An Optimality-Theoretic Analysis of Some Phonological Errors Produced by Saudi Female Learners of the English Language

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ABSTRACT
Purpose. The purpose of this study was to investigate the phonological errors associated with consonant and vowel pronunciation made by Saudi learners of the English language in light of the optimality hypothesis. In addition, transfer and contrastive analysis hypotheses are discussed, which justify why Saudi English language learners make phonological errors.
Methods. Thirty Saudi female students in their first semester in the English language department at Qassim University were randomly selected. They were examined on their pronunciation of over 30 words from a list of twenty sentences. Each participant...
was individually recorded using a sensitive microphone, and all recordings were transcribed using IPA symbols and compared to the English transcription to identify the correct and incorrect pronunciation. Each participant filled out a consent form before to having their pronunciation recorded.

**Results.** The majority of errors committed by Saudi English learners are attributable to the substitution of foreign sounds with the closest native sounds. In addition, Saudi English learners tend to add a glottal stop to non-onset syllables and insert a vowel to break clusters of three or more obstruent consonants. This finding is due to the fact that their native language is an onset language and lacks clusters of three or more obstruent consonants. The descriptive tables in addition to the Pareto charts of these errors are provided.

**Conclusions.** Overall, results from this study support optimality theory, transfer, and contrastive analysis hypotheses. Moreover, this study contributes to the growing literature on the investigation of phonological errors produced by Arab learners of English, particularly Saudi learners. This study proposes that Saudi English learners listen attentively to English native speakers to correct phonological errors. In addition, Saudi English learners should record their pronunciation during discussions and replay them in order to identify their mistakes and avoid them in the future.

**Key words:** phonology, phonological errors, Saudi Arabic, optimality theory, consonants, vowels, substitution of sounds, epenthesis, transfer, contrastive analysis.

**Introduction**

**Background**

Investigating phonological errors is helpful to increase the perceived degree of those errors that affect the meaning of some expressions and words by uttering them incorrectly. Phonology is a branch of linguistics concerned with the system of sounds essential for differentiating words in any language. Phonology is distinct from phonetics, which focuses on the physical production and acoustic perception of sounds, whereas phonology focuses on how sounds function within a particular language to encode meaning.

Learning the sound system of English is very significant for non-native English learners. The significance lies in the fact that the English language is the most global, recognized, and prominent language. According to Graddol (2006), “the use of English as a tool for international communication has been continuing for several decades” (as cited in Shen & Chiu, 2019: 89). Notably, learning the English sound system enables learners to understand and be understood by other
An Optimality-Theoretic Analysis of Some Phonological Errors...

English speakers. Al-Saidat (2010) stated that “it is vital that students learning English for international communication learn to speak it as comprehensibly as possible to be understood. Moreover, they must learn to understand it when spoken by different accents” (ibid.: 122).

Most second-language learners aim to produce native-like fluency. However, many of these learners face difficulties pronouncing words in a native-like manner. In most cases, they are identified as non-native speakers from their accents. Some learners consider native-like pronunciation to be the main challenge they encounter in their learning, and it is a fundamental problem they face in their communication with English speakers.

According to Sabbah (2015), “errors are systematic, in the sense that they are likely to occur repeatedly and not recognized by the learner” (p. 270). The significance of investigating the phonological errors of Saudi learners of English lies in increasing the perceived degree of those errors that affect the meaning of some expressions and words by uttering them incorrectly. For example, they may pronounce the word *leave* as *leaf* since they have no /v/ sound, or *cheap* as *sheep* since there is no /ʃ/ sound in Arabic. Thus, increasing English as a Foreign Language (EFL) learners’ perception of phonological errors would lead them to avoid such errors in the future and attain native-like fluency.

**The Purpose of the Study**

In this paper, the researcher aims to examine the phonological errors related to English vowels and consonants made by Saudi learners of the English language and how they are accounted for within the framework of optimality and second language acquisition theories.

**Research Questions**

RQ 1. What are the most frequent phonological errors produced by Saudi learners of the English language?

RQ 2. How to analyze those phonological errors within the optimality theory?

RQ 3. What is the main reason for committing those errors in the second language acquisition?
An Overview of Theoretical Essentials

Optimality Theory

There has been a great deal of interest in phonological analyses from the point of well-formedness constraints instead of rules systems in recent years. This approach of well-formedness constraints is known as optimality theory, which was proposed by Alan Prince and Paul Smolensky (1993) and later expanded by Prince and McCarthy (1995). This model has been one of the most powerful and significant frameworks for various linguistics fields, such as phonology, syntax, historical linguistics, sociolinguistics, and language acquisition. Over the past 30 years, this theory has guided researchers in analyzing the relationship and interaction between input and output forms. Accordingly, I will use this theory to analyze the most frequent phonological errors related to consonants and vowels produced by Saudi learners of English.

Optimality theory assumes that all languages share a set of constraints that produce that specific language’s basic grammatical and phonological patterns. According to Alahmari (2018), “optimality is a theory of constraint interaction which promotes the violability of constraints and competition between various output candidate forms for a given input” (p. 11). So, the primary idea of the optimality theory is that for each possible underlying form (an input form), a set of related surface forms (output forms), known as candidates and would be evaluated by some constraints. The winning output of this evaluation is called the optimal candidate. This process is conducted by two tools: (GEN) (generator), which generates a group of possible candidates for input, and (EVAL) (evaluator), which selects the most optimal candidate.

The OT constraints are universal and ranked in a hierarchy where a high-ranked constraint dominates the low-ranked constraints. The ranking of these constraints is language-specific, in which every language has its own ranking. The optimal form is the form that satisfies a language-specific, highly ranked constraint and violates the less ranked constraints.

These constraints are divided into two families, markedness constraints and faithfulness constraints. Faithfulness constraints require that the output form corresponds to the input form in some particular way. On the other hand, markedness constraints allow alternations on the structural well-formedness of the output depending on its interaction with the faithfulness constraints.
Theories of Second Language Acquisition

There are two fundamental theories in the field of the second language (L2) acquisition that can be used to interpret the phonological errors of Saudi learners of English. The first theory is transfer theory, which refers to “the influence that the learner’s L1 exerts over the acquisition of an L2” (Ellis, 1997: 51). The transfer consists of two types: a positive transfer due to the similarities between the source and target languages and facilitates the process of learning. In contrast, a negative transfer due to the differences between the two languages and leads to errors. Based on this theory, the researcher of this paper assumes that Saudi learners of English produce errors in English phonology due to of the influence of their Arabic phonology.

