DOI: 10.5433/2237-4876.2019v22n3p104

Oral Realisations of Orthographic Diphthongs in English Language

Alexandre **STEIN***
Dircel Aparecida **KAILER****

* PhD in Language Studies at Londrina State University (2020) and English language teacher with experience in the private and in the public sectors. Contact: alexandrestein02@gmail.com

** PhD in Linguistics and Portuguese Language at The Science and Languages College from UNESP (2008) (Araraquara-SP Campus) and Professor at Londrina State University: Contact: ueldircel@hotmail.com

Abstract:
This study aims at presenting an analysis of how Brazilian students of English language realise the English orthographic diphthongs orally. We are based on the theoretical principles of Second Language Acquisition, Linguistic Variation in L2 and the concepts of Interlanguage, Phonological Awareness and also on the studies about the grapho-phonic influence in L2. The *corpus* analysed is constituted of 52 words containing orthographic diphthongs that are realised as monophthongs according to the norms of pronunciation of English language. The data collection was carried out through a questionnaire with 22 questions, and a list of 31 sentences to be read out loud. This collection resulted in 1.045 realisations by 21 students of intermediate and advanced levels of English. The main results show that most of the participants produced the English orthographic diphthongs in accordance with the norms of pronunciation of that language. However, we detected phonetic-phonological deviant forms and aimed at establishing the relations between the oral realisations and the linguistic aspects in order to reveal which aspects may influence those deviant pronunciations of the studied segments.

Keywords:
Orthographic Diphthongs. Oral Realisations. English Language.

Signum: Estudos da Linguagem, Londrina, v. 22, i. 3, p. 104-126, Dec. 2019

Received on: 04/18/2019
Accepted on: 05/13/2019

Oral Realisations of Orthographic Diphthongs in English Language

Alexandre Stein; Dircel Aparecida Kailer

INTRODUCTION

When we compare English to other languages, it is considered quite easy to learn due to its relatively syntactic simplicity. However, the lexical and phonological aspects may present some difficulties to those who want to learn this language. Based on conversations with English teachers and on our classroom experience, we detected that the oral realisations of vocalic segments is one of the most difficult phonological aspect for Brazilian learners.

Based on the premise stated above, we established the general objective of this study: to verify how oral monophthongs that are spelled with diphthongs are realised by Brazilian learners in intermediate and advanced levels. We chose to analyse the orthographic diphthongs because, based on our empiric experience, we hypothesise that, in general, adolescent and adult learners are presented to written words before or at the same time they are presented to their pronunciation and this may influence the oral realisations of the vocalic segments.

In English language, there are two ways to pronounce words written with diphthongs. In one of them, which occurs less often, orthographic diphthongs are realised orally as two distinct phonemes, for instance: 'height' and 'painter' pronounced [haɪt] [ˈpeɪntər][1] respectively. On the other one, which happens more often, we have orthographic diphthongs realised orally as a single phoneme as in 'ceiling', 'said' and 'because' pronounced [ˈsiːlɪŋ], [sɛd] and [bɪˈkɒz], respectively (ROACH, 2009; CELCE-MURCIA; BRINTON; GOODWIN, 2010).

Regarding the possibilities of oral realisations of the orthographic diphthongs in English language, the specific objectives of this study are: 1) to verify if the linguistic aspects such as: the types of orthographic diphthongs, the position of the orthographic diphthongs in the target words and the stress of the target syllable may influence in the realisation of those diphthongs; 2) to verify if the oral realisations of the orthographic diphthongs differ according to the production context (in a less self-monitored context and in a more self-monitored context).

In order to achieve the proposed objectives, we carried out a data collection using a phonetic-phonological questionnaire with 22 questions and a list with 31 sentences

[1] In this article, the retroflex is represented by the symbol /r/ according to Roach (2009) and Celce-Murcia, Brinton and Goodwin (2010).

(41 words) to be read aloud. The collected data were transcribed, coded and run on the *Goldvarb X* computer programme, which provided us with results in percentages.

To analyse the data collected we were based on different theoretical assumptions as the principles of Second Language Acquisition, Phonological Awareness, Linguistics Variation in L2 and assumptions of Interlanguage (ECKMAN, 1981; ELLIS, 1986, 1994; FRASER, 2000; MORI, 2000; KEYS, 2001; TREHEARNE, 2003; BAYLEY, 2005; ZIMMER; ALVES, 2006; ALVES, 2012a; ARCHIBALB, 2018.). Due to the extension of this article, all these assumptions are briefly presented in the following sections.

Second Language Acquisition and Linguistic Variation

Studies based on analyses regarding Second Language Acquisition (SLA) and Linguistic Variation (LABOV, 2008) have originated the so-called Variation in Second Language (ELLIS, 1986, 1994). Some scholars – as Beebe (1977), Selinker and Douglas (1985), Tarone (1985) and Ellis (1987) – believed that this variation was caused by some specific factors like the learner's ethnicity, the time this learner had to produce the target language or even the topic discussed. However, Bayley (2005) defend that, in fact, the variation of an aspect in a foreign language may be the result of a set of factors, named by this author as Multiple Causes Principle. According to this author "the question for the researcher is thus not which single factor is associated with variation, but what the relative strength of the different factors associated with variation is". Moreover, "to attempt to explain interlanguage[2] variation as a result of a single factor is to ignore the complexities of SLA" (BAYLEY, 2005, p. 3).

Based on those premises, Bayley (2005) establishes four important contributions from Variationist Linguistics to the SLA research, presented on the following Chart.

Chart 1 – Contributions of Variationist Linguistics to SLA research

1)	Variationist Linguistics offers a clear way to study the effects of language transfer.
2)	The detailed analyses of variable forms produced by quantitative sociolinguists in speech communities around the world provide a much more realistic view of how target language function than do traditional grammars.
3)	Variationist analysis provides a means of testing whether SLA involves a process of repeated restructuring or whether it proceeds gradually along a multi-dimensional continuum.
4)	As Variationist studies are seen as a new strand of research that examines the acquisition of target language patterns of variability, they offer insights into the process by which learners may move (or fail to move) beyond the formal style that characterizes most classroom instructions.

Source: The authors based on Bayley (2005, p. 3-4).

[2] The concept of interlanguage will be presented in the next section.

As we can verify, on the first contribution presented in Chart 1, we see the expression *language transfer* which is widely used in SLA and represents an important notion in the description of variations found in a target language. This expression refers to a concept in which "second language (L2) production is influenced by properties of the first language (L1)" (ARCHIBALD, 2018, p. 9). This may result in spoken and written forms that differ from the L2 standard norm. Nonetheless, Bayley (2005, p. 4) states that the inadequate usage of an L2 feature is not always the result of an L1 transfer. This inadequate usage may be the result of an "idealized version" of what the learner judges to be right.

Regarding the second contribution from the Variationist studies to the Second Language Acquisition and its variations, Bayley (2005) states that certain variations may come from the contact between L2 learners and speakers of variations of the target language. As an example, the author reports the case of Puerto Rican immigrants living in New York that acquired linguistic features of African American Vernacular English (AAVE) because they had contact with that speech community. That is, what seems to be the lack of acquisition of a feature of a second language may actually, through the Sociolinguistic perspective, represent the learner's ability to assimilate the target language peculiarities in its vernacular form.

