The Role of Interference, Prominence and Theory of Distinctive Features in Detecting Wrong Pronunciations of Consonants: A Case Study of Arab Learners of English

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Abstract:

The objective of this study was to examine the role of interference, prominence and the theory of distinctive features in detecting mis-pronunciations of consonants and their drawbacks at the lexical level. Female Arab learners of English incorrectly pronounced certain consonants; the errors led not only to defects in spelling but also to meanings of words. The results illustrated that a number of consonants constituted areas of difficulty. The sources of those errors were either intralingual or interlingual. The consonants pronounced incorrectly by the maximum number of learners were regarded the most prominent of all; however, the consonants pronounced wrongly by the least number of learners were counted as the least prominent and so on. The results also illustrated that any change in the correct pronunciation of any consonant meant a change of its distinctive features which led to an error in spelling and meaning of the word.

Keywords:

interference, prominence, distinctive features, consonants, errors, learners.

دور فرضيات التدخل ، والتفوق ، ونظرية السمات المميزة في كشف أخطاء نطق الصوامت : دراسة حالة متعلمات للغة الإنجليزية

ملخص

استهدفت هذا الدراسة تفحص دور فرضية التدخل والتفوق ونظرية السمات المميزة في اكتشاف الأخطاء الصوامت وسلبياتها في اللغة الإنجليزية على مستوى الكلمة . اتضح أن هناك مجموعة من الطالبات العرب اقترفن أخطاء في نطق بعض صوامت اللغة الإنجليزية والذى أدى ليس فقط إلى إفساد نطق الكلمات وإنما أيضا معانيها. أظهرت نتائج الدراسة أن بعض الصوامت اللاتي نطقت خطأ تختص فيها هذه الدراسة ويبين الباحث أن مصادر تلك الأخطاء إما بسبب تأثير اللغة الأم على تعلم اللغة الأجنبية أو بسبب عدم معرفة الطالبات بأصوات اللغة الأجنبية. كما اعتبر الباحث أن الصوت الصامت الذى نطق خطأ من قبل العدد الأكبر من الطالبات هو الأكثر تفوقاً والذي نطق خطأ من قبل العدد القليل من الطالبات هو الأقل تفوقاً أي أن هناك أصوات تتفوق على أخرى بسبب عامل تكرار الخطأ . وكما أظهرت نتائج الدراسة أيضاً أن أي تغير في نطق الصامت الصحيح يعني تغيراً في سماته المميزة وهذا يقود بالتالي إلى أخطاء في نطق ومعانى الكلمات المستعملة.

مفتاح الكلمات :

تدخل ، تفوق ، سمات مميزة ، صوامت ، أخطاء ، متعلمات .

Introduction

Phonology and phonetics are two homogeneous rivers that pour in to one side of the sea. In other words, if phonology is concerned with the abstract segments, phonetics is concerned with the actual physical articulation of such segments. A number of studies have been made in phonology in this regard with the purpose of making use of the concepts and analytical techniques of the matter to explain various facts about the articulation of segments of all languages all over the world. Thus, one might call phonetics ~~as~~ "applied phonology" (c.f. Rouch, 2000, p. 128). To study the physical attributes of segments, phoneticians proposed various distinctive features in an attempt to identify phonemes in the proper manner. This kind of research raises a number of difficulties and interesting theoretical problems in both phonology and phonetics in theoretical linguistics.

In the theoretical literature, the theory of distinctive features was propagated by Jakobson et al (1951) and Jakobson and Halle (1956) in which a number of phonetic parallels were properly discussed on an acoustic background; thus, they proposed the cavity features of (i) gravity, (ii) compactness and (iii) diffuseness to describe the primary strictures of all segments.

McCawley (1967) created a phonological mechanism called "a feature- interpretation component" in which the feature "flat" was used to explain any segment which was a part of any description. There would be different components for any language that utilized the opposition of "flatness".

Chomsky and Halle (1968) argued that the phonetic analysis was carried out from a generative perspective, which radically modified interpretations of phonetic features. The phoneticians' task is not only to identify and classify the elements in a given corpus but also to devise a system of rules that explain the phonetic changes that might take place. *They* argued that the phonological components explicated the relationship

between the surface of a sentence and the patterns of speech sounds organized in a syntagmatic relation in a language. The systematic use of sound segments encodes meaning in any spoken human language in a physical manner. It describes the way sounds function within a given language or across languages to encode meaning. The abstract unit in phonology is called a phoneme which is defined as the smallest sound that indicates differences in meaning. The various pronunciations of a phoneme are called the allophones of the same phoneme. The articulated allophones are either in free variation or in complementary distribution. They are in free variation if the choice between the different allophones is based on the speakers' choice; whereas, allophones are in complementary distribution because where one stop consonant occurs, the other does not. A phoneme is also defined as a bundle of features in the process of articulation. It may lose, gain or change some of its primary or secondary original features in this process.