The second theory that may identify the phonological errors of learners of English is the contrastive analysis hypothesis that was proposed by Lado in the late 1950s. It is necessary to mention the contrastive analysis hypothesis when discussing the transfer of aspects of a native L1 to L2. According to this hypothesis, in cases involving differences between languages, L2 learners use the patterns that they learned before to help them achieve L2 tasks. Lado (1957) claimed that people rely on their first language when they learn the second language, which has been recently confirmed in an empirical study carried out by Mourssi (2012). This hypothesis claims that similar elements of L1 and L2 will be simple to acquire for L2 learners, and those different elements will be difficult. According to Gass and Selinker (2008), “contrastive analysis assumes that difficulty and ease in learning are determined respectively by differences and similarities between the L1 and L2 in contrast” (p. 97). Based on this hypothesis, the researcher of this study assumes that Saudi learners of English should know the sound system of their native language and second language because such knowledge can help them to identify the areas of transfer of L1 to L2 and correct the interferences.

Errors cannot be reasoned by only the CA and transfer since they are not enough to explain the errors. Eckman (1977) suggested the MDH (markedness differential hypothesis) as a revision to the contrastive analysis hypothesis. It accounts for the degree of difficulty of areas in second language acquisition. The familiar sounds among languages are considered unmarked, while the marked sounds are those less familiar (e.g., voiced obstruents, nasal vowels, and closed syllables
are marked sounds, while voiceless obstruents, oral vowels, and open syllables are unmarked sounds). Some researchers have agreed that markedness causes L2 errors. In contrast, others have debated this hypothesis and think there are other ways to identify error sources. For example, Eckman’s (1991) structural conformity hypothesis claims that “the universal generalizations that hold for primary languages also hold for interlanguages” (as cited in Eckman, 2008: 102).

**Literature Review**

**Phonological Studies on the Optimality Theory Perspective**

Numerous studies have investigated the phonological aspects of the optimality framework. Alahmari (2018) analyzed some aspects of phonology and morphology in a southwestern Saudi Arabian dialect within the framework of optimality theory. He focused on issues related to onset sonority, the analysis of phonologically conditioned allomorphy, superheavy syllables, stress assignment, and foot construction under the effect of geminates and long vowels.

Alhuwaykim (2018) examined some aspects of the phonology of a northwestern Saudi dialect of Arabic. He concentrated on forming complex word edges where different types of consonant clusters occur word-initially and word-finally, syllabification patterns under moraic theory, the stress system along with foot construction under metrical stress theory, and phonologically-governed allomorphy that is determined by the weight of word-final syllables. He assumed that the northwestern Saudi dialect shows several unusual patterns from other Arabic dialects.

**Phonological Studies on the Transfer and Contrastive Analysis Hypotheses**

Odlin (1989) investigated the similarities and differences between languages that may influence the acquisition of grammar, vocabulary, and pronunciation. He discussed other essential areas for the study of transfer, including discourse, sociolinguistic factors, and individual variation. He stated that the debates concerning the role of transfer in historical change date back to the 19th century. Odlin also pointed out that “the study of transfer is peculiar among language acquisition and the phenomenon of language use” (ibid.: 6). He declared that “native language phonetics and phonology are powerful influences on second language pronunciation” (ibid.: 112).
Avery and Ehrlich (1992) introduced an English pronunciation system for non-native English teachers and learners from any native language background. They provided an introduction to the phonology and phonetics fields related to second language learning, with many of the descriptions and concepts exemplified through typical errors made by ESL students. They claimed that learners transfer their L1 sound patterns into the second language, which causes foreign accents, resulting from the mispronunciations of expressions and words by non-native speakers. In this context, Avery and Ehrlich (1992) identified three conditions under which the phonological system of any language can influence the pronunciation of learners of a non-native language: (1) the sound of the target language is not found in the native language, (2) the phonotactic rules of combining sounds into words are dissimilar in both languages, and (3) transfer of patterns of stress and intonation into the target language occurs because the melody and rhythm of a language determine these patterns. Avery and Ehrlich (1992) stated that the greatest difficulties Arab learners face are /θ/, /ð/, /tʃ/, /ŋ/, /dʒ/, /ɻ/, and consonant clusters (e.g., splendid vs. /spilendid/).

Elmahdi and Khan (2015) investigated the difficulties of English pronunciation encountered by Saudi secondary school learners when pronouncing English consonants. Besides, they examine the area of the English consonant clusters system. Their findings demonstrate that the participants had difficulties pronouncing eleven consonant sounds, and unintentionally inserting a vowel sound in English syllables to break up consonant clusters.

Alsaidat (2010) investigated the English phonotactics of Arab learners of English as a foreign language to determine pronunciation difficulties. Notably, he analyzed the declusterization (i.e., inserting a vowel to break a consonant cluster) types and sources that are found in L2 interlanguage. The findings revealed that Arab learners of English unintentionally insert a vowel in the onset and the coda of specific syllables in English. Moreover, Alsaidat (ibid.) found that the significant reason behind the processes of declusterization is the influence of the Arabic language.

Al-Yami and Alathwary (2021) examined the students’ errors in pronouncing consonant clusters produced by a sample of 134 Saudi EFL learners and found that students faced difficulty in pronouncing consonant clusters specially coda position. They found that students
adopted different pronunciation strategies to simplify their errors. The students' response to a survey revealed that poor adequate knowledge and lack of exposure to authentic language input were the main reasons for producing such errors in their pronunciation. In a recent study, Alotaibi (2022) found that the students' wrong production of consonant clusters reflects the underlying phonological system and learners adopted simplification strategies to pronounce sounds that do not exist in Arabic phonological system by the nearest sound to English equivalent.

Phonological Studies on the Optimality Framework in Language Acquisition

There is scant research in the literature on applying of the optimality theory to the study of second language acquisition. In his study on optimality in second language phonology: codas in Thai ESL, Hancin-Bhatt (2000) stated that “Thai ESL learners need to resolve the conflict between their first language or L1 and their L2. Optimality Theory provides the mechanisms to understand how this phonological conflict is resolved, and in what ways” (ibid.: 201).

Zhang (2016) investigated dissimilation in the second language acquisition of Mandarin Chinese tones. He analyzed the acquisition of identical tone sequences in Mandarin Chinese by adult speakers of three non-tonal languages: English, Japanese, and Korean. His study introduced a constraint-based analysis (optimality analysis). It proposed a four-stage path of the Obligatory Contour Principle sub-constraint re-ranking to account for the error patterns found in the phonological experiment.