Concerning the third and the fourth contributions, Bayley (2005, p. 5) affirms "that linguistic constraints operates in the same way for all speakers of the same variety" in the process of acquiring a second language. That is, studies confirm that L2 variations made by a certain language speaker are probably going to be repeated by all the speaker of that L1, mainly if it is related to the grammatical structure of the L2. However, these variations will differ from one person to another according to the proficiency level reached in the L2.

Interlanguage

According to Keys (2001, p. 156-157), "the term interlanguage (IL) first arouse from the work of Selinker (1972) and referred to the provisional grammars developed by second language learners during the process of the target language (TL) acquisition".

Nowadays this term has been widely used to designate "a variable point along a *continuum* between the native language (NL) and the target language (TL)" (KEYS, 2001, p. 157) and it applies to any teaching and learning aspect of a second language, namely, the grammatical, the lexical, the semantic and the phonetic-phonological aspects. According to this author,

> The term 'interlanguage' can be seen to apply in two cases: *synchronic*, or the state of a learner's [linguistic] system at a given point in time; and *diachronic*, meaning the development of intermediate systems over time (KEYS, 2001, p. 157).

To Keys, "the idea that the [linguistic] development" of a second language learner "is linear and progressive is misleading" because this "interlanguage (IL) develops over time as the learner receives *input* from the TL and modifies the IL according to this information" (p. 157).

This knowledge about interlanguage is extremely important for us to understand why learners of a certain language make certain mistakes in the target language in different phases of their learning process. Besides, it offers insights so that teachers and course book authors can anticipate problems or propose resources to solve them or at least bring light on the aspects that lead learners to produce such marked forms.

PHONOLOGICAL AWARENESS

Phonological Awareness is broadly defined as the ability to recognise and manipulate the sounds of a spoken language. In other words, it is to understand that a language is formed by words, words are formed by syllables and these are composed by minimum sound units: the phoneme (THEHEARNE, 2003). This is a well-known approach used in the literacy phase, that is, it is associated to the development of reading and writing skills and it is related to the establishment of letter and sound relation in the initial formal learning stage of a mother tongue.

Thus, in this study we would like to propose a (re)appropriation of the concept of Phonological Awareness regarding the work with oral skills (production and comprehension) in the English language teaching and learning as an L2. We would like to put forward the idea of explicit teaching of phonetic representations of English sounds in English Language classes. This perspective finds support in the studies of Alves (2012a), Fraser (2000) and Mori (2000) to cite a few. To Fraser (p. 182) "giving learners an auditory model […] is not in itself enough to help them improve their pronunciation".

Alves (2012b, p. 31), based on Chard and Dickson (1999), defines Phonological Awareness as "a deliberate understanding of the various ways oral language can be divided in smaller components (phrases, words, syllables and sounds [phonemes]) and then manipulated".[3] Based on this knowledge, the speaker of a language should be "capable of talking about their own linguistic code, exposing their findings and inferences in relation to how the sounds combine, which sounds combinations are possible and also the ones that do not occur in their language"[4] (ALVES, 2012b, p. 31).

[3] "um entendimento deliberado acerca dos diversos modos como a língua oral pode ser dividida em componentes menores (frases, palavras, sílabas e sons [fonemas]) e então manipulada".

[4] "capaz de falar sobre seu próprio código, expondo suas descobertas e inferências a respeito de como os sons se combinam, quais as combinações de sons possíveis, e também as que não ocorrem em sua língua".

This author also highlights that there is a "*continuum* of phonological awareness levels" that are developed throughout the individual intellectual maturity" (CHARD; DICKSON, 1999). In this *continuum*, we can find the following phonological levels: sensibility to words rhymes, syllable awareness, intra-syllabic awareness and phonemic awareness, in this order necessarily. The last level, the phonemic awareness, is considered the most sophisticated and complex of all, because it "implies to recognise that words are constituted of distinctive sounds and the ability to manipulate them by segmenting, uniting and modifying those sounds […] in order to create new words"[5] (ALVES, 2012, p. 33). Based on this, Alves (p. 32) attributes two key words to the concept of Phonological Awareness: "reflexion and manipulation".[6]

Regarding the last Phonological Awareness level, the phonemic, it is considered as the most complex because it suggests that one would have the capability to distinguish sounds like /p/ and /b/ and to know that they would cause a change in meaning in case one is replaced by the other (e.g. *pat* and *bat*). Likewise, a phonemically aware person must be able to perceive that sounds like /t/ and /tʃ/ are allophones, at least in Portuguese. It means that they would not cause a change in meaning in words like '*tia*' ([tʃia] or [tia]) (ALVES, 2012b, p. 39). On the other hand, in English these sounds are phonemes, because they have distinctive features, for example, if the word 'tore' [tɔː] is pronounced as [tʃɔː] (chore) we have two completely different words. Thus, we can see how important the development of phonological awareness is for both the acquisition of an L1 and an L2.

Based on what has been presented up to here, we may suppose that an L2 learner, literate in his/her L1, is able to transfer their reflection and manipulation abilities from L1 into the L2. Nevertheless, according to Alves (2012a, p. 171), this "is not true".[7] This author states that even if a learner is phonologically aware of his or her own language, he/she will not have the same level of awareness in the language being acquired. In this sense, the author affirms that "the differences between both sound systems [the L1's and the L2's] need to be noted by the learner, so that he/she is able to manipulate them"[8] (p. 171).

Thus, we can state that the L2 teachers' work is of paramount importance in order to bring phonological awareness to their learners since many phonemic aspects may not be as evident for those learners as we think.

---

[5] "implica saber reconhecer que as palavras são constituídas de sons de caráter distintivo, envolvendo a capacidade de manipulação que inclui segmentar, unir e modificar tais sons [...] para a criação de novas palavras".

[6] "reflexão e manipulação".

[7] "não é verdade".

[8] "as diferenças entre ambos os sistemas sonoros precisam ser notadas pelo aprendiz, para que elas então possam ser manipuladas".

THE ENGLISH LANGUAGE VOCALIC SYSTEM

According to Ladefoged (2005) there are approximately 200 vocalic sounds in the languages around the world. On Chart 2 below, we present the vocalic sounds of English language in the British and American varieties.

Chart 2 – English Language Vocalic System

British English		**American English**	
Orals Monophthongs (12)	**Orals Monophthongs (08)**	**Orals Monophthongs (10)**	**Orals Monophthongs (05)**
/ɪ/ fish	/aɪ/ bike	/ɪ/ fish	/aɪ/ bike
/iː/ sheep	/aʊ/ mouth	/i/ sheep	/aʊ/ mouth
/ʊ/ book	/ɪə/ here	/ʊ/ book	/eɪ/ tray
/uː/ shoe	/eɪ/ tray	/u/ shoe	/oʊ/ show
/æ/ cat	/ eə/ hair	/æ/ cat	/ɔɪ/ boy
/ɑ/ alarm	/əʊ/ show	/ɑ/ alarm	
/ɔː/ horse	/ɔɪ/ boy	/ɔ/ horse	
/ɒ/ dog	/ʊə/ tourist	/ʌ/ up	
/ʌ/ up		/ɛ/ left	
/ɜː/ her		/ə/ teacher	
/ɛ/ left			
/ə/ teacher			

Source: The authors based on Roach (2009) and Celce-Murcia; Brinton e Goodwin (2010).