Schane (1973) followed the generative approach and argued that no two segments may have identical specifications for all features. Minimally, two different segments must be opposed in value for at least one feature. He mentioned a number of distinctive features for consonants such as, consonantal, sonorant, continuant, delayed release, strident, nasal, lateral, anterior and coronal.

Lass (1985) mentioned that the Jacobson's approach was based on a relatively small set of distinctive features utilized by all languages. The features were primarily acoustic rather than articulatory. Thus, any phoneme was discussed in terms of binary oppositions, where each segment was specified by 'plus' or 'minus' for a given feature.

Clark and Yallop (1995) illustrated that distinctive features were essential to discuss segments of any language. As there were no two languages having the same shape of phonemes, the features were language specific. They proposed the features of consonantal/non-consonantal, compact/diffuse, tense/lax, voiced/voiceless, nasal/oral, discontinuous/continuant, strident/mellow, checked/unchecked, grave/ cute, flat/plain and sharp/plain for all segments.

Rouch (2000) realized that the notion of distinctive features was given a lot of attention in his time. Therefore, phonemes were studied by a combination of different features. For example, the plosive [b] is different from [d] and [g] in place of articulation; however, the plosive [t]

is different from [s], [z] and [n] in manner of articulation.

In the empirical relevant literature , Kharma and Hajjaj (1989) discovered that Arab learners were unable to differentiate between the consonants [tʃ] and [ʃ] in 'chair' and 'share', [v] and [f] in 'fast' and 'vast', [p] and [b] in 'pin' and 'bin'.

Altaha (1995) applied a study to a sample of Saudi students who started learning English at the age of (13). He found that the participants had problems in articulating the consonants that occur in pairs such as in [v] and [f] in 'van' and 'fan' and [p] and [b] in 'pat', 'bat' and [ʧ] and [ʃ] in 'chair' and 'share' .

Tushyeh (1996) found in his study that the Arab participants could not differentiate between [p] and [b] and [f] and [v] in minimal pair constructions.

Barros (2003) found that Arab learners faced difficulty in articulating the consonants [ŋ], [p], [v], [d], [l], [ʧ], [ð] and [r] whenever they occurred at the word level.

Binturki (2008) realized that the consonants [p], [v] and the alveolar approximate [ɾ] were difficult to be articulated by Saudi students.

Al- Saidat (2010) tried to analyze the English phonotactics of syllables in an attempt to find out the types of pronunciation difficulties made by a few Arab learners. Relevant to this study, we found that in the insertion of the vowel /I/ in the onset; thus, the Arab learners pronounced the words 'splash', and 'spleen' as [sIblæʃ] and [sIblIn] respectively; however, in the same environment in the coda position, the learners pronounced the word 'asked' as [a:skid]. Thus, /p/ and /t/ were problematic areas for the Arab learners.

In short, the above and other relevant theoretical views in this study will be referred to in an attempt to find other areas of difficulties that the sample of this study might encounter.

The Statement of the Problem

A change in the correct articulation of any English consonant damages not only the spelling but also the meaning of the lexical item due to a change in its distinctive features. Another aspect of the problem is that it is difficult to trace the source of errors whether they are intralingual or interlingual.

The Objectives and Questions of the Study

The objective of this study was to find which consonants constituted areas of difficulties for the Arab learners. It was an attempt to find the consonants that were more prominent than others and to trace their sources of difficulties. Also, we had to make use of the theory of distinctive features to account for the change of both spellings and meanings of words in which the errors took place. Therefore, the following questions were posited:

1- How could the researcher distinguish between prominent consonants that were made errors from those which were less prominent?

2- What was the source of error that enforce the participants to commit an error?

3- How did Chomsky and Halle's (1968) theory of distinctive features account for the changes of spellings and meanings of the words in which the error occurred?

The Significance of the Study

The researcher intended to show the significance of the assumptions of interference and prominence and the theory of distinctive features in detecting consonants that form areas of difficulties for the Arab learners who study English as a foreign language in the southern part of Jordan. This study will shed the light on the change of meaning of words that succumb to the process of wrong articulation of consonants. The theory of distinctive features confirms that if a consonant is wrongly pronounced by learners, it is meant that there has to be a change in its original features. Therefore, each English learner has to be taught in advance features of segments in order to avoid committing errors.

The Methodology

The methods used were both instrumental and theoretical in this study.

The instrument

This study took place in the academic year 2007/2008. The researcher recorded the students' readings on a computer which was equipped with a microphone and software for recording (Cowon Jet Audio). The process took place in a classroom environment with an invigilator.

The sample of the study

The study sample was randomly selected and consisted of 20 female students who were studying English at grade 9 at Taybeh Secondary School, Ma'an governate in Jordan. The participants' names are listed in appendix (I).

Data collection

The participants were asked to read a list of lexical items to serve the purpose of the study. The words were written phonetically by using Roach's (2000, p. ix- x) RP symbols in the target performance. The words used in this study are included in appendix (II).