Although there is a large body of literature offering insights of optimality theory and many studies investigating EFL learners’ errors, none of the existing studies addresses Arab phonological errors, particularly Saudi phonological errors in light of the optimality theory. This paper aims to examine some of the phonological errors related to English consonants and vowels pronunciation by Saudi learners of English in terms of optimality theory and how to interpret those errors from the second language acquisition perspective.

Methodology

To investigate the phonological errors related to the pronunciation of English vowels and consonants made by Saudi learners of English,
the researcher developed a list of 20 sentences consisting of more than 30 target words as the primary tool for data collection. This list was read aloud by a randomly chosen group of 30 female students from the intensive English course offered by the English language and translation department at Qassim University. The researcher recorded their pronunciation of a chosen group of sentences individually by a sensitive microphone provided with the phone. All the recordings were transcribed by IPA symbols and compared with the English transcription to determine the correct and incorrect pronunciation. Consent forms were filled by the students to take permission from them to participate. Additionally, the researcher worked as a teacher for the intensive English language course at Qassim University for two semesters in 2020 and observed the most significant phonological errors produced by Saudi learners of the English language. This research aims to examine the phonological errors related to English vowels and consonants that Saudi learners of the English language produce due to optimality and second language acquisition perspectives.

Results

To attain the main objective of analyzing the phonological errors produced by Saudi learners of the English language, the researcher first identified study participants’ most frequently produced errors related to English consonants and vowels. The most frequent phonological errors lie in substitution and epenthesis of consonants or vowels, as shown in the following tables (see Table 1–4).

### Table 1
(A). Substitution of Consonants

<table>
<thead>
<tr>
<th>Words</th>
<th>IPA pronunciation</th>
<th>Some learners pronunciations</th>
<th>Phonological error</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>paper</td>
<td>/perpər/</td>
<td>/beɪbər/</td>
<td>Voicing</td>
<td>40%</td>
</tr>
<tr>
<td>plastic</td>
<td>/plastɪk/</td>
<td>/blæstɪk/</td>
<td>Voicing</td>
<td>73%</td>
</tr>
<tr>
<td>snapchat</td>
<td>/snæptʃæt/</td>
<td>/snæbʃæt/</td>
<td>Voicing + Frication</td>
<td>83%</td>
</tr>
<tr>
<td>five</td>
<td>/fɛːr/</td>
<td>/fæf/</td>
<td>Devoicing</td>
<td>63%</td>
</tr>
<tr>
<td>love</td>
<td>/laʊ/</td>
<td>/laːf/</td>
<td>Devoicing</td>
<td>26%</td>
</tr>
<tr>
<td>video</td>
<td>/vɪdɪəʊ/</td>
<td>/fɪdɪəʊ/</td>
<td>Devoicing</td>
<td>23%</td>
</tr>
<tr>
<td>chair</td>
<td>/tʃeər/</td>
<td>/ʃeər/</td>
<td>Frication</td>
<td>20%</td>
</tr>
</tbody>
</table>
Table 1 presents the most frequent errors produced by some Saudi learners of English about substituting the dissimilar sounds with similar sounds available in their source language. They substitute the voiceless bilabial stop /p/ with a voiced bilabial stop /b/ (voicing), and devoice the voiced, labiodental fricative /v/ to the voiceless labiodental fricative /f/ (devoicing). Moreover, they substitute the palato-alveolar affricate /ʧ/ with the labiodental fricative /ʃ/ (friction), and the palato-alveolar fricative /ʒ/ with the palato-alveolar affricate /ʤ/ (affrication). Most consonants are similar in both languages, such as /dʒ/, /f/, /ʃ/, and /b/, while others are found in English, but not in Arabic, such as /ʒ/, /v/, /ʧ/, and /p/. Therefore, some participants faced problems pronouncing the consonant sounds /p/, /v/, /ʒ/, and /ʧ/.

Table 2
(B). Epenthesis of Consonants

<table>
<thead>
<tr>
<th>Words</th>
<th>IPA pronunciation</th>
<th>Some learners pronunciations</th>
<th>Phonological error</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>album</td>
<td>/ælbəm/</td>
<td>/ʔælbəm/</td>
<td>Epenthesis of [ʔ]</td>
<td>83%</td>
</tr>
<tr>
<td>apple</td>
<td>/æpl/</td>
<td>/ʔæpl/</td>
<td>Epenthesis of [ʔ]</td>
<td>80%</td>
</tr>
<tr>
<td>add</td>
<td>/æd/</td>
<td>/ʔæd/</td>
<td>Epenthesis of [ʔ]</td>
<td>53%</td>
</tr>
</tbody>
</table>

Table 2 shows that some participants insert a glottal stop /ʔ/ at the beginning of a word that starts with a vowel. Mainly, they insert the glottal stop in the onset position, i.e., the part of a syllable that precedes the nucleus (vowel). The onset is an obligatory constituent of the Arabic syllable. For this reason, most participants insert a prevocalic consonant, the glottal stop in the initial position of a word.

Table 3 reveals that some Saudi learners of English substitute English vowels with other vowels similar to the main vowels in Arabic. The Arabic language has three short vowels /a/, /i/, and /u/; three long vowels /aː/, /iː/, and /uː/; and two diphthongs /ai/ and /au/, while in English there are 12 monophthongs and eight diphthongs and
sometimes more in certain variations of English. This difference leads most participants to substitute the diphthong /əʊ/ with the long vowel /u:/ in the word *phone*, or the back vowel /ɑː/ with the front vowel /æ/ in the word *mask*. Moreover, some participants substitute the vowel /ɛ/ by /æ/ in the word *purpose*, as well as replacing the mid-back vowel /ɔː/ into the high back vowel /u/ in the word *walk*, because they lack such vowels in their native language. However, most participants pronounce *boot* longer than *pot* because of the similarities of short and long vowels /u/ and /u:/ in both languages. Also, since there are just two diphthongs, /ai/ and /au/, in the participants’ language, most of them pronounce *buy* as /bai/, and *daughter* as /dauter/.