Based on Chart 2, we can verify that in North American English there are 15 vocalic sounds: 10 oral vowels: /ɪ/, /ʊ/, /æ/, /ɛ/, /ə/, /ʌ/, /i/, /u/, /ɑ/, /ɔ/; 5 oral diphthongs: /a͡ɪ/, /e͡ɪ/, /ɔ͡ɪ/, /a͡ʊ/, /o͡ʊ/ (CELCE-MURCIA; BRINTON; GOODWIN, 2010).

In British English, we have 20 vocalic sounds: 7 simple monophthongs: /ɪ/, /ʊ/, /æ/, /ɒ/, /ɛ/, /ə/, /ʌ/; 5 complex monophthongs: /iː/, /uː/, /ɑː/, /ɔː/, /ɜː/; and 8 oral diphthongs: /aɪ/, /aʊ/, /ɪə/, /eɪ/, /eə/, /əʊ/, /ɔɪ/, /ʊə/ (ROACH, 2009). The 8 British English diphthongs are divided in 5 rising diphthongs: /a͡ɪ/, /e͡ɪ/, /ɔ͡ɪ/, /a͡ʊ/, /ə͡ʊ/; and 3 centring diphthongs: /ɪə/, /eə/, /ʊə/.[9] These 3 centring

[9] For this article we are going to use the standard transcription presented by dictionaries like *Cambridge English Dictionary* e *Oxford English Dictionary* and authors like Davenport and Hannahs (2005); Roach (2009); Ashton and Shephard (2012), because they are in accordance with IPA (International Phonetic Alphabet).

diphthongs only happen in British English in words like *hear* [heəʳ], *hair* [heəʳ], *tourist* [ˈtʊərɪst] (CRISTÓFARO-SILVA, 2012).

Celce-Murcia, Brinton and Goodwin (2010) state that the factors which should be taken into consideration when we study vocalic sounds are:

> 1) The degree to which the vowel is articulated with an accompanying glide; 2) The vowel's relative place of articulation within the oral cavity (high versus mid versus low; front versus central versus back); 3) The position of the lips during articulation (spread versus neutral versus rounded); and 4) Vowel quality: tense versus lax. (p. 114).

This knowledge should be part of the learners' instructions in the learning of English as a second or foreign language in order to help them in the process of its phonological acquisition.

STUDIES ABOUT VOWELS AND DIPHTHONGS PRODUCTION IN ENGLISH AS AN L2

In this section, we present some studies that investigate the oral production of English language diphthongs. These studies portrait the English language acquisition by speakers of other languages.

Balas (2009) investigate the possible changes in the pronunciation of English centring diphthongs in data obtained through the reading of sentences. The participants were nine Polish learners of advanced English with ages between 19 and 25 and a native speaker of British English. According to this author, in Polish language there are no real diphthongs, only vowel sequences accompanied by glides that are similar to English rising diphthongs, but not similar to centring diphthongs.

The author, based on the theoretical assumptions of "Natural Phonology" or "Natural Linguistics",[10] verifies that the diphthongs produced by Polish learners of English are placed in a category which she calls "Vowel Space Repopulation", that is, the sounds produced by the Polish are not explained by the concepts of transfer or interference. She hypothesises that the diphthongs oral realisations of this group of learners are situated in the L2 interlanguage phonological system.

Thus, she concludes that it is not possible to make any definite affirmation about the acquisition of the vocalic height by Polish speakers of English. Concerning the phonological diphthong /ɪə/, the values of the F1[11] showed that the English native

[10] Donegan, 1985, 1993, 2001; Dressler, 1984, 1985, 1996, 1999; Dziubalska-Ko³aczyk, 1990, 1995, 2001, 2002a, 2002b; Ritt, 2001 *apud* BALAS, 2009).

[11] Balas (2009) submitted the data collected to the programme of acoustic analysis Praat (BOERSMA; WEENINK, 2008) and used the values of F1, F2 and F3 formants to compare the English centring diphthongs produced by an English native speaker and the realisations of Polish learners of English.

speaker production was higher in the first part of the diphthong than the production of the Polish learners. Regarding the phonological diphthong /ʊə/, the first part of the diphthong was also lower in the production of the Polish learners when compared to the native speaker of English. Regarding the diphthong /eə/ the author observed a lowering of the F1 values in the first part of the segment produced by the Polish learners.

Mousa (2015) also studied the production of phonological diphthongs in English as an L2. His research was carried out under the premise that "years of investigation have revealed that child language, second/foreign language learning, and pidgin and creole languages are, more or less, related in terms of processing" (p. 1). In order to confirm this premise, the author compares the acquisition of the centring diphthongs /əʊ/ and /eɪ/ in words like 'home' and 'lane' by Arabic learners of English with the creolisation[12] process of two speakers of Jamaican Creole.

As it happens in the Polish language, according to Mousa (2015, p. 2), there are no phonological diphthongs in Arabic and the vocalic combinations similar to diphthongs like /aw/ and /aj/ are realised as /oː/ and /eː/ respectively. Mousa states that /aw/ and /aj/ are not considered diphthongs, because /w/ and /j/ have a consonantal status.

Concerning the Jamaican Creole, Mousa (2015) affirms that there are diphthongs like /ai/, /ou/, /ie/ and /uo/ in this language and they are similar to the vocalic sounds in English words like *mice*, *cow*, *cane* and *goat*. However, the author states that the Jamaican Creole "has been affected by a phonemic reduction tendency that languages with Pidgin origins had gone through" (p. 3). Therefore, words like face /feɪs/ and goat /gəʊt/ are frequently produced as /feːs/ or /fies/ and /goːt/ or /guot/ by Jamaican Creole speakers.

The results of his research show that in all the cases the Arabic learners produced /oː/ instead of /əʊ/ in words like 'home', 'hope', 'coat', 'rope' and /eː/ for /eɪ/ in words like 'rain', 'lane' and 'train'. These findings could cause researchers to believe that some 'deviations' may be produced because of L1 transfer, however, coincidently, the Jamaican participants also used the same monophthongs (/oː/, /eː/) when producing the diphthongs mentioned.

Mousa (2015) concluded that if speakers from such different origins chose to produce the mentioned diphthongs (English centring diphthongs) in the same way, then, the hypothesis of transfer cannot be sustained. The author states that the monophthongised realisations of the diphthongs are both present in the production of learners from different ethnic groups learning an L2 and also in the production of

[12] The process of languages mixing to produce new ones, used especially to refer to mixtures of local languages with European languages (PIDGIN, 2019).

children from different nationalities acquiring their mother tongues. On the other hand, the production of long vowels shows that the research participants are aware the vowels in those words are not simple but complex.