Discussions and Results

Prominence, Interference and Statistical Analysis of Consonants

In order to understand the analysis of this section, the researcher tried to provide certain theoretical views that are very essential to give a full statistical description as well as to find the reasons behind the discrepancies between the consonants that were formed incorrectly. Thus, interlanguage and intralanguage were two significant terms that helped us to trace the source of errors since we dealt in this study with learners who learn English as a foreign language. There was enough evidence from many different grammarians devoted to studying cross-linguistic language influence to believe that there should be a distinction between the influence it has on learning different notions of the same language and the influence if has on the learning of a new language (as English in this study). The former was referred to as intralanguage influence, since the influence takes place within the same language itself; whereas the latter was called interlanguage influence, since it referred to the influence that one language had on another one. It was evident that this study paid full attention to the wrong articulation of consonants of English that took place in the learning process. Richard (1971 and 1997) argued that there could be an influence of the mother tongue on the learner's language. The types of errors that happened in this environment were referred to as intralingual. Selinker (1972) and Calvo (2006) also suggested that interlingual errors show the influence of one language on another; however, intralingual errors were those that took place within the same language itself, .i.e., either due to unawareness of the target language

rules, or due to the influence of mother tongue on the learning process of a new language. To illustrate the significance of frequency of errors, the researcher also refers to the assumption of "prominence". This assumption was made by a number of phoneticians to build up analyses on the observable properties of the flow of speech. This assumption illustrates that the major peak of prominence is represented by the nucleus of a syllable and that this nucleus is normally a vowel or a vowel like segment. Consonants will generally occur as the margins to the peaks i.e. they occur either as onsets or codas (c.f. Clark and Yallop, 1995, p. 60-61). The prominence assumption was not used in the same literal sense, i.e., to show which vowel was more prominent than the other in the same word; however, it was used to showing which consonant was more prominent than others in terms of the higher frequency it scored. Thus, we said that if a consonant scored 80% and another one scored 75%, the former was more prominent than the latter because of the number of participants who made errors with it was more than those participants who made with the latter. This section was restricted to discuss data that were relevant to answer question number 1: How did the researcher distinguish between prominent consonants that were made errors from those which were less prominent? And question number 2: What was the source of error that enforce the participants to commit an error? Table 1 below contains the segments that succumbed to change, the number of participants' incorrect performances and their percentages, the number of participants' correct performances utterances and their percentages, the learners' actual RP performances, target RP performances and the correct spelling.

Table (1) : Features change of consonants

No	Segment	No. of participants' incorrect performances and percentage	No. of participants' correct performances and percentage	Participants' performances RP	Target RP	spelling
1.	/ŋ/ - /g/	20, (100%)	0, (0%)	[fa:mIng], [bIng], [sIngər], [kIlIng]	[fa:mI ŋ], [bi:I ŋ], [sI ŋə], [kIliŋ]	farming, being, singer, killing
2.	/ θ / -/t/	1, (5%)	19, (95%)	[taʊzəndz]	[θaʊzəndz]	thousands
3.	/s/- /k/	4, (20%)	16, (80%)	[brʊdju:kId]	[brɒdju:st]	produced
4.	/ʤ/ - /d/	2, (10%)	18, (90%)	[səʊldə]	[səʊlʤə]	soldier
5.	/ʤ/ - /g/	1, (5%)	19, (95%)	[la:g]	[la: ʤ]	large
6.	/p/ - /b/	20, (100%)	0, (0%)	[dIvIlʊbId], [bi:bʊl], [bleI]	[dIveləpt], [pi:pl], [pleI]	developed, people, play
7.	/t/ - /d/	20, (100%)	0 , (0%)	[brʊdju:sId], [stʊbId]	[prɒdju:st], [stɒpt]	produced, stopped
8.	/s/ - /z/	6, (30%)	14, (70%)	[gru:bz]	[gru:pz]	groups
9.	/v/ -/f/	20, (100%)	0, (0%)	[ʊf]	[ɒv]	of
10.	/ð/ - /ϴ/	20, (100%)	0, (0%)	[beIθ]	[beIð]	bathe
11.	/ʒ/ - / ʃ/	4, (20%)	16, (80%)	[dIsIʤIn], [bleʤə],	[dIsI ʒn], [bleʒə],	decision, pleasure,
12.	/tʃ/ - /ʃ /	8, (40%)	12, (60%)	[sʌʃ], [ri:tʃ]	[sʌtʃ], [ri:ʃ]	such, reach

