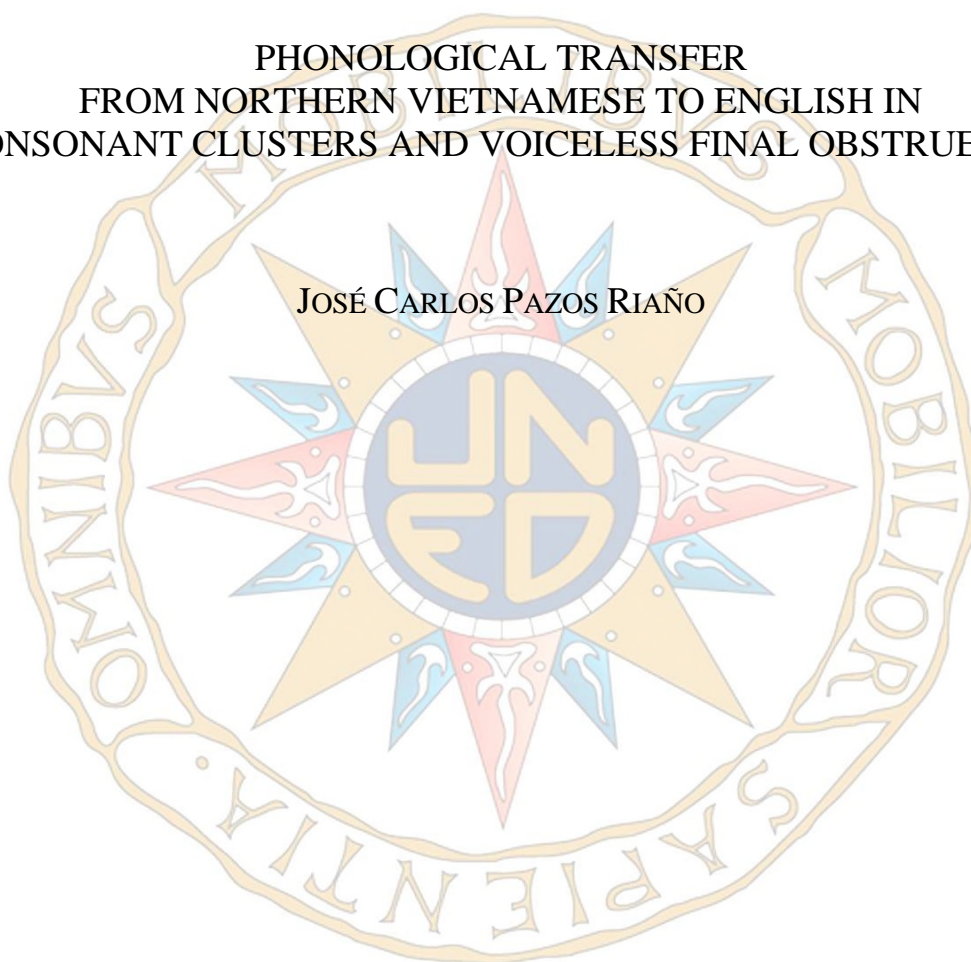




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**PHONOLOGICAL TRANSFER
FROM NORTHERN VIETNAMESE TO ENGLISH IN
CONSONANT CLUSTERS AND VOICELESS FINAL OBSTRUENTS**

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ABSTRACT

This paper studies the phonological transfer from Northern Vietnamese to English observed in the production of consonant clusters and voiceless final obstruents. The pronunciation of a corpus of words produced by eight Northern Vietnamese participants has been obtained by means of two reading tasks and compared to the productions of two RP speakers. Avoiding the idea of correctness, RP English has been considered a model in this study, and Northern Vietnamese English as one more variety of English with the same status as any other. The material has been auditorily and acoustically analysed following a descriptive approach and using a mixed methodology. The features that conform to the phonological transfer from Northern Vietnamese to English have been identified and analysed. Finally, some applications of this study have been proposed to help intelligibility in international contexts and to enhance the teaching of English to Northern Vietnamese students.

RESUMEN

Este documento desarrolla el estudio de la transferencia fonológica desde el dialecto norvietnamita hacia el inglés que se observa en la pronunciación de los grupos consonánticos y de las consonantes oclusivas sordas en posición final de palabra. Mediante la grabación de la lectura de dos textos, se ha elaborado un corpus de palabras, cuya pronunciación por ocho norvietnamitas se ha comparado con la pronunciación de dos hablantes ingleses («RP»). Se ha evitado el concepto de «corrección», ya que la variedad RP del inglés se ha considerado como modelo para este estudio, no como norma, y el dialecto norvietnamita como una variedad más del inglés, con la misma categoría que cualquier otra. El material utilizado en esta investigación ha sido analizado auditiva y acústicamente con un criterio descriptivo y mediante una metodología mixta. Se han identificado y estudiado los rasgos observados que se corresponden con transferencias fonológicas. Por último, se realizan propuestas para mejorar la inteligibilidad en contextos internacionales y para la enseñanza del inglés a los estudiantes norvietnamitas.

KEYWORDS

Consonant cluster, voiceless final obstruent, Northern Vietnamese, International English, phonological transfer, RP English.

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1. INTRODUCTION

1.1. Purpose and Objectives

This paper aims to examine the pronunciation of English by Northern Vietnamese speakers and analyses the cases of phonological interference from the L1 (Northern Vietnamese) to the L2 (English). In order to do that, we will compare the production of consonant clusters and voiceless final obstruents in the two languages. This study will also allow us to reconsider the concepts of correctness and English varieties.

One of the main problems that people living, or working, in an international context have to face up to is mutual intelligibility. Referring to the English language used in international contexts, Smith (1976: 38-39) distinguishes between ‘international language’ and ‘auxiliary language’. For him, the former is ‘one which is used by people of different nations to communicate with one another’, while the latter is ‘a language, other than the first language, which is used by nationals of a country for internal communication’. In this sense, and assuming that English fulfils both aspects, he considers English as an international auxiliary language, and as such, it is not a property of the so-called ‘native speakers’, but of the world, i.e., ‘English belongs to any country which uses it and may have as wide or as limited a use (either as an international or auxiliary language) as is felt desirable’.

With this idea in mind, the concept of correctness lacks a reference (correctness or incorrectness compared with what?). Received Pronunciation (RP) was considered as the Standard English, the ‘teaching model for L2 learners of English and the point of reference against which their pronunciation should be judged’