In the following section, we discourse about the oral realisations of the diphthongs in the target words selected for this study.

The Oral Realisations of Orthographic Diphthongs in English Language

In this section, we focus on the English language functioning in order to understand why Brazilians speaker of English produce marked realisation of some orthographic diphthongs.

Differently from Portuguese language, in which most of time the realisation of an orthographic diphthong as a phonological monophthong is interpreted as a linguistic variation of the standard norm, in English Language there are two situations.

- In the first one, we have the words that are written with diphthongs which must be pronounced as phonological monophthongs,[13] for example, *juice*, *caution* and *bought* realised as [dʒuːs], [ˈkɔːʃən], [bɔːt] respectively.
- In the second one, we have words that are written with diphthongs and must be pronounced with two distinct phonemes, for example, painter [ˈpeɪntər], sound [saʊnd] and approach [əˈprəʊtʃ] (ASHTON; SHEPHERD, 2012; SMITH; MARGOLIS, 2012).

This alternation between the oral realisations of orthographic diphthongs, sometimes as monophthongs, sometimes as diphthongs, may cause difficulties for those who are willing to learn English. This will happen especially when the contact with this language occurs during adolescence or adulthood since these learners are generally exposed to the written words before or at the same time their pronunciation is presented to them. Therefore, the written form of the words may lead learners to make a wrong association between spelling and pronunciation. It is based on this premise that we investigated how Brazilian learners of English, from intermediate and advanced levels, realise the diphthongs presented in Chart 3.

[13] Although we know that in English there are some words that despite being written with diphthongs are pronounced as monophthongs, our intention is to appoint that Brazilian learners of English must be aware of this aspect.

Chart 3 – English words with orthographic diphthongs and their realisations according to the pronunciation norm of the target language

N.	Orthographic Diphthongs	Realised as phonological monophthongs in the target language		Realised as phonological diphthongs in the target language	
01	<ai>	against said	[əˈgɛnst] [sɛd]	painter trained	[ˈpeɪntər] [treɪnd]
02	<au>	aunt author because caught caution sauce taught	[ɑːnt ~ ɑænt ~ ɑnt] [ˈɔːθər] [bɪkɒz ~ bɪˈkʌz] [kɔːt ~ kɑːt] [ˈkɔːʃən] [sɔːs ~ sɑːs] [tɔːt]		
03	<ea>	deal death early earth heard heart heavy learned peace sea	[diːl] [dɛθ] [ˈɜː(r)li] [ɜː(r)θ] [hɜː(r)d] [hɑː(r)t] [ˈhɛvi] [lɜː(r)nd] [piːs] [siː]	hear idea	[hɪə (r)] [aɪˈdɪə]
04	<ee>	agree fee green need speed	[əˈgriː] [fiː] [griːn] [niːd] [spiːd]		
05	<ei>	ceiling receive	[ˈsiːlɪŋ] [rɪˈsiːv]		
06	<eo>	people	[ˈpiːp(ə)l]		
07	<ie>	ancient believe cookie grieve smoothie	[ˈeɪnʃənt] [bɪˈliːv] [ˈkʊki] [griˈv] [ˈsmuːði]	died	[daɪd]
08	<io>	ambition education	[æmˈbɪʃən] [ˌedʒʊˈkeɪʃen]		

N.	Orthographic Diphthongs	Realised as phonological monophthongs in the target language		Realised as phonological diphthongs in the target language	
09	<oa>			approach boat goal	[əˈprəʊtʃ] [bəʊt ~ boʊt] [gəʊl]
10	<oe>	canoe shoe	[kəˈnuː] [ʃuː]		
11	<oi>			choice join	[tʃɔɪs] [dʒɔɪn]
12	<oo>	blood choose root stood tattoo zoo	[blʌd] [tʃuːz] [ruːt] [stʊd] [tætˈuː] [zuː]		
13	<ou>	bought could country enough pour thought	[bɔːt] [kʊd] [ˈkʌntri] [ɪˈnʌf] [pɔː(r)] [θɔːt]	sound	[saʊnd]
14	<ue>	glue	[gluː]		
15	<ui>	biscuit building juice	[ˈbɪs·kɪt] [ˈbɪldɪŋ] [dʒuːs]		

Source: Elaborated by the authors based on the target words selected for this research.

In Chart 3, we present 63 English words from different grammatical categories as verbs, nouns and adjectives containing orthographic diphthongs. 52 out of these 63 words are realised orally as monophthongs and 11 are realised as phonological diphthongs (used as distractors). We selected these words, randomly, based primarily on the fact that they are written with diphthongs and also based on their recurrence in communicative situations according to our experience as an L2 teacher. As we could verify, the 15 orthographic diphthongs are realised in various forms, for example, the diphthong <ea> can be pronounced as /iː/, /ɛ/, /ɜː/, /ɪə/ (deal [diːl], death [dɛθ], earth [ɜː(r)θ], idea [aɪˈdɪə]). That's why, in most cases, we selected more than one word with a given orthographic diphthong.

The explanation on the previous paragraph justifies the discrepancy in the orthogonality of the words selected. In other words, the reason why we chose more than one word with the same orthographic diphthong is justified by the fact that the diphthongs have multiple oral realisations.

Methodology of Data Collection and Analysis

For this study, we initially selected 63 English words containing orthographic diphthongs as presented in Chart 3. These words from different grammatical categories were organised in a list with their phonetic transcriptions based on two renowned online dictionaries: the 'Cambridge English Dictionary' and 'The Oxford English Dictionary'.[14] These transcriptions bring the Standard English spoken in The United Kingdom and in The United States of America. Although we know there are many varieties of English Language around the world, we are going to use these two as reference.

Following that, the words were randomly separated into two groups. For the first group, we wrote definitions with which we obtained the target words orally. The second group were inserted into contextualized sentences so that the participants could read them out loud enabling us to obtain their oral realisations. Thus, we had a questionnaire with 22 questions and a list with 31 sentences (containing 41 words) to be read out loud.

The total number of questions and sentences (53) is not the same as the total number of selected words (63) because the sentences contained one or more target words. The disparity between the numbers of words collected with the questionnaire (22) and with the sentences (41) is justified since one of the objectives of this study is to verify the influence of spelling over pronunciation.

The 21 participants are all from a private language school from Londrina, in the State of Paraná-Brazil. Regarding their gender, 15 are females and 6 are males. Their age ranges from 14 to 60 years old. They were selected primarily because they were Brazilian students of English language in intermediate and advanced levels. We initially used the levels they were in at the school as a parameter to invite them to take part in this study, but in order to make sure they were at the level required, we also applied a complementary levelling test with 50 questions.[15]

The data, obtained through the questionnaire and the list of sentences to be read out loud, were recorded and transcribed using the symbols of IPA (The International Phonetic Alphabet). To analyse the percentages of the data collected, we submitted the data to the computer programme *Goldvarb X* (SANKOFF; TAGLIAMONTE; SMITH, 2005). For this reason, the data were coded according to the following variables: 1) the oral realisation of the orthographic diphthongs either as monophthongs or diphthongs; 2) the types of orthographic diphthongs (13 all together, disregarding the two used only as distractors); 3) the diphthong position in the target words; 4) the stress of the target syllable; and 5) the instruments used in the data collection (questionnaire or sentences to be read).