The table above illustrates that the velar nasal /ŋ/, in (1), was wrongly pronounced /g/ when it occurred at the coda position of the word 'farming' [fa:mIng]. It was evident that the coda structure /ng/ is impermissible in English. It permits two sorts of consonant final clusters, one being a final consonant preceded by a pre-final consonant and the other a final consonant followed by a post –final one; the pre-final consonants form a small set: [m], [n], [l] and [s] as in 'bump' [bʌmp], 'bent' [bent], 'bank' [bæŋk], 'belt' [belt] and 'ask' [a:sk]. The post final consonants form a small set: [s], [z], [t], [d] and [θ] as in the examples 'bets' [bets], 'beds' [bedz], backed' [bækt], 'bagged' [bægd] and eighth' [eItθ] (c.f. Rouch, 2000, p. 73). Thus, the cluster /ng/ was not included in the lists provided. This intralingual error occurred because the learners were unaware of the English phonotactics rules; in other words, if /n/ and /g/ occurred next to each other, they has to be pronounced as /ŋ/ and [n] and k] as /ŋk/ (c.f. Richard, 1971, 1997 and Calvo, 2005, p. 239). It was clear that 20 participants pronounced /ŋ/ incorrectly and scored the frequency of (100%). This segment was found to be difficult to pronounce in Barros (2003). In (2), the fricative /θ/ was wrongly pronounced /t/ when it occurred in the onset of the word 'thousands' [taʊzəndz]; the error happened due to intralingual reasons because the learner was unaware of the phonotactics of [t] and [h] and was supposed to be pronounced /θ/ in English. It seemed that the students had a weak background of similar phonotactics such as /ch/ and /sh/ in English. Therefore, one learner scored (5%) whereas 19 participants pronounced it correctly and scored 95%. The occurrence of this kind of error was not found in the given relevant literature. In (3), the fricative /s/ was incorrectly pronounced /k/ in the word 'produced' [brʊdju:kId]; if the past morpheme occurred, the final coda set could be [st], [kt] and [pt] but not [kd] …etc. (c.f. Rouch ,2000, p. 75). (4) participants articulated it wrongly and scored 20% while (16) participants pronounced it correctly and scored 80%. The occurrence of this error was not also found in the relevant literature. The palato-alveolar affricate /ʧ/, in (4), was wrongly pronounced /d/ in the word 'soldier' [səʊldə]; the error happened because the learners were unaware of the phonotactics of /die/ which was supposed to be pronounced /ʧ/ instead of [d]. (2) participants pronounced /ʧ/ incorrectly and scored 10%; however, 18 participants pronounced it correctly and scored the percentage of (90%). This error proved to be an

area of difficulty for the Arab learners of English in Barros (2003). However, the same phoneme /ʤ/, in (5), was pronounced /g/ in the word 'large' [la:g] whenever this sound occurred in the coda set. The error happened because the learner was unable to realize that the phonemic structure /ge/ must be pronounced /ʤ/ in English. The reason behind committing this error was intralingual since the learner was unaware of the internal English phonological rules. Only 1 participant committed this error and scored 5%; whereas, 19 participants pronounced it correctly and scored 95%. This type of error was found in Barros's (2003) work. The plosive /p/, in (6), constituted a drastic problem in the process of articulation for all the participants in this study. It was clear that 20 learners committed that error and pronounced /p/ as /b/ in the words 'developed' [dIvIlʊbId], 'people' [bi:bʊl] and 'play' [bleI] at the lexical level. The source of the error was interlingual because the learners' mother tongue (Arabic) does not have this particular phoneme and instead it has /b/. Thus, every /p/ for them is /b/ wherever it occurred in a word. All the participants committed that error and scored 100%. That error was explicated by different scholars in the literature, namely, Kharma and Hajjaj (1989), Altaha (1995), Tushyeh (1996), Barros (2003) and Binturki (2008). In (7), the plosive /t/ became /d/ in the coda position of the word 'produced' [brʊdju:sId]. It was evident that /t/ constituted a real problem to all participants who scored 100% of difficulty. The error happened because of intralingual reasons; the learners were unaware of the fact that if a voiceless fricative /s/ is followed by the past morpheme /ed/, the morphophoneme had to be pronounced /t/ but not /d/. Another reason of difficulty was that the learners did not realize that English consonants may assimilate each other. The former segment /s/ devoiced the latter /d/ in a partial progressive assimilation (c.f. Clark and Yallop, 1995, p. 88-90 and Schane, 1973, p. 68). That error was not found in the relevant literature. The fricative /s/, in (8), was wrongly pronounced /z/ in the final position of the word 'groups' [gru:bz]; if one pre final coda consonant was [b], then the plural morpheme had to be pronounced [z]. However, the error took place due to intralingual reasons; the learners could not make out if a voiceless bilabial stop [p] was followed by the plural morpheme /s/ had to be pronounced /s/ but not /z/ in that position. It was clear that 6 participants pronounced it wrongly and scored the percentage of 30%; however, 14 participants pronounced it correctly and scored 70%. That error was not also found in the relevant literature. The