**Table 3**

(C). *Substitution of Vowels*

<table>
<thead>
<tr>
<th>Words</th>
<th>IPA pronunciation</th>
<th>Some learners pronunciations</th>
<th>Phonological error</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>mask</td>
<td>/maːsk/</td>
<td>/mæsk/</td>
<td>Substitution of back to front vowels</td>
<td>26%</td>
</tr>
<tr>
<td>cause</td>
<td>/kɔːz/</td>
<td>/kauz/</td>
<td>Substitution of a long vowel to a diphthong</td>
<td>40%</td>
</tr>
<tr>
<td>walk</td>
<td>/wɔːk/</td>
<td>/wuk/</td>
<td>Substitution of mid back to high back</td>
<td>53%</td>
</tr>
<tr>
<td>phone</td>
<td>/fəʊn/</td>
<td>/fuːn/</td>
<td>Substitution of a diphthong to a long vowel</td>
<td>83%</td>
</tr>
</tbody>
</table>

**Table 4**

(D). *Epenthesis of Vowels*

<table>
<thead>
<tr>
<th>Words</th>
<th>IPA pronunciation</th>
<th>Some learners pronunciations</th>
<th>Phonological error</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>text</td>
<td>/tekst/</td>
<td>/tekɪst/</td>
<td>Epenthesis of a vowel</td>
<td>63%</td>
</tr>
<tr>
<td>glimpsed</td>
<td>/glɪmpst/</td>
<td>/glɪmpɪst/</td>
<td>Epenthesis of a vowel</td>
<td>30%</td>
</tr>
<tr>
<td>next</td>
<td>/nekst/</td>
<td>/nekɪst/</td>
<td>Epenthesis of a vowel</td>
<td>66%</td>
</tr>
<tr>
<td>masks</td>
<td>/maːskəs/</td>
<td>/mæskɪs/</td>
<td>Epenthesis of a vowel</td>
<td>36%</td>
</tr>
</tbody>
</table>

Table 4 shows that most Saudi participants insert a vowel among three or more consonant clusters; in particular, they insert the vowel /ɪ/ in the coda position VC(ɪ)C, which has three or more obstruent sounds, e.g., /tekɪst/ and /nekɪst/. This result supports Sabbah (2015): “Arab learners of English find difficulty in pronouncing English initial and final clusters of a word” (p. 281).
Additionally, the researcher observed that although the voiceless alveolar /t/ sound is found in both languages, some participants pronounce it without flapping, while native English speakers pronounce it with flapping [ɾ], such as *beauty*, *database*. The pronunciation difference is due to the participants’ source language, in which Arabic speakers, particularly Saudis, mostly do not flap the /t/ sound, unlike English speakers who flap the /t/ phoneme.

Moreover, the descriptive statistics will be shown in the following tables (see Table 5, Tableau 1–12) and graphics (see Figure 1–4).

**Table 5**  
**Descriptive Statistics**

<table>
<thead>
<tr>
<th></th>
<th>Substitution of Consonants</th>
<th>Epenthesis of Consonants</th>
<th>Substitution of Vowels</th>
<th>Epenthesis of Vowels</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong># of Words</strong></td>
<td>12</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>23</td>
</tr>
<tr>
<td><strong>Mean</strong></td>
<td>52%</td>
<td>72%</td>
<td>51%</td>
<td>49%</td>
<td>54%</td>
</tr>
<tr>
<td><strong>Median</strong></td>
<td>52%</td>
<td>80%</td>
<td>47%</td>
<td>50%</td>
<td>53%</td>
</tr>
<tr>
<td><strong>Mode</strong></td>
<td>83%</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>83%</td>
</tr>
<tr>
<td><strong>Standard Deviation</strong></td>
<td>30%</td>
<td>17%</td>
<td>24%</td>
<td>18%</td>
<td>26%</td>
</tr>
<tr>
<td><strong>Max</strong></td>
<td>90%</td>
<td>83%</td>
<td>83%</td>
<td>66%</td>
<td>90%</td>
</tr>
<tr>
<td><strong>Min</strong></td>
<td>13%</td>
<td>53%</td>
<td>26%</td>
<td>30%</td>
<td>13%</td>
</tr>
</tbody>
</table>

**Substitution of Consonants:**

The mean and median of 52% indicate that, on average, 52% of the consonants were substituted incorrectly by the Saudi learners of English. This suggests that there is a significant phonological error in their pronunciation of consonants. The mode of 83% suggests that some words (i.e., *snapchat*) were pronounced with a very high rate of error, while the standard deviation of 30% indicates that there was a wide range of error rates across the sample of words. The maximum error rate of 90% suggests that some words (i.e., *prestige*) were consistently mispronounced by the Saudi learners, while the minimum error rate of 13% suggests that some words (i.e., *watch*) were pronounced correctly most of the time. It is also worth noting that the high standard deviation and the range of error rates indicate that there is significant variation in the pronunciation of consonants among the Saudi learners.

**Epenthesis of Consonants**

The mean and median of 72% and 80%, respectively, suggest that the Saudi learners of English tend to add an extra consonant in
the middle of a word 72% to 80% of the time. This suggests that there is a significant phonological error in their pronunciation of consonant clusters. The absence of a mode suggests that there was no single word that was consistently mispronounced, but rather a relatively consistent pattern across the sample of words.

The standard deviation of 17% suggests that there was a relatively narrow range of error rates across the sample of words. The maximum error rate of 83% and minimum error rate of 53% suggest that there is some variation in the pronunciation of consonant clusters among the Saudi learners.

Substitution of Vowels:
The mean and median of 51% and 47%, respectively, suggest that the Saudi learners of English tend to substitute vowels incorrectly 51% to 47% of the time. This suggests that there is a moderate phonological error in their pronunciation of vowels. The absence of a mode suggests that there was no single word that was consistently mispronounced, but rather a relatively consistent pattern across the sample of words.

The standard deviation of 24% suggests that there was a relatively wide range of error rates across the sample of words. The maximum error rate of 83% and minimum error rate of 26% suggest that there is significant variation in the pronunciation of vowels among the Saudi learners, and some words were consistently mispronounced while others were pronounced correctly most of the time.

Epenthesis of Vowels
The mean and median of 49% and 50%, respectively, suggest that the Saudi learners of English tend to add an extra vowel sound in the middle of a word 49% to 50% of the time. This suggests that there is a moderate phonological error in their pronunciation of vowel clusters. The absence of a mode suggests that there was no single word that was consistently mispronounced, but rather a relatively consistent pattern across the sample of words.

The standard deviation of 18% suggests that there was a relatively narrow range of error rates across the sample of words. The maximum error rate of 66% and minimum error rate of 30% suggest that there is some variation in the pronunciation of vowel clusters among the Saudi learners.