[14] Available at: www.dictionary.cambridge.org and www.oxforddictionaries.com.

[15] The levelling test used is from National Geographic Learning which is part of Cengage Learning Company. Available at <http://www.eltoutcomes.com/>.

These variables were created to support the analyses. That is, our intention is to verify if the linguistic variables may influence the pronunciation of a given orthographic diphthong in English language. The data about the extralinguistic variables are not presented in this article because of the length limitation.

Description and Analysis of the Linguistic Variables

As a starting point for the analysis, we present Table 1 with the researched diphthongs in alphabetical order. This Table presents the orthographic diphthongs and the percentages of realisations either as phonological monophthongs or phonological diphthongs produced by the participants.

Table 1 – Oral realisations of the orthographic diphthongs by the participants[16]

Orthographic Diphthongs	Total of realisations	Realised as phonological monophthongs		Realised as phonological diphthongs	
ai	42	35	83,3%	07	16,7%
au	143	82	57,3%	61	42,7%
ea	204	192	94,1%	12	5,9%
ee	101	101	100%	0	0%
ei	37	26	70,3%	11	29,7%
eo	21	21	100%	0	0%
ie	99	83	83,8%	16	16,2%
io	33	32	97%	1	3%
oe	41	26	63,4%	15	36,6%
oo	124	118	95,2%	6	4,8%
ou	125	99	79,2%	26	20,8%
ue	14	14	100%	0	0%
ui	61	33	54,1%	28	45,9%
TOTAL	**1045**	**862**	**82,5%**	**183**	**17,5%**

Source: The authors.

In Table 1, we can verify in which of the 13 selected orthographic diphthongs in English language this group of participants presented higher difficulties of oral realisations and which has supposedly been internalised by them. Based on this Table, we explain the realisations obtained in relation to each diphthong.

[16] We do not present the orthographic diphthongs <ao> and <oi> in Chart 4 because the selected words with these diphthongs were used only as distractors.

Regarding the orthographic diphthong <ai> we observed that among the 16,7% of marked production we found words like said [sɛd] realised as [seɪd] and [seɪs], with 25.58% of occurrence. We believe that these marked occurrences are directly linked to the influence of spelling since <ai> is realised as the phonological diphthong [ei] in words like painter [ˈpeɪntər] and trained [treɪnd] used as distractors in the instruments used for the data collection. This hypothesis is confirmed by the studies of Das (2014) among others. According to this author, the production of certain segments by English speakers as an L2 may be influenced by its orthography.

The orthographic diphthong <au> presented a considerable index of diphthongised realisations (42,7%) in the general computation, that is, phonologically marked. The marked indexes are even more expressive when we analyse word by word. For example, the diphthong <au> in the word 'author' [ˈɔːθər] was realised by the participants as [ˈaʊtər] or [ˈoʊtər] in 88.24% of the cases. The index of marked realisation in the word 'caution' [ˈkɔːʃən] was of 61.90% ([ˈkaʊʃən]), followed by the word 'sauce' [sɔːs, sɑːs] and 'aunt' [ɑːnt, ænt], realised as [sɔʊs] in 52.38% of the cases and [aʊnt] with 42.86% of occurrences and 'caught' [kɔːt, kɑːt] realised as [kaʊt] or [koʊt] in 38.10% of the cases. As we could see, to almost 43% of the learners, who took part in this research, the diphthong <au> was realised as a phonological diphthong. Our hypothesis for this high index of marked occurrences is the influence of orthography over orality, the transfer of L1 features to the L2 and the lack of phonological awareness (based on ERDENER; BURNHAM, 2005, ZIMMER; ALVES, 2006; ALVES; BARRETO, 2012; ALVES, 2018).

The orthographic diphthong <ea> with 204 oral realisations in words as 'deal' [diːl], 'death' [dɛθ], 'early' [ˈɜː(r)li], 'earth' [ɜː(r)θ], 'heard' [hɜː(r)d], 'heart' [hɑː(r)t], 'heavy' [ˈhɛvi], 'learned' [lɜː(r)nd], 'peace' [piːs] and 'sea' [siː] did not present an expressive number of marked realisations, only 5.9%. This index is quite surprising since the orthographic diphthong <ea> presents at least four different oral realisations /iː, ɛ, ɜː, ɑː/ in the selected words. We believe that the high index of realisations in accordance with the standard pronunciation norms of English language is the well succeeded internalisation of those segments by the researched participants.

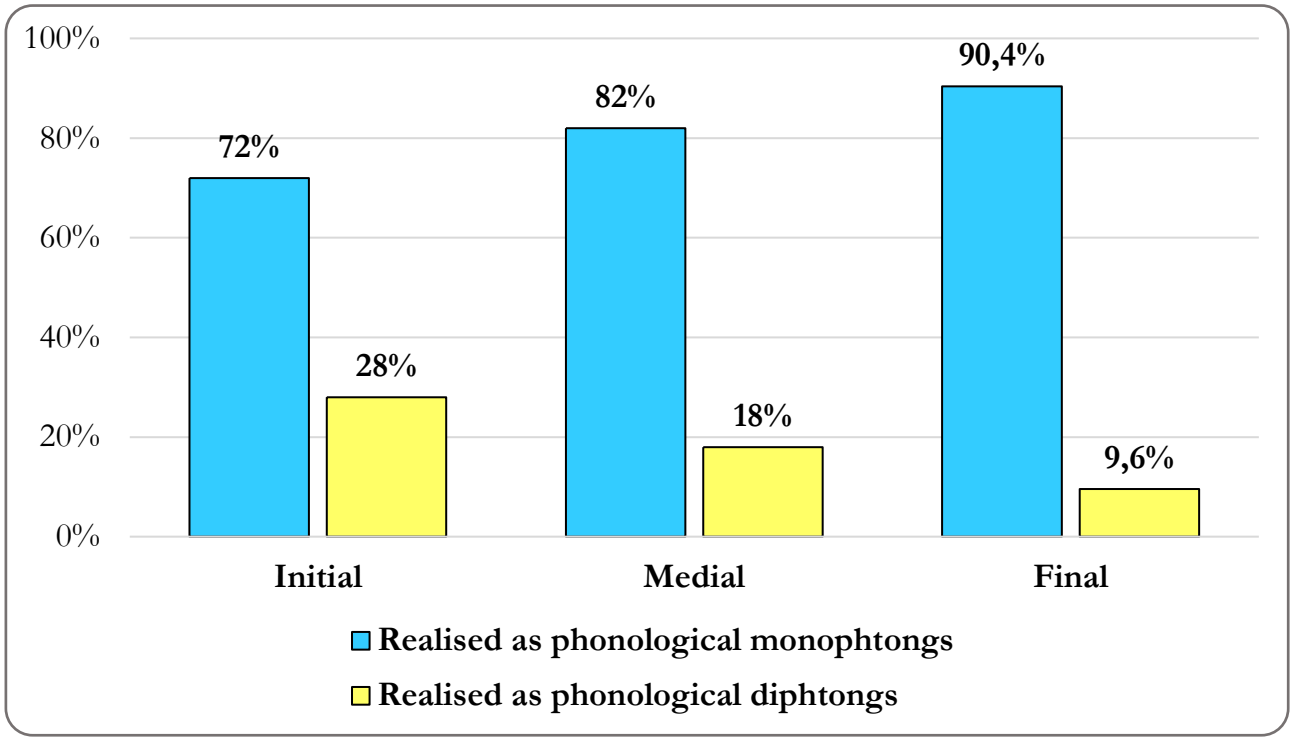
The same happened with the orthographic diphthongs <ee> and <eo> which were not realised in a marked way by the participants in words like 'agree' [əˈgriː], 'fee' [fiː], 'green' [griːn], 'need' [niːd], 'speed' [spiːd] and 'people' [ˈpiːp(ə)l].