fricative /v/, in (9), was wrongly pronounced /f/ in the final position of the word 'of' [ʊf]. The source of error was interlingual because the learners' mother tongue (Arabic) does not involve this kind of phoneme /v/ in its phonological system. Thus, every /v/ was pronounced /f/ anywhere. All 20 participants committed this error and scored 100%. That kind of error had already been discussed by Kharma and Hajjaj (1989), Altaha (1995), Tushyeh (1996), Barros (2003) and Binturki (2008) whenever it occurred either in minimal pairs or at the lexical level. In (10), the fricative /ð/ was wrongly pronounced / z / in the final position of the word 'bathe' [beIθ]; the error was purely intralingual due to lack of awareness of the English syntactic rules. The word 'bathe' was a verb and /the/ was supposed to be said /ð/; however, if the noun 'bath' was used, /th/ had to be pronounced /Ɵ/. The specimen showed that all the participants, i.e., 20 pronounced it wrongly and scored 100%. That error was also highlighted by Barros (2003). The fricative / ŋ /, in (11), was wrongly pronounced /ʃ/ in the medial position of the words 'decision' [dIsIʤIn] and 'pleasure' [bleʤə]. There was no doubt that the source of error was intralingual since the learners could not realize that the phonotactics /sion/ had to be pronounced /ʒ/ but not /ʃ/. (4) participants pronounced it incorrectly and scored 20% in contrast with 16 participants who spoke it wrongly and scored (80%). The error was not discussed in the relevant literature. In (12), the fricative /tʃ/ was pronounced /ʃ/ in the final position of the words 'such' [sʌʃ] and 'reach' [ri:ʃ]; we confirmed that the source of that error was also intralingual because the participants were unable to see that the phonotactics /ch/ had to be pronounced /tʃ/ but not /ʃ/. 8 participants committed this error and scored 40%; however, 12 participants pronounced it incorrectly and scored 60%. The error was explicated by Kharma and Hajjaj (1989) and Altaha (1995) in the relevant literature.

In short, the consonants that scored the highest percentages in being an area of difficulty were regarded the most prominent consonants and those that scored less were regarded less prominent and so forth. For instance, the most prominent consonants in which errors occurred were /ŋ/ in (1), /p/ in (6), / t/ in (7), /v/ in (9) and /ð/ in (10). The consonant /tʃ/ in (12) was more prominent than the consonant /s/ in (8). Also, the consonant /ʤ/ in (4) was less prominent than /s/ in (3) and /ʒ/ in (11). In conclusion, the consonants / θ / in (2) and /ʤ/ in (5) were the least prominent. The difficulty of articulation was due to intralingual

interference in (1, 2, 6, 7, 8, 9, 10, 11 and 12); however, (3, 4 and 5) took place due to interlingual reasons. Certain consonants constituted areas of difficulty and became common to the Arab learners as in (1), (4), (5), (6), (9) (10) and (12). The rest of consonants which were liable to be mispronounced and were not discussed in the relevant literature were (2, 3, 7, 8 and 11). In other words, as the Arab learners have weak background in English, almost every consonant was likely to be pronounced incorrectly.

Distinctive Features: Spelling and Meaning

Chomsky and Halle (1968) proposed that the articulated phonemes could be described in terms of features. The presence of a feature is marked by a plus sign [+] whereas the absence of a feature is marked by a minus sign [–]; these signs are placed on the left side of the feature; for example, the phoneme [n] has the phonetic feature of [+ nasal, + continuant, + anterior, + coronal, - vocalic] while [p] has the phonetic features of [- nasal, - continuant, + anterior, - coronal - voiced]. Features are defined on the basis of articulatory terms but not on acoustic basis as it was propagated by Jackobson et al (1951). The consonantal phonetic problems will be analyzed with reference to the theory of distinctive features that has (1) major class features, (2) cavity features, (3) manner of articulation features and (iv) source features (1968, p. 293-329). *Major class features* have the fundamental features of consonantal vs non-consonantal. The former is used to produce sounds with a major constriction at some point along the vocal tract. They involve liquid, nasal and non- nasal; however, the latter is used to highlight sounds without such a constriction; they include all vowels. In this type, there are the features of sonorant vs non-sonorant in which the former is used to describe sounds that allow spontaneous voicing; they involve glides, liquids and nasals whereas the latter feature is used to define sounds without spontaneous voicing; they are represented by fricative and affricate consonants. *Cavity features* are represented by coronal vs non-coronal. The former feature is used to describe sounds produced with the blade of the tongue raised from its neutral position. They involve dental, alveolar, palato-alveolar consonants; however, the latter feature is used to describe the sounds articulated with lips or with the body of the tongue in the neutral position. They are glide and uvula sounds. Secondly, cavity

