/ as /ʊ, ʌ & ɔ:/ (*pot-put, cot-cut, cot-caught*) and /ʌ/ as /æ, ʊ, ɑ:/ (e.g. *hut* as *hat-heart-hot*).

Another factor may be related to the way by which these English sounds are taught. According to the data reported in the questionnaire, most participants stated that their English teachers did not usually use the aids and techniques that help them distinguish these English segments more accurately, e.g., labs, recorders, perceptual training, etc. Further, the other factors that were found to affect the acquisition of L2 speech sounds accuracy, particularly the perception of English vowels by EFL or ESL learners, include the effect of L2 experience on the acquisition of English vowels (e.g. Simon & D'helster, 2012), L1 interference and transfer (e.g. Escudero et al., 2009; Flege, Bohn & Jang, 1997; Nikolova-Simic, 2010; Udovchenko, 2016), length of residence in an English-speaking country (e.g. Baker & Trofimovich, 2006; Grenon et al., 2019), age of learning (e.g. Flege et al., 1999; Flege et al., 2003; Gordon 2008; Piske et al., 2002) and the effect of phonetic training (e.g. Alshingiti, 2015; Evans & Alshingit, 2018; Grenon et al., 2019).

To compare the vowel perception test findings obtained in this study to those findings of previous research in terms of the overall accurate performance, it was found that the vowel perception findings the present study reports are consistent with the findings of Al-Homaidhi's (2015) study, in which Saudi female EFL learners scored no more than 56.75% of the correct perception for beginners and 61.95% for advanced learners (Al-Homaidhi, 2015). They are also similar to those found in Tajelldin Ali's (2011) study; in which Sudanese learners of EFL did not overall correctly identify more than 48% of English vowels produced by a native speaker of British English.

Comparing the most difficult vowels misperceived by Yemeni EFL learners to those English vowels misperceived by ESL or EFL learners of different L1 backgrounds in the previous studies (e.g. Mandarin, Japanese, Spanish, Basque, Korean, Arabic etc.), the results of the vowel perception in this study are partially in line with some findings of previous studies as most of such studies did not investigate all the vowels of English; they only focused on examining the accuracy perception for few numbers of English vowels such as contrasting vowels, front vowels, etc. (e.g., Cenoz & Lecumberri, 1999; Gisela et al. 2006; Ho, 2009; Munro 1993; Nikolova-Simic, 2011; Nishi & Kewley, 2007; Strange et al., 1998; Tench, 2003; Yu, 2013). For example, the vowels /ʌ/ and /ʊ/ were found the most difficult vowels for Japanese learners of English to perceive (Nishi & Kewley, 2007). Other studies which tested the accuracy of English vowel perception by Japanese English learners such as Strange et al. (1998) found that the AE mid and low vowels (i.e., /æ/, /ɑ:/, /ʌ/ and /ɔ:/) were problematic for Japanese learners to recognize; these learners were found to assimilate them to their L1 vowel sounds. For Spanish and Basque learners of English, the vowels /ʊ/ and /eə/ were found to be the most difficult English vowels to perceive (Cenoz & Lecumberri, 1999). In Mokari and Weners' (2017) study, the results of the perception accuracy task indicate that Azerbaijani learners of English found it difficult to identify some English vowels. For example, the segment /ʌ/ was often misperceived as /ɑ:/ and /ʊ/, and the segment /ʊ/ was mostly misidentified as the vowels /ɑ:/ and /ʌ/. For Mandarin ESL learners, the two AE vowel pairs /ɛ - æ/ and /ʌ - a/ were found the most difficult to perceive by these learners as acquiring these English segments is affected by L1 interference or transfer and as these speech sounds do not have close counterparts in Mandarin and are close in vowel space (Gisela, et al., 2006). Moreover, Korean learners of English found it difficult to distinguish the *full* vowel /ʊ/ from the *fool* vowel /u:/; they had difficulty in discriminating /ɔ:/ as *caught* as distinct from /əʊ/, as in *coat*. The vowel /ʌ/ as in *cut, jug* was often misperceived as /ʊ/ as in *cot* and *jog* (Tench, 2003).

For Arab learners of English, the vowel contrast /æ/ vs. /ʌ/ appeared to be the most difficult for Saudi and Tunisian advanced ESL learners to perceive (Alotaibi, 2018). Saudi learners scored only 17% of correct perceptions of these two vowels, whereas Tunisian learners had 48% of correct perceptions of these two segments. As for Arab ESL learners who participated in Nikolova-Simic's (2010) study, the most perceptual errors made by these learners were with /ɔ/ and /ɛ/, i.e., they confused with the AE vowels /ɔ/ (43.29%) and /ɛ/ (40.97%). For Saudi female EFL learners, /ɑ:/ and /ʌ/ were found the most difficult to perceive (Al-Homaidhi, 2015). In Evans and Alshangiti's (2018) study, which is somewhat in line with the present study in terms of the most difficult vowels in perception, it was found that Arabic ESL learners of the higher proficiency level had the greatest difficulty in identifying the vowels /eə/ (28%), /ʊ/ (33%) & /ʌ/ (49%). The same vowels [ʊ/ (3.0%), /eə/ (18%) and /ʌ/ (31%)] were identified with the lowest rates of the correct perception by learners of the lower proficiency level. To sum up, many of English vowels which were found problematic to be perceived in the previous studies by EFL or ESL learners of L1 backgrounds were also found difficult to perceive by Yemeni EFL learners.