The orthographic diphthong <oe> was present in only two of the target words (*canoe* [kəˈnuː] and *shoe* [ʃuː]). However, it presented a high index of marked forms (36.6%). The word 'canoe' is the main reason for this high index. Even though the diphthong <oe> in the word 'canoe' occurs in the same position of the word 'shoe' and is pronounced in the same way, /uː/, according to the norms of English pronunciation, the participants realised it as [kæˈnoi], [kəˈnəʊ] or [kəˈnoʊ] in 71.43% of the cases. Regarding this index, we hypothesise that it may happened because 'canoe' is a cognate in the L1of the participants.

Another orthographic diphthong with high indexes of marked forms is <ui> in words like 'biscuit' ['bɪskɪt] and 'juice' [dʒu:s]. The word 'biscuit' was realised as ['bɪskuɪt] in 80.95% of the cases, and the word 'juice' was realized as [dʒuis] in 50% of the cases. Once again we noted a possible influence of spelling over speaking and features of transfer of mother tongue over target language, since the orthographic diphthong <ui> is realised as the phonological diphthong [uɪ or wɪ] in Portuguese, in most cases.

Based on what was presented, we have a description of the words that were realised as marked more often by the participants. Some of these words are: said [sɛd], author ['ɔ:θər], caution ['kɔ:ʃən], sauce [sɔ:s, sɑ:s], aunt [ɑ:nt, ænt], canoe [kə'nu:], biscuit ['bɪskɪt] and juice [dʒu:s]. In the following section, we discuss the position of the orthographic diphthongs in the target words.

The Realisation of the Orthographic Diphthong According to Their Position in the Target Words



Source: Elaborated by the authors.

Graph 1 – Realisations of the orthographic diphthongs according to their position in the target words

Graph 1, presented below, portraits the percentages of oral realisation of the orthographic diphthongs in English language according to their position in the target words (initial, medial or final) produced by the group of learners researched. Although this Graph presents considerable indexes of realisations within the pronunciation norm of the L2 (initial: 72%, medial 82%, final 90,4%) we also highlight the percentages of

marked realisations (initial: 28%, medial: 18%, final: 9,6%) in order to analyse them and formulate hypotheses that may justify these realisations.

Based on the information presented in Graph 1, we could verify that for this group of learners if the orthographic diphthong occurs in the initial position of the word it tends to be realised, more frequently, in a diphthongised way. Some examples of these are: author [ˈɔːθər] and aunt [ɑːnt, ænt], realised as [ˈoʊtər] or [ˈaʊtər] and [aʊnt], respectively. Despite having few examples among the target words with orthographic diphthongs in initial position, they showed considerable occurrences of diphthongised realisations. Our hypothesis for these occurrences is that when Brazilian learners resort to their phonological repertoire in L1 they usually find words starting with orthographic diphthongs almost always realised as phonological diphthongs, for example, '*autor*', '*autoridade*', '*autoria*' (author, authority, authorship). On the other hand, words like 'early' [ˈɜː(r)·li] were realised 100% within the pronunciation norm of English and 'earth' [ɜː(r)θ] was realised, by this group of learners, with only 9.52% as phonological diphthongs.

Table 2 – Orthographic diphthongs realised as a deviant form according to their position in the target words

Position of the orthographic diphthongs in the target words	Words	Realisations according to the target language	Participants' realisations	Percentage of deviant realisations
Initial	aunt	[ɑːnt, ænt]	[aʊnt]	42.86%
	author	[ˈɔːθər]	[ˈaʊtər ~ ˈoʊtər]	88.24%
	earth	[ɜː(r)θ]	[worθ ~ ɪərθ]	9.52%
Medial	ancient	[ˈeɪnʃənt]	[ˈeɪnʃɪənt ~ ˈeɪnsɪant]	82.35%
	bought	[bɔːt]	[boʊt]	23.81%
	caught	[kɔːt] [kɑːt]	[kaʊt ~ koʊt]	38.10%
	caution	[ˈkɔːʃən]	[ˈkaʊʃən]	61.90%
	ceiling	[ˈsiːlɪŋ]	[ˈseɪlɪŋ]	41.18%
	country	[ˈkʌntri]	[ˈkaʊntri]	47.62%
	deal	[diːl]	[dɪal]	23.81%
	juice	[dʒuːs]	[dʒuis]	55%
	said	[sɛd]	[saɪd ~ seɪd]	28.57%
	sauce	[sɔːs]	[sɔʊs ~ saʊs]	52.38%
	taught	[tɔːt]	[taʊt]	19.05%
Final	canoe	[kəˈnuː]	[kəˈnəʊ ~ kəˈnoʊ]	71.43%

Source: The authors.

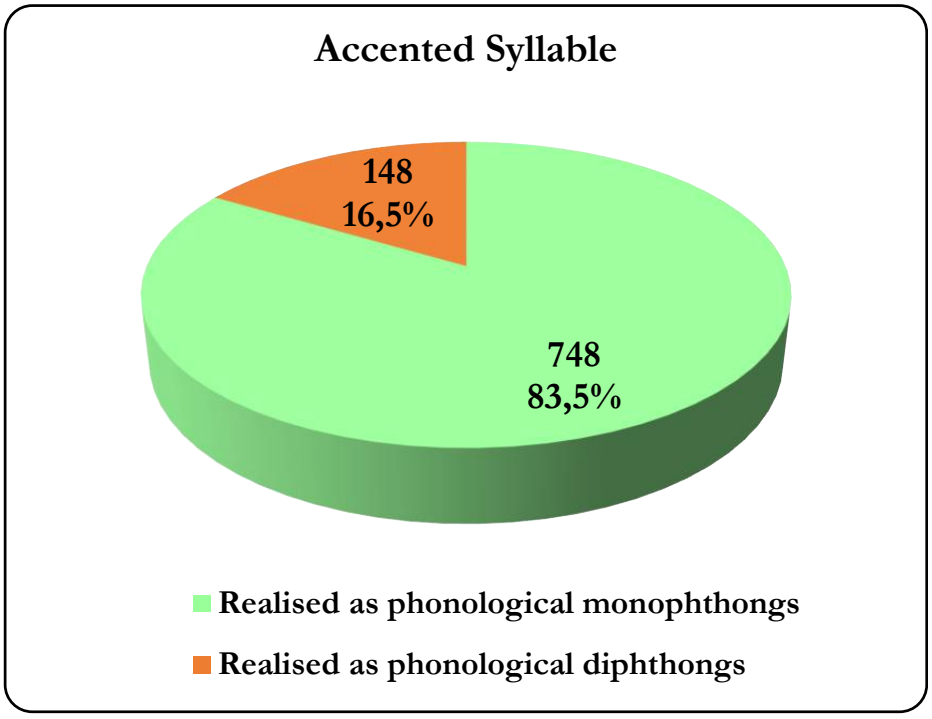
In order to have a wider view of how the orthographic diphthongs were realised according to their position in the target words, we present Table 2 with the words more frequently realised in a deviant form.