The following analysis is for the aggregate phonological error of all the four kinds of phonological errors (Substitution of Consonants,
Epenthesis of Consonants, Substitution of Vowels, and Epenthesis of Vowels). The data includes a total of 23 words, and the mean and median phonological error percentages were 54% and 53%, respectively. This suggests that the Saudi learners of English make phonological errors in their overall pronunciation of English words at a moderate rate. The mode of 83% suggests that there was a word (i.e., snapchat) that was consistently mispronounced across the sample.

The standard deviation was 26%, which indicates that there was a relatively wide range of error rates across the sample of words. The maximum error rate was 90% and the minimum error rate was 13%, which suggests that there is significant variation in the pronunciation of English words among the Saudi learners, and some words were consistently mispronounced while others were pronounced with relatively low errors.

Overall, these results suggest that the Saudi learners of English make moderate phonological errors in their pronunciation of English words, and there is a need for targeted instruction and practice to improve their pronunciation skills. The consistent mispronunciation of a particular word (mode at 83%) suggests that there may be specific phonological patterns that need to be addressed in instruction. However, since the sample size is relatively small, it may be necessary to collect more data to confirm these findings.

Figure 1
The Pareto Chart – Substitution of Consonants
The Pareto Chart for Substitution of Consonants reveals that the errors are not evenly distributed among the words in the sample. The chart shows that three words, “prestige”, “snapchat”, and “beige”, account for a significant proportion of the errors, with phonological error percentages of 90%, 83%, and 86%, respectively. The next highest percentage is for “plastic”, which has a phonological error percentage of 73%.

The remaining words have relatively lower phonological error percentages, ranging from 40% to 26%, with the lowest percentage being 13% for the word “watch”. Overall, the chart indicates that the errors for substitution of consonants are largely concentrated in a few words.

**Figure 2**
*The Pareto Chart – Epenthesis of Consonants*

The Pareto chart for Epenthesis of Consonants reveals that the errors are only present in a few words in the sample. The chart shows that the word “album” has the highest phonological error percentage of 83%, followed by “apple” with a percentage of 80%. The word “add” has the lowest percentage at 53%.

The Pareto chart for substitution of vowels shows that the errors are concentrated in a few words in the sample. The chart indicates that the word “phone” has the highest phonological error percentage of 83%, followed by “walk” with a percentage of 53%. The remaining two words, “cause” and “mask”, have relatively lower phonological error percentages, with the lowest being 26% for “mask”.

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The Pareto chart for epenthesis of vowels reveals that the errors are present in a few words in the sample. The chart shows that the word “next” has the highest phonological error percentage of 66%, followed by “text” with a percentage of 63%. The word “glimpsed” has the lowest percentage at 30%, while “masks” has a percentage of 36%.
Discussion

Optimality-Theoretic Analysis

In the previous section, the researcher argued that Saudi learners of English, particularly beginners, produce phonological errors influenced by their source language of Arabic. Therefore, they substitute the distinct English sounds, which are not available in their native language, with similar Arabic sounds. Further, they insert a vowel among consonant clusters which consist of more than two obstruent sounds. Additionally, when an initial syllable of a word starts with a nucleus, they insert a glottal stop in the onset position of the syllable.

This section aims to provide an optimality-theoretic analysis for the phonological errors produced by Saudi learners of English, and to account for the various alternations observed in such errors. A ranking using the Optimality Theory (OT) perspective (Prince & Smolensky, 1993/2004), can introduce the phonological errors as interactions of a set of violable universal constraints on one another to reveal their important characteristics.

There are three main issues to account for in this section. The first issue concerns substituting the different sounds with similar sounds in both languages (Arabic and English). The second issue relates to the insertion of a vowel among obstruent consonant clusters. The third issue concerns the epenthesis of a glottal stop in the prevocalic position of the syllable.

1. Substitution

Two significant issues to be accounted for in this section are substituting consonants and substituting vowels. We have seen earlier that some participants of Saudi learners of English replace the consonants /ʒ/, /v/, /ʃ/, and /p/ with their similar consonants /dʒ/, /f/, /ʃ/, and /b/ that are available in both source and target languages. Moreover, they replace the distinct vowels such as /əʊ/, /ɜː/, /ɔː/, and /ɑː/ with their similar vowels in Arabic /u:/, /ɪ/, /u/, and /æ/.

A. Substitution of Consonants

In order to examine the substitution of some English consonants with other consonants by Saudi learners of English, the researcher delimited the English consonants that are not found in Arabic. These four consonants /ʒ/, /v/, /ʃ/, and /p/ are avoided in the participants’ first...
language. Therefore, these consonants are interpreted as constraints in OT terminology that deny their existence in Arabic. So, the Arab participants replace them with other consonants similar to those not dismissed in Arabic.

\*p
The voiceless bilabial stop [p] is prohibited in Arabic.

\*v
The voiced labio-dental fricative [v] is prohibited in Arabic.

\*ʧ
The voiceless palate-alveolar affricate is prohibited in Arabic.

\*ʒ
The voiced palate-alveolar fricative is prohibited in Arabic.

These four constraints are markedness constraints which trigger the difference of input form from the output form based on the interaction of faithfulness constraints. These constraints enforce output forms to be less faithful to the input form by violating the constraints of [IDENT] IO (VOI) and [IDENT] IO (MANNER). Furthermore, the markedness constraints are more highly ranked than the faithfulness constraints:

\*[IDENT] IO (VOI)
The voicing specification for a segment [+ voice] should be identical in the input and output forms.

\*[IDENT] IO (MANNER)
The manner of articulation for a segment should be identical in the input and output forms.

The following tableaux show the interaction between the markedness constraints *p, *v, *ʧ, and *ʒ and the faithfulness constraints *[IDENT] IO (VOI) and *[IDENT] IO (MANNER). The researcher adopted one word to represent every case.

**Tableau 1**
**Voicing /spreɪ/ [sbreɪ]**

<table>
<thead>
<tr>
<th>/spreɪ/</th>
<th>P*</th>
<th>[DEP] IO (V)</th>
<th>[IDENT] IO (VOI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. spreɪ</td>
<td>*!</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. sbreɪ</td>
<td></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>c. sipreɪ</td>
<td>*!</td>
<td>*</td>
<td></td>
</tr>
</tbody>
</table>

Tableau 1 shows how the voiceless bilabial stop /p/ is voiced as the voiced bilabial stop by Saudi beginner learners of English. In this
tableau, candidate (b) is the optimal form since it avoids the marked sound /p/. By contrast, candidates (a) and (c) violate the high-ranked constraint *p.