features involve the features of anterior vs non-anterior; the former is used to describe sounds that are produced with an obstruction located in front of the palato-alveolar region of the mouth. They include labial, dental and alveolar segments; however, the latter feature is used to describe sounds without such an obstruction. They are represented by palato-alveolar, retroflex, palatal, velar, uvular and pharyngeal sounds. Thirdly, this group involves the features of nasal vs non-nasal in which the former is used to describe sounds that are released through the nasal cavity while the latter is used to describe sounds that go through the oral cavity. Finally, this group has the features of lateral vs non-lateral in which the former is used to describe sounds that allow the air to flow from both sides of the tongue whereas the latter feature is made to describe the sounds that do not have this quality. *Manner of articulation features* are used to describe consonants with regard to the quality of air flow. Firstly, they have the features of continuant vs non-continuant in which the former is used to describe sounds that do not have constrictions in the vocal tract and the air can go out. This category includes nasal, liquid, glide and fricative sounds; however, the latter feature is used to describe sounds that have constrictions in the same area in which the air is blocked. It involves stop and affricate segments. Secondly, this group has the features of instantaneous release vs delayed release. The former feature is used to produce sounds with a complete closure of the tract but with short release; they engulf plosives; however, the latter feature is used to produce sounds with a complete closure of the tract but with delayed release; they involve affricate. The two features then are combined to describe the respective consonant classes. Stops are characterized as [+ instantaneous - delayed release] while affricates are [-continuant; + delayed release]. *Source features* include (i) voiced vs non-voiced; it is a fundamental feature characteristic of sounds in any language since it operates on the status of the glottis. If the glottis is open, there is a spontaneous vibration; however, if the glottis is a part, there is no voicing. (ii) strident vs non-strident features are used to describe the acoustic feature of a sound. Obstruent continuants are strident while affricates are not. In short, the researcher referred to the above theoretical views to account for the consonants that were difficult to be pronounced correctly by the learners of English in this study. It was important to notice that the results were confined to the sample, data, place and time of this study. In other words, the researcher cannot generalize them to be universal.

Relevant to the question of spelling and meaning, it was noticed that there were certain phonotactics constraints with regard to the rhyme (coda) that was violated by the learners in this study. Theoretically, in many accents of English /r/ does not occur as in 'farm' [fa:m] and 'car' [ka:]. Such accents that lack /r/ in rhymes were called non-rhotic accent; they included Australian English, New Zealand, RP, South African English, most of the accents of the North of England and the Southern and Eastern accents of the United States. However, rhotic accents including General American English (GA), the accents spoken in Scotland and some accents spoken in South West of England do not lack /r/ to be covert (c.f. Carr, 1999). Such views would be referred to in our analysis in an attempt to provide enough evidence to all possibilities of spelling and meaning of words in English. The analysis provided an answer to question number 3 which said: How did Chomsky and Halle (1968) theory of distinctive features account for the change of spelling and meaning of a word? Each segment was discussed with reference to a change of features before and after being used by the participants.

In (1), the velar nasal [ŋ] was incorrectly pronounced [g] in the words 'farming' [fa:mIng], 'being' [bIng], 'singer' [sIngər] and 'killing' [kIlIng]. The velum was raised up to block the airstream from going through the nasal cavity so that [g] was produced. The segment [ŋ] had the features of [+nasal, +sonorant, + continuant] while [g] had the features of [-continuant, -sonorant, - coronal, - anterior]; the given words were incorrect insofar as the spelling and meaning were concerned. In other words, neither Standard English nor rhotic and non -rhotic accents accept such words in English insofar as the pronunciation of [g] was concerned. In (2), the fricative [ϴ] was incorrectly pronounced [t] in the word 'thousands' [taʊzəndz]. The former had the features of [+coronal, +anterior, -voice, +continuant]; however, the latter had the features of [+coronal, +anterior, -voice, -continuant]. As far as the spelling and the meaning of the word were concerned, it was obvious that the spelling was wrong because the phonotactics /th/ was supposed to be pronounced [ϴ] but not [t]. With regard to the meaning of the word [taʊzəndz], it had no meaning either as per the two given accents or the Standard English. Likewise, the fricative [s], in (3), was wrongly pronounced [k] in the word 'produced' [brʊdju:kId]. The segment [s] was having the features of [+coronal, +anterior, -voice, +continuant] while [k] had the features of [-