The words from Table 2 are organised in alphabetical order. When we analyse this Table, despite the variation of the numbers of words in each category, we can verify that the marked forms of the target diphthongs present indexes between 9.52% and 88.24% in initial position, 19.05% and 82.35% in medial position, and in final position we obtained 71.43%. In the following sections, we make some considerations about the possible influence of the stress of the target syllable in the realisation of the orthographic diphthongs.

Stress of the Target Syllable

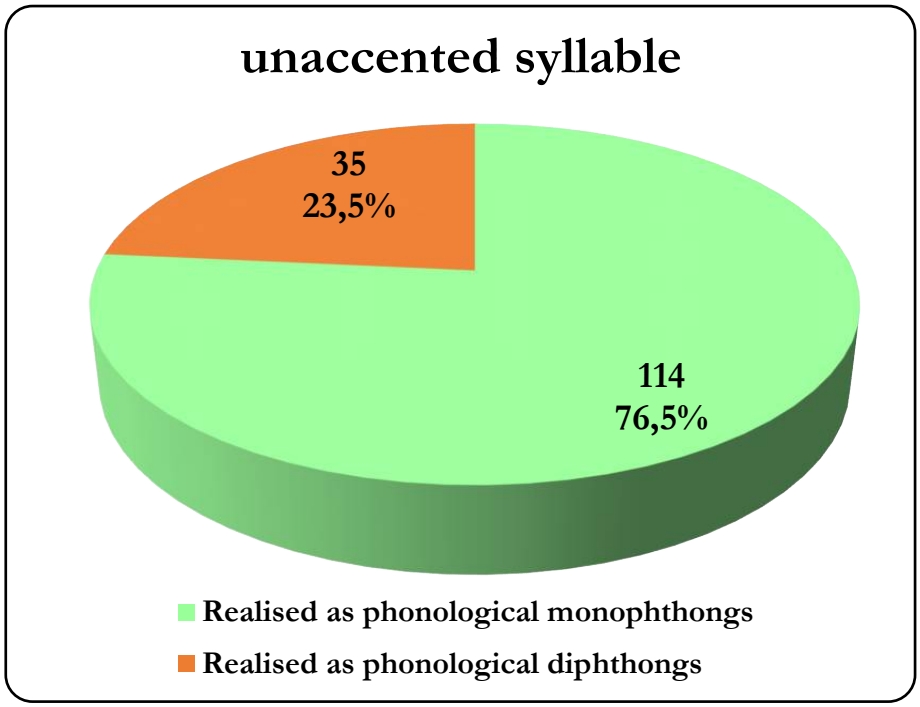
44 out of 52 of the target words (84,62%) containing the researched orthographic diphthongs present the target diphthongs in the accented position and 15,38% (8 words) in the unaccented position. We investigated the stress of the target syllable in order to verify if this aspect has any influence over the realisations of the orthographic diphthongs by the participants. Graphs 2 and 3 below present the realisations of the diphthongs either as phonological diphthongs or phonological monophthongs as produced by the research participants.

Graph 2 – Realisations of the orthographic diphthongs in accented syllables



Source: Elaborated by the authors.

Graph 3 – Realisation of the orthographic diphthongs in unaccented syllables



Source: Elaborated by the authors.

862 out of 1.045 of the realisations collected (82,5%) were realised as phonological monophthongs and 17,5% (183 words) were realised as phonological diphthongs, that is, in a marked way. As presented in Graph 2, we observed a lower occurrence of orthographic diphthongs realised as phonological diphthongs when they were in accented syllables (16,5%). On the other hand, when the diphthong occurred in unaccented syllables, as we can see in Graph 3, we verified a higher index of marked realisations (23,5%).

However, when we analyse the words separately, we observe that there is a more significant occurrence of marked realisations in target words which the diphthongs occurred in accented syllables Example of these words are: author /ˈɔːθər/, canoe /kəˈnuː/, caution /ˈkɔːʃən/, country /ˈkʌntri/, juice /dʒuːs/ and sauce /sɔːs/, realised as [ˈaʊθər], [kəˈnoe], [ˈkaʊtʃən], [ˈkaʊntri], [dʒuis] and [sɔʊs] respectively. Based on these data, we believe that the realisations of orthographic diphthongs in a marked way might be more related to the type of diphthong than the stress of the target syllable.

Final Remarks

The data and the analyses presented in this article make us reflect upon the linguistic variables that may influence in the quality of oral production of words in English language containing orthographic diphthongs. These data and these analyses stem from a wider doctorate research.

The linguistic variables are seen as important aspects for the description and the analysis of the data collected because they indicate that some orthographic diphthongs have a greater tendency to be realised as phonological diphthongs than others. Our assumptions for this result is that Brazilian learners of English, in the process of acquiring the oral production of this language, transfer some phonological features from their L1 into the L2, which depicts a development process of their L2 interlanguage.

Yet, although we have detected some oral productions as marked or even difficult to be understood, we verified that the researched participants performed, in general, a satisfactory realisation of the studied segments with 82.5% of the realisations of the target words within the standard norms of English language pronunciation.

Regarding the questions related to the teaching and learning of English language pronunciation, we believe that this study may contribute to the understanding of how some orthographic diphthongs in this language is realised by Brazilian learners and, thus, motivate English teachers to use explicit phonetic and phonological instruction as a tool to raise their students' phonological awareness. We still believe that the development of phonological awareness of vocalic segments realisations may be a feasible way to help Brazilian learners understand how these sounds work in English language and, thus, enable them to produce these sounds in a more appropriate way.

References

ALVES, U. K. Consciência dos aspectos fonético-fonológicos da L2. *In:* LAMPRECHT, R. R. (org.). *Consciência dos sons da língua:* subsídios teóricos e práticos para alfabetizadores, fonoaudiólogos e professores de língua inglesa. 2. ed. Porto Alegre: EDIPUCRS, 2012a. p. 169-191.

ALVES, U. K. O que é consciência fonológica. *In:* LAMPRECHT, R. R. (org.). *Consciência dos sons da língua:* subsídios teóricos e práticos para alfabetizadores, fonoaudiólogos e professores de língua inglesa. 2. ed. Porto Alegre: EDIPUCRS, 2012b. p. 29-41.