**Tableau 2**

*Devoicing /faiv/ [faif]*

<table>
<thead>
<tr>
<th>/faiv/</th>
<th>V*</th>
<th>[IDENT] IO (VOI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. faiv</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>b. vaiv</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>c. vaif</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>d. faif</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Tableau 2 displays how those learners devoice the voiced labio-dental fricative /v/ to be the voiceless labio-dental fricative /f/. In this tableau, candidate (d) is the optimal form since it avoids the marked sound /v/. By contrast, candidates (a), (b), and (c) violate the high-ranked constraint *v.

**Tableau 3**

*Frication and Voicing /ʧiːp/ [ʃiːb]*

<table>
<thead>
<tr>
<th>/ʧiːp/</th>
<th>ʧ*</th>
<th>P*</th>
<th>[IDENT] IO (MANNER)</th>
<th>[IDENT] IO (VOI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. ʧiːb</td>
<td>!*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. ʃiːp</td>
<td>!*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. ʃiːb</td>
<td></td>
<td>!*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. ʧiːp</td>
<td>!*</td>
<td>!*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Tableau 3 presents how the learners produce the plato-alveolar fricative /ʃ/ instead of the plato-alveolar affricate /ʧ/. In this tableau, candidate (c) is the optimal form since it avoids the marked sounds /p/ and /ʧ/. By contrast, candidates (a), (b), and (d) violate the high-ranked constraint *p and *ʧ.

**Tableau 4**

*Affrication /beɪʤ/ [beɪdʒ]*

<table>
<thead>
<tr>
<th>/beɪʤ/</th>
<th>ʒ*</th>
<th>[IDENT] IO (MANNER)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. beɪʒ</td>
<td>!*</td>
<td></td>
</tr>
<tr>
<td>b. beɪdʒ</td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>
Tableau 4 shows how they affricate the plato-alveolar fricative /ʒ/ to be the plato-alveolar affricate /dʒ/. In this tableau, candidate (b) is the optimal form since it avoids the marked sound /ʒ/. By contrast, candidate (a) violates the high-ranked constraint *ʒ.

(B). Substitution of Vowels
Scott (1962, as cited as Sabbah, 2015) states that the Arabic vowel system is totally different from that of English (p. 281). This difference leads some Arab learners of English, particularly Saudis, to produce English vowel errors derived from their native language vowel system. As mentioned previously, the vowels in Arabic include only six monophthongs, three lax and three tense vowels, and only two diphthongs. On the other hand, English includes various vowel systems based on many English varieties. For instance, in British Received Pronunciation (RP), there are 21 different vowels, of which 12 are monophthongs, and nine are diphthongs, whereas General American has only 16 distinct vowels, of which 11 are monophthongs, and five are diphthongs. Therefore, Arab Saudi learners mostly mispronounce the vowels /ɜː/, /ɔː/, /əʊ/, and /ɑː/ before unemphatic sounds. They shift them to /ɪ/, /u/, /u:/, and /æ/. In OT terms, these sounds are expressed as the markedness constraints *ɜː, *ɔː, *əʊ, and *ɑː in the Arabic language, which Saudi learners thus avoid in pronunciation.

- *ɜː:
The mid-central unrounded vowel [ɜː] is not allowed in Arabic.

- *ɔː:
The mid-back rounded vowel [ɔː] is not found in Arabic.

- *əʊ:
The diphthong [əʊ] is not found in Arabic.

- *ɑː:
The low back vowel [ɑː] is prohibited before the unemphatic sounds in Arabic.

These four markedness constraints *ɜː, *ɔː, *əʊ, and *ɑː entail violating the faithfulness constraint of *[IDENT] IO. In this faithfulness constraint, the output form becomes less faithful to the input form. Consider the following tableaux.

- *[IDENT] IO
Output segments should match the corresponding input segments.

- *[MAX] IO
The prohibition of deletion of any segment from the input.
Tableau 5  
**Voicing + Substitution of a Vowel /pɜːpəs/ [bɪbəs]**

<table>
<thead>
<tr>
<th></th>
<th>P*</th>
<th>ɔ:*</th>
<th>[IDENT] IO (VOI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>/pɜːpəs/</td>
<td>![pɜːpəs]</td>
<td>![pɜːpəs]</td>
<td>![pɜːpəs]</td>
</tr>
<tr>
<td>a. pɜːpəs</td>
<td>![pɜːpəs]</td>
<td>![pɜːpəs]</td>
<td>![pɜːpəs]</td>
</tr>
<tr>
<td>b. pɜːbəs</td>
<td>![pɜːbəs]</td>
<td>![pɜːbəs]</td>
<td>![pɜːbəs]</td>
</tr>
<tr>
<td>c. bɪpəs</td>
<td>![bɪpəs]</td>
<td>![bɪpəs]</td>
<td>![bɪpəs]</td>
</tr>
<tr>
<td>d. bɪbəs</td>
<td>![bɪbəs]</td>
<td>![bɪbəs]</td>
<td>![bɪbəs]</td>
</tr>
</tbody>
</table>

Tableau 6  
**Substitution of a Vowel /wɔːk/ [wuk]**

<table>
<thead>
<tr>
<th></th>
<th>ɔ:*</th>
<th>[MAX] IO</th>
<th>[IDENT] IO</th>
</tr>
</thead>
<tbody>
<tr>
<td>/wɔːk/</td>
<td>![wɔːk]</td>
<td>![wɔːk]</td>
<td>![wɔːk]</td>
</tr>
<tr>
<td>a. wɔːk</td>
<td>![wɔːk]</td>
<td>![wɔːk]</td>
<td>![wɔːk]</td>
</tr>
<tr>
<td>b. wuk</td>
<td>![wuk]</td>
<td>![wuk]</td>
<td>![wuk]</td>
</tr>
<tr>
<td>c. wk</td>
<td>![wk]</td>
<td>![wk]</td>
<td>![wk]</td>
</tr>
</tbody>
</table>