6. Conclusion and Limitations

The present study generally showed that Yemeni EFL learners were not able to recognize all the vowels of BE with high ratings of correct perceptions. The study found that the problematic English vowels were those vowel sounds which are close to each other or neighbors in the vowel space, it also found that perceiving some English vowels was difficult for all participants, indicating that even advanced EFL learners of long experience in English still make the same errors (misperceptions) committed by English learners of the beginning or intermediate levels. It was found that learners of the advanced level performed in vowel perception better than those learners of the lower levels (i.e., beginners and intermediate learners), reflecting that the higher the level of a learner studying English as an FL, the more accurate the vowel perception performance was; the accurate performance of English vowels increases gradually across learners' proficiency levels, i.e. learners' English vowel perception greatly improves and develops as learners' levels grow. Thus, as expected, proficiency levels affected learners' English vowel perception performance.

The present research was limited to evaluating how BE vowels were perceived by Yemeni EFL learners rather than examining the effect of the participants' different L1 backgrounds on the acquisition of these English vowel segments. The learners in this study were from various places (regions) in Yemen and the amount of dialectal experience they have might vary from one region to another. Investigating the effect of L1 requires an independent and in-depth investigation in the future research.

Additionally, a further investigation of the relationship between perception and production of the BE vowels by Yemeni EFL learners would reveal whether accurate perception of English vowels is important for the accurate production of these sounds (Flege, 1995, 1999, 2003; Perkell et al., 2004).

Declaration

We hereby declare that this paper is our own work, and it has not been submitted for publication anywhere else.

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Appendix A

Questionnaire

Please, fill in the blanks with the information required:

Note: It should be noted that all the information and data collection in this investigation will be confidential, and used only for scientific research purposes. (30 minutes)

1- Name: -----

2- Age: -----

3-Nationality: -----

4- Level: -----

5- Have you ever lived in an English speaking country? -----If yes, Where? -----For how long? -----Week(s) ----- Month(s) -----Year(s) -----

6- Have you ever studied English outside your country? -----If yes, Where? ----- For how long? -----Week(s) ----- Month(s) -----Year(s) -----

7- Have you been taught by native English speakers before? -----

If yes, Where? ----- For how long? -----

8- How many courses?----- How many teachers?-----

8-What's your native/first language (NL/L1)? -----

9-What's your parents' native/first language (NL/L1)? M:-----F:-----

10- Do your parents speak a second language (L2)?

If yes, What? M: -----F:-----

11-How old were you when you began studying/learning English?-----

12-How long have you been learning/studying English?-----

13. Is your hearing normal? Yes No

16- The number of phonetics/phonology courses you have studied until now

one two three no

17. The number of listening and speaking courses you have been taught until now

one two three more

18- To what extent do you understand spoken English?

a- weak **b-** fair **c-** good **d-** very good **e-** excellent

19- To what extent do you understand native speakers of British English?

a- weak **b-** fair **c-** good **d-** very good **e-** excellent

20- How often have you been taught vowels of British English with the use of aids such as labs, recorders etc.?

a- never **b-** rarely **c-** sometimes **d-** often **e-** always

21- To what extent do you have problems with British English vowel perception?

a- never **b-** rarely **c-** often **d-** frequently **e-** always

22-How often have your English teachers tested your British English vowel perception in the classroom?

a- never **b-** rarely **c-** sometimes **d-** often **e-** always

23-How often have your English teachers taught you English vowels with the use of perceptual training?

a- never **b-** rarely **c-** sometimes **d-** often **e-** always

Appendix B

The Stimulus Words Used in Vowel Perception Test

No	Vowel	Items produced by a native speaker	Distractors	No.	Vowel	Items produced by a native speaker	Distractors
1	/ɒ/	pot hot cot	put, putt, part hut, heart, hurt cut , coat, caught	11	/æ/	bat pat bad	but, bet, bart pet, part, putt bed, bud, bard
2	/u: /	boot pool luke	bought, bout, boat pall, pull, poll look, lock, luck	12	/aɪ /	mine mile file	mean, men, main mill, meal, male fill, feel, fail
3	/e /	set bet dead	sit, sat, seat bit, bat, beat did, dad, deed	13	/aʊ /	noun bout town.	known, noon, non boat, boot, bought tone, ton, tan
4	/ʊ /	put look full	port, pot, part lock, luke, luck fool, foal, fall	14	/ɔɪ/	boil boy soil	ball, bowl, bail buy, bay, bow soul, swell, swill
5	/eɪ /	sate male sake	seat, set, sit meal, mile, mill seek, sick, sec	15	/ɜ: /	err hurt bird	air, are, ear heart, heat, hat beard, bard, bared
6	/ɑ:/	part heart cart	pat, putt, port hut, hat, hurt cat, curt, cot	16	/eə /	air fare bare	ear, err, are fear, fur, far bur, beer, bar
7	/i:/	seat beat feel	sate, set, sit bit, bet, bate fill, fell, fail	17	/ɪə/	ear fear beer	err, air, are fare, fur, far bur, bar, bare
8	/ɔ:/	bought tall court	boot, boat, bout tool, toll, tail cot, cart, coat	18	/ʊə/	poor tour sure	power, pore, pair tower, tore, tar shower, shore, shoo
9	/ʌ /	but hut luck	bat, bet, bout hat, heart, hot lack, lock, look	19	/əʊ/	coat road known	caught, cot, cut rude, rowed, rod noun, noon, non
10	/ɪ /	sit bit till	sate, seat , set beat, bet, bate teal, tell, tail				

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