coronal, -anterior, -voice, -continuant]. The word 'produced' [brʊdju:kId] had lost both its meaning and spelling as well; this was due to the fact that there was no word that might allow the phonemes /b/ and /k/ to occur in such positions in English and its accents. In (4), the affricate [ʤ] was incorrectly pronounced [d] in the word 'soldier' [səʊldə]; thus, [ʤ] had the features [+delayed release, +coronal, -anterior]; however, [d] got the feature of [-delayed release, +coronal, +anterior]. Although the phoneme /r/ was changed to the schwa [ə] in the word 'soldier' [səʊldə] as in (Rouch, 2000, p. 115-117); still, the native speaker cannot make out the spelling and the meaning of the word 'soldier'; this was because [ʤ] could never be replaced by [d] in that position. In (5), [ʤ] was incorrectly pronounced [g] in the word 'large' [la:g]. The former had the features of [+delayed release, +coronal, -anterior] whereas the latter got the features of [-delayed release, -coronal, -anterior]. Though it is possible in non-rhotic accent to omit /r/, the word [la:g] is still incorrect insofar as the spelling and meaning were concerned. This was because the vowel /e/ that occurred after /g/ could not be omitted in that environment. In (6), the stop [p] was wrongly pronounced [b] in the words 'developed' [dIvIlʊbId], 'people' [bi:bʊl] and 'play' [bleI]. The segment /p/ was having the features of [+anterior, -coronal, -nasal, -voiced]; however, /b/, got the features of [+anterior, -coronal, -nasal, +voiced]. The words 'developed' [dIvIlʊbId], 'people' [bi:bʊl] and 'play' [bleI] were incorrect in both spelling and meaning. It was due to the fact that /p/ and /b/ are two different phonemes and constitute minimal pairs in English. In other words, they can never occur in a free variation environment. In (7), the stop [t] was wrongly changed into [d] in the words 'produced' [brʊdju:sId] and 'stupid' [stʊbId] . The segment [t] had the features of [+anterior, +coronal, -voice, -continuant]; however, [d] got the features of [+anterior, +coronal, -voice, -continuant]. The words 'produced' [brʊdju:sId] and 'stupid' [stʊbId] were wrong not only in spellings but also in meanings in both Standard English and its accents. In (8), the fricative [s] was incorrectly pronounced [z] in the word 'groups' [gru:bz]; the former had the features of [+coronal, +anterior, -voice, +continuant] whereas the latter got the features of [+coronal, +anterior, +voice, +continuant]. The word 'groups' [gru:bz] had lost both spelling and meaning. This was due to the fact that the phonemes [t] and [d] are two different phonemes in Standard English as well as rhotic and non- rhotic accents. In (9), the fricative [v] was incorrectly pronounced [f] in the

word ‘of’ [ʊf]. The segment [f] had the features of [-coronal, +anterior, +voice, +continuant] while [v] got the features of [-coronal, +anterior, -voice, +continuant]. The spelling of the word ‘of’ [ʊf] was wrong as per Standard English and other accents as well; this was because the phoneme [o] in ‘of’ has a weak form of stress in ‘most of all’ and written [əv]; however, if it occurs in a final position in ‘someone I’ve heard of’, it must be written [ɒv] (c.f. Rouch, 2000, p. 117) . As far as the meaning of [ʊf] is concerned, a native speaker cannot figure out its meaning because it is contrasted with ‘off’ [ɒf] in English. In (10), the fricative [ð] was wrongly pronounced [ɵ] in the word ‘bathe’ [beIθ]; the former had got the features of [+coronal, +anterior, +voice, +continuant] but the latter segment got the features of [-coronal, +anterior, -voice, +continuant]. The word ‘bathe’ [beIθ] was wrong in spelling and meaning in Standard English, rhotic and non-rhotic accents. This was due to the fact that [ð] can occur with the verb form ‘bathe’; however, [ɵ] can occur with the noun form ‘bath’. Thus, the error was syntactically motivated in that example. In (11), the fricative [ʒ] was wrongly pronounced [ʃ] in the words ‘decision’ [dIsIʤIn] and ‘pleasure’ [bleʤə] ; the features [+coronal, -anterior, +voice, +continuant] belonged to the former; whereas, the features [+coronal, -anterior, -voice, +continuant] belonged to the latter. Due to wrong articulation of the words ‘decision’ [dIsIʤIn] and ‘pleasure’ [bleʤə], they lost their spelling and meaning. They cannot be correct English words neither in Standard English nor in its accents. It was obvious that [ʒ] and [ʤ] are two different phonemes and each one belongs to a different manner of articulation; they cannot be substituted in those environments of the words. In (12), the affricate [tʃ] was incorrectly changed to [ʃ] in the words ‘such’ [sʌʃ and ‘reach’ [ri:ʃ]. The former segment had the features of [+coronal, -anterior, +delayed release, -continuant] while the latter got the features of [+coronal, -anterior, -delayed release, +continuant]. The words in question neither had correct spelling nor meaning in Standard English and its accents..

In short, the theory of distinctive features proposed by Chomsky and Halle (1968) was helpful in a number of ways. Any change in the correct articulation of any consonant meant a change in the quality of features in that consonant. The change damaged not only the spelling but also the meaning of the word as it was evident in (1-12). Thus, the features had

one to one relation with the correct spelling of the consonants. Another advantage of the theory was that it accounted not only for the place of articulation but also for the manner of articulation. This meant that there was no chance for the participants to produce wrong articulations. We conclude that although distinctive features are naturally acquired by the native speakers of English, such faults may not happen to that extent; however, for English learners, they were very difficult but they can be taught at early stages to avoid such faults to happen in the future.