Tableau 7  
**Substitution of a Vowel /fəʊn/ [fu:n]**

<table>
<thead>
<tr>
<th></th>
<th>ɑ:*</th>
<th>[MAX] IO</th>
<th>[IDENT] IO</th>
</tr>
</thead>
<tbody>
<tr>
<td>/fəʊn/</td>
<td>![fəʊn]</td>
<td>![fəʊn]</td>
<td>![fəʊn]</td>
</tr>
<tr>
<td>a. fəʊn</td>
<td>![fəʊn]</td>
<td>![fəʊn]</td>
<td>![fəʊn]</td>
</tr>
<tr>
<td>b. fu:n</td>
<td>![fu:n]</td>
<td>![fu:n]</td>
<td>![fu:n]</td>
</tr>
<tr>
<td>c. fn</td>
<td>![fn]</td>
<td>![fn]</td>
<td>![fn]</td>
</tr>
</tbody>
</table>

Tableau 8  
**Substitution of a Vowel /mɑːsk/ [mæsk]**

<table>
<thead>
<tr>
<th></th>
<th>ɔ:*</th>
<th>[MAX] IO</th>
<th>[IDENT] IO</th>
</tr>
</thead>
<tbody>
<tr>
<td>/mɑːsk/</td>
<td>![mɑːsk]</td>
<td>![mɑːsk]</td>
<td>![mɑːsk]</td>
</tr>
<tr>
<td>a. maːsk</td>
<td>![maːsk]</td>
<td>![maːsk]</td>
<td>![maːsk]</td>
</tr>
<tr>
<td>b. mæsk</td>
<td>![mæsk]</td>
<td>![mæsk]</td>
<td>![mæsk]</td>
</tr>
<tr>
<td>c. msk</td>
<td>![msk]</td>
<td>![msk]</td>
<td>![msk]</td>
</tr>
</tbody>
</table>

Tableaux 5, 6, 7, and 8 above have presented how some participants substitute the unfamiliar English vowels with Arabic ones. In tableau 5, the candidate (d) is the optimal form since it avoids the marked sounds /p/ and /ɜː/, while the candidates (a) and (b) violate the high ranked constraints *p and *ɜː, and the candidate (c) violates the high ranked constraint *p. In tableaux 6, 7, and 8 the optimal forms are in candidate (b) since they exclude the marked sounds /ɔː/, /əʊ/, and /ɑː/. Conversely, the candidates (a) and (c) violate the high ranked constraints *ɔː, *əʊ, and *ɑː.
(2). Epenthesis

Epenthesis is the insertion of one or more sounds into a word. There are two issues concerned with the epenthesis in phonological errors produced by Saudi learners of English. The first issue is the epenthesis of a consonant sound in the onset position of the syllable. The second issue is the epenthesis of a vowel among three or more obstruent consonant clusters, particularly in the coda position of the syllable.

(A). Epenthesis of a Consonant

The onset position is obligatory in Arabic syllables, and no syllable lacks the onset or coda in Arabic. Therefore, some Saudi learners of English add a glottal stop /ʔ/ before the nucleus in the English syllables, which have no onset. In OT terms, this is expressed with the constraint ONSET, which requires the existence of onset in syllables. This markedness constraint is highly ranked and leads to violating the faithfulness constraint [DEP] IO (C) which disallows adding a consonant to the input and is ranked lower than the ONSET constraint.

*ONSET
Onset is obligatory in Arabic syllables.
* [DEP] IO (C)
The epenthesis of a consonant to the input is prohibited.

The following tableaux show how the optimal output forms are selected based on the interactions of ONSET constraint with the constraint DEP-C for the input forms /ælbəm/ and /æpl/ in tableaux 9 and 10.

**Tableau 9**
Epenthesis of a Consonant /ælbəm/ [ʔælbəm]

<table>
<thead>
<tr>
<th>/ælbəm/</th>
<th>ONSET</th>
<th>[MAX] IO</th>
<th>[DEP] IO (C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. ælbəm</td>
<td>!*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. ʔælbəm</td>
<td></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>c. lbəm</td>
<td></td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>

**Tableau 10**
Epenthesis of a Consonant /æpl/ [ʔæbl]

<table>
<thead>
<tr>
<th>/æpl/</th>
<th>ONSET</th>
<th>*p</th>
<th>[IDENT] IO</th>
<th>[DEP] IO (C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. æpl</td>
<td>!*</td>
<td></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>b. ʔæbl</td>
<td></td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>c. æbl</td>
<td></td>
<td>!</td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>
(B). Epenthesis of a Vowel.
Clusters of three or more consonants are prohibited in Arabic. Therefore, some Saudi learners of English insert a vowel among the three or more obstruent clusters, particularly in the coda position. OT demonstrates this as the constraint NO$3O_{BSCLUST}$, which avoids three or more consonant clusters. This constraint entails violating the faithfulness constraint [DEP] IO (V), which prohibits inserting any vowel among consonant clusters. The constraint NO$3O_{BSCLUST}$ is highly ranked over the constraint [DEP] IO (V).

*NO3OBSCLUST
The prohibition of three or more consonant clusters in Arabic.
*[DEP] IO (V)
The epenthesis of a vowel among consonant clusters is prohibited.

Consider the following tableaux, which display how some participants insert a vowel among the three obstruent clusters in the coda position of the syllable.

**Tableau 11**
*Epenthesis of a Vowel /nekst/ [nekast]*

<table>
<thead>
<tr>
<th>/nekst/</th>
<th>NO3OBSCLUST</th>
<th>[MAX] IO</th>
<th>[DEP] IO</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. nekst</td>
<td>![</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>b. nekést</td>
<td>![</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>c. nkst</td>
<td>![</td>
<td>*</td>
<td></td>
</tr>
</tbody>
</table>

**Tableau 12**
*Epenthesis and Substitution of Vowels /mɑːskəs/ [mæskis]*

<table>
<thead>
<tr>
<th>/mɑːskəs/</th>
<th>NO3OBSCLUST</th>
<th>əʊ*</th>
<th>[MAX] IO</th>
<th>[DEP] IO</th>
<th>[IDENT] IO</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. mɑːskəs</td>
<td>![</td>
<td>![</td>
<td>![</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>b. mæskis</td>
<td>![</td>
<td>![</td>
<td>![</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>c. msks</td>
<td>![</td>
<td>![</td>
<td>![</td>
<td>*</td>
<td></td>
</tr>
</tbody>
</table>

**Second-Language Acquisition Theoretic Analysis**
As shown previously in this research, certain sounds are difficult to pronounce correctly for some Saudi learners of English, especially beginner learners. Therefore, they produce errors by substituting the different sounds with sounds similar to their native language. They substitute the marked consonants /ʒ/, /ʃ/, /ʧ/, and /p/ with the unmarked sounds /dʒ/, /ʃ/, /ʧ/, and /b/. Furthermore, they substitute the unfamiliar...
vowels /ɜː/, /ɔː/, /əʊ/, and /ɑː/ with familiar vowels /ɪ/, /u/, /u:/, and /æ/ in Arabic. It is noteworthy that Saudi English learners produce /æ/ instead of /ɑː/ when it comes between unemphatic sounds other than /r/, for example, between /m/ and /s/ in mask.

Moreover, most Saudi learners of English add a glottal stop /ʔ/ to the initial syllables of words that lack an onset since the onset is obligatory in Arabic syllables. Further, since Arabic has no three or more obstruent consonant clusters, learners insert a vowel to break the three or more consonant clusters in English words, e.g., next or text. However, they pronounce the words spray and splash without inserting a vowel in the initial three consonant clusters since the /r/ and /l/ are sonorant consonants.

These findings support the adopted second language theories for this study, the transfer theory that assumes the primary source of errors in the production of a second language is the influence of the native language, as well as the contrastive analysis hypothesis that claims learners should consider and learn the differences between the first and second languages in order to avoid such errors. According to Elmahdi and Khan (2015), who support this hypothesis, “studying errors of English pronunciation is a valuable source to which provides information on students’ errors” (p. 85).

Moreover, the findings of this study are consistent with previous studies such as Watson (2002), who stated that the consonants /f/-/v/, /p/-/b/, /tʃ/-/dʒ/-/ʃ/ are considered problematic sounds for Arab learners of English. Avery and Ehrlich (1992) have asserted that the most significant difficulties that Arab learners face are /θ/, /ð/, /ʃ/, /ŋ/, /dʒ/, /r/, and consonant clusters. Furthermore, Alsaidat (2010) investigated declusterization and stated that Arab learners of English unintentionally insert a vowel in English syllables and claimed that the significant reason behind the processes of declusterization is the influence of the Arabic language.

**Conclusion**

According to Samuel Johnson (1761, as cited in Sabbah, 2015), “to use two languages familiarly and without contaminating one by the other, is very difficult” (p. 282). This paper has investigated the
phonological errors related to consonants and vowels that Saudi learners of English have produced under the optimality theory. Furthermore, it discusses some theories of second language acquisition that illustrate why Saudi learners of English produce such errors, such as the transfer and contrastive analysis hypotheses. The findings reveal that most errors by Saudi learners of English are produced by substituting the different sounds with similar sounds of their native language as well as inserting a vowel to break the three or more consonant clusters and adding a consonant to syllables starting with a vowel.

To resolve phonological errors, this study thus recommends that Saudi learners of English listen intensively to English native speakers. Additionally, Saudi learners of English should record their pronunciation during conversations and listen to them again in order to perceive their errors and avoid them later.

ADHERENCE TO ETHICAL STANDARDS

Ethics Declarations. The study was conducted according to the guidelines of the Declaration of Helsinki (1964). The study was approved by the ethical committee at Qassim University. All the participants were asked for written consent/permission to take part in the study. Participants were made aware of their right to withdraw from the study at any time.

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Data availability statement: The data are included in this article and will be shared by an international database once it appears in the published form.

Conflict of Interest. The author declares no conflict of interest.

Author Contribution. The author is the only person that contributed to all parts of this paper.

Consent for Publication. The author approves of this submission and, conditional upon the decision made by the editorial board from the peer-review process, consents to the publication of the current work. The work has not been submitted to other journals in consideration for publication.

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References


Appendix

1. That chair is made from plastic.
2. Hair spray is essential to hair beauty.
3. I usually walk to school.
4. My daughter is nine months old.
5. My boots are from Splash.
6. I always cook in ceramic pots.
7. The purpose of paper is medical.
8. Text messages are stored in the database in the phone.
9. The bag’s price is cheap.
10. We will travel next week.
11. Ali is twenty-five years old.
12. I love to watch Youtube videos.
13. I love to buy masks.
14. I will add pepper to pasta.
15. I glimpsed an album on the table.
16. The old universities have a lot of prestige.
17. She is looking for the cause of pain.
18. Apple is useful for the skin.
19. Snapchat is my favorite app.
20. My dress is beige.
АНОТАЦІЯ
Мета. Вивчити фонологічні помилки, пов’язані з вимовою приголосних і голосних, яких припускаються саудівські студенти, котрі вивчають англійську мову в парадигмі гіпотези оптимальності. Крім того, обговорюються гіпотези переносу та контрастивного аналізу, які пояснюють, чому саудівські студенти, які вивчають англійську мову, роблять фонологічні помилки.

Методи. Тридцять саудівських студенток першого семестру навчання на факультеті англійської мови Університету Кассіма були відібрані випадковим чином. Їх перевірили на вимовлення понад 30-ти слів зі списку з двадцяти речень. Кожного учасника індивідуально записували за допомогою чутливого мікрофона, а всі записи транскрибували за допомогою символів IPA і порівнювали з англійською транскрипцією, щоб визначити правильну і неправильну вимову. Перед записом вимови кожен учасник заповнював бланк згоди на запис його вимови.

Результати. Більшість помилок, яких припускаються саудівські студенти, вивчаючи англійську мову, пов’язані зі заміною іноземних звуків на найближчі до них рідні звуки. Крім того, студенти, які вивчають англійську мову в Саудівській Аравії, схильні додавати глотовий змичний до складів, що не починаються, і вставляти голосний, щоб розбити групу з трьох або більше приголосних, котрі перешкоджають вимові. Цей висновок пов’язаний з тим, що їхня рідна мова є мовою початку і не має кластерів з трьох або більше приголосних, що перешкоджають. На додаток до діаграм Парето для цих помилок наведено описові таблиці.

Висновки. Загалом, результати цього дослідження підтверджують гіпотези теорії оптимальності, перенесення та контрастивного аналізу. Крім того, це дослідження є внеском у зростаючу кількість літератури, присвяченій дослідженню фонологічних помилок, яких припускаються арабські студенти, які вивчають англійську мову, зокрема саудівські студенти. У цьому дослідженні пропонується, щоб саудівські студенти, які вивчають англійську мову, уважно слухали носіїв англійської мови, щоб виправити фонологічні помилки. Крім того, саудівські студенти, які вивчають англійську, повинні записувати свою вимову під час дискусій і відтворювати їх, щоб визначити свої помилки та уникнути їх у майбутньому.

Ключові слова: фонологія, фонологічні помилки, саудівська арабська мова, теорія оптимальності, приголосні, голосні, заміна звуків, епентеза, перенос, контрастивний аналіз.