ALVES, U. K. Teoria dos sistemas dinâmicos e desenvolvimento fonético-fonológico em uma nova língua. *In*: ORTIZ-PREUSS, E.; FINGER, I. (org.). *A dinâmica do processamento bilíngue.* Campinas: Pontes, 2018. p. 117-161.

ALVES, U. K.; BARRETO, F. M. O processamento e a produção dos aspectos fonético-fonológicos da L2. *In:* LAMPRECHT, R. R. (org.). *Consciência dos sons da língua:* subsídios teóricos e práticos para alfabetizadores, fonoaudiólogos e professores de língua inglesa. 2. ed. Porto Alegre: EDIPUCRS, 2012. p. 193-209.

ARCHIBALD, J. Transfer, contrastive analysis and interlanguage phonology. *In:* KANG, I.; THOMSON, R. I.; MURPHY, J. M. (ed.). *The Routledge Handbook of Contemporary English Pronunciation*. London: Routledge, 2018. p. 9-24.

ASHTON, H.; SHEPHERD, S. *Work on your accent:* clearer pronunciation for better communication. London: Harper Collins Publishers, 2012.

BALAS, A. English centering diphthong production by Polish learners of English. *Research in Language,* v. 7, i. 1, p. 129-148, 2009.

BAYLEY, R. Second language acquisition and sociolinguistic variation. *Intercultural Communication Studies,* v. 14, i. 2, p. 1-15, 2005.

BEEBE, L. The influence of the listener on code-switching. *Language Learning* – A journal of Research in Language Studies, v. 27, n. 2, p. 331-339, 1977.

CELCE-MURCIA, M.; BRINTON, D. M.; GOODWIN, J. M. *Teaching pronunciation:* a course book and reference guide. 2nd ed. New York, NY: Cambridge University Press, 2010.

CHARD, D. J.; DICKSON, S. V. Phonological awareness: Instructional and assessment guidelines. *Intervention in School and Clinic,* v. 34, i. 5, p. 261-270, May 1999.

CRIOULO. *Dicio*. Dicionário Online de Português. Acepção 6. Available at: bit.ly/3dDjxkWcrioulo. Access on: Feb. 16 2019.

CRISTÓFARO-SILVA, T. *Pronúncia do inglês:* para falantes do português brasileiro. São Paulo: Contexto, 2012.

DAS, K. Production of central vowels and centering diphthongs by Assamese speakers of English. *Northeast Journal of Contemporary Research,* v. 1, i. 1, p. 55-64, May 2014.

DAVENPORT, M.; HANNAHS, S. J. *Introducing phonetics & phonology.* 2nd ed. London: Hodder Education, 2005.

ECKMAN, F. R. On the naturalness of interlanguage phonological rules. *Language Learning* – A Journal of Research in Language Studies, v. 30, i. 1, p. 195-216, June 1981.

ECKMAN, Fred R. Theoretical L2 phonology. *In:* KANG, I.; THOMSON, R. I.; MURPHY, J. M. (ed.). *The Routledge Handbook of Contemporary English Pronunciation.* London: Routledge, 2018. p. 25-38.

ELLIS, R. *Understanding second language acquisition.* Oxford: Oxford University Press, 1986.

ELLIS, R. Interlanguage variability in narrative discourse: Style shifting in the use of past tense. *Studies in Second Language Acquisition,* v. 9, i. 1, p. 1-20, 1987.

ELLIS, R. *The study of second language acquisition.* Oxford: Oxford University Press, 1994.

ERDENER, V. D.; BURNHAM, D. K. The role of audiovisual speech and orthographic information in nonnative speech production. *Language Learning,* v. 55, i. 2, p. 191-228, June 2005.

FRASER, H. Phonetics, phonology, and the teaching of pronunciation: a new CD-ROM for ESL learners, and its rationale. AUSTRALIAN INTERNATIONAL CONFERENCE ON SPEECH SCIENCE AND TECHNOLOGY, 8., 2000, Canberra. *In: Proceedings of SST 2000.* p. 180-185. Available at: bit.ly/3dDN2Dcfraser. Access on: May 20 2018.

KEYS, K. J. State of the art: interlanguage phonology - factors and processes in the development of a second language phonology. *Revista Brasileira de Linguística Aplicada,* Belo Horizonte, v. 1, n. 1, p. 155-190, 2001. Available at: bit.ly/2UNnjPYKeysKJ. Access on: May 09 2018.

LABOV, W. *Padrões sociolinguísticos.* Translation Marcos Bagno; Maria Marta Pereira Scherre; Caroline Rodrigues Cardoso. São Paulo: Parábola, 2008 [1972].

LADEFOGED, P. *Vowels and consonants:* an introduction to the sounds of languages. 2nd ed. Oxford: Blackwell Publising, 2005.

MORI, A. C. Fonologia. *In:* MUSSALIM, F.; BENTES, A. C. (org.). *Introdução à Lingüística:* domínios e fronteiras. São Paulo: Cortez, 2000. p. 147-179.

MOUSA, A. Acquisition of the Closing Diphthongs /əʊ/ and /eɪ/ in English L2 and Jamaican Creole: a comparative study. *SAGE Open,* p. 1-15, Apr. 2015. Available at: https://bit.ly/3it7APV. Access on: May 25 2018.

PIDGIN. *Michaelis On-line.* Dicionário Brasileiro da Língua Portuguesa. 2019. Available at: bit.ly/3bBNdx2pidgin. Access on: Feb. 16 2019.

ROACH, P. *English Phonetics and Phonology:* a practical course. 4th ed. New York, NY: Cambridge University Press, 2009 [1983].

SANKOFF, D.; TAGLIAMONTE, S. A.; SMITH, E. *Goldvarb X:* A variable rule application for Macintosh and Windows. Department of Linguistics, University of Toronto. 2005. Available at: bit.ly/3as54Glgoldvarb. Access on: Aug. 25 2018.

SELINKER, L. Interlanguage. *IRAL* - International Review of Applied Linguistics in Language Teaching, v. 10, i. 3, p. 209-231, 1972.

SELINKER, L.; DOUGLAS, D. Wrestling in 'context' with Interlanguage Theory. *Applied Linguistics,* v. 6, i. 2, p. 190-204, 1985.

SMITH, J.; MARGOLIS, A. *Pronunciation:* English for academic study. Reading, UK: University of Reading; Garnet Education, 2012.

TARONE, E. Variability in interlanguage use: A study of style-shifting in morphology and syntax. *Language Learning,* v. 35, p. 373-403, 1985.

TREHEARNE, M. P. Phonological Awareness. *In*: TREHEARNE, M. P. *Comprehensive literacy resource for kindergarten teachers.* Chicago, IL: ETA Cuisenaire, 2003. p. 118-152.

ZIMMER, M. C.; ALVES, U. K. A produção de aspectos fonético-fonológicos da segunda língua: instrução explícita e conexionismo. *Linguagem & Ensino,* v. 9, n. 2, p. 101-143, July/Dec. 2006.