Conclusion

It was evident that the consonants that were pronounced wrongly and scored the highest percentages were regarded the most prominent ones as against those that scored less than them were regarded less prominent and so forth. For instance, the most prominent consonants which were difficult to be pronounced correctly were: /ŋ/ in (1), /p/ in (6), / t/ in (7), /v/ in (9) and /ð/ in (10). Thus, the consonant /ʧ/ in (12) was more prominent than the consonant /s/ in (8). Also, the consonant /ʧ/ in (4) is less prominent than /s/ in (3) and /ʒ/ in (11). The consonants /ɵ/ in (2) and /ʧ/ in (5) were the least prominent of all the occurrences in this study. It was evident that the source of errors were: (i) intralingual reasons which were in numbers (1, 2, 6, 7, 8, 9, 10, 11 and 12); however, the errors that were committed due to interlingual reasons were in numbers (3, 4 and 5). It was also evident that certain consonants were difficult to be pronounced for most of Arab learners as in (1), (4), (5), (6) (9) and(10); however, the rest of consonants which were difficult were for the sample of this study were (2), (3), (7), (8) and (11). In other words, as Arab learners have a weak background in English, every consonant is liable to be pronounced incorrectly. The theory of distinctive features proposed by Chomsky and Halle (1968) was helpful in a number of ways. Any change in the correct articulation of any correct consonant meant a change in the quality of its features as well. The change not only damaged the spelling but also the meaning of the word as it was evident in the words (1-12). Thus, the features had one to one relation with the correct spelling of the consonant. Another advantage of the theory was that it accounted not only for the place of articulation but also for the manner of articulation. That fact meant that there was no chance to be given to the participants to produce wrong articulation. We concluded that distinctive features are to be taught at early stages to avoid such faults to happen in the future.

To sum up; the assumptions of interference and prominence and the theory of distinctive features were fit to be applied to that kind of study in analyzing errors of foreign learners. Interference assumption highlighted the source of error while prominence assumption highlighted the consonant which was more prominent in terms of difficulty. However, the theory of distinctive features made the analysis of consonants very clearly in the sense that each single change in the articulation of a consonant regardless of its position caused a defect to both spelling and meaning of the word whether in Standard English or in its relevant accents (i.e. rhotic and non- rhotic accents). Thus, if the participants were aware of such features before hand, no such errors would have been committed. The study was valid because the features were universal and yielded very precise results in dealing with articulatory errors as well as their meanings.

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Appendix I

List of participants' names of the sample.

1- Alaa' Majid
2- Alaa' Suleiman
3- Amani Khlaifat
4- Aseel Saidat
5- Aseel Yousef
6- Athari Sabbah
7- Duha Salem
8- Hadeel Mohammad
9- Haneen Atallah
10- Haya Khlaifat
11- Heba Saleh
12- Issra' Ali
13- Jumana Abdullah
14- Maram Salah
15- Maymoona Mohammad
16- Reem Rawadyeh
17- Samah Ibrahim
18- Sanaa' Khlaifat
19- Turfa Khaleel
20- Yasmeen Khaleel

Appendix II

List of words as Performed by the Participants

Learners' performances	Target performances (RP)	Spelling
[fa:rmIng]	[fa:mIŋ]	farming
[bIng]	[bi:I ŋ]	being
[sIngər]	[sI ŋ]	singer
[kIlIng]	[kIlIŋ]	killing
[taʊzəndz]	[ϴaʊzəndz]	thousands
[brʊdju:kid]	[prɒdu:st]	produced
[sɔ:ldər]	[səʊlʤə]	soldier
[la:rg]	[la: ʤ]	large

[dIvIlʊbId	[dIveləpt]	developed
[bi:bʊl]	[pi:pl]	people
brʊdju:sid]	[prɒdu:st]	produced
[stʊbId]	[stɒpt]	stopped
[gru:bz]	[gru:ps]	groups
[bleIs	[pleIsIz]	places
[bəwər]	[paʊə]	power
[bleI]	[pleI]	play

[ʊf]	[ɒv]	of
[laIf[, [lIf], [lʌv]	[lIv]	live
[bæϴ]	[beIð]	bathe
[ði:s]	[ði:z]	these
[əreIs]	[eərIəz]	areas
[æs]	[əz]	as
[dIsIʃIn]	ən]ʒ[disI	decision
[bleʃər]	ə]ʒ[ple	pleasure

[sʌʃ]	[sʌtʃ]	such
[ri:ʃ]	[ri:tʃ]	reach

[tIn]	[ten]	ten
[rId]	[red]	red
[Ind]	[end]	end
[dʊg]	[dɒg]	dog
[tʊgəðər]	[təgeðə]	together
fɔ:rmər]	[fa:məz]	farmers

[jəs]	[jes]	yes
[nIdId]	[ni:dId]	needed
[gʌn]	[gɒn]	gone
[mjʊzIk]	[mju:zIk]	music
[tInϴIs]	[tenϴs]	tenths
[tIksIts]	[teksts]	texts
[twIlfIϴs]	[twelfϴs]	twelfths
[sIblæʃ]	[splæʃ]	splash

[sIbli:n]	[spli:n]	spleen
[ka:stIl]	[ka:səl	castle
[bəwər]	[paʊəz]	powers
[sentər]	[sentə]	centre
[la:rʧər]	[la:ʧə]	larger
[sta:rtId]	[sta:tId	started
[sItIs]	[sItIz]	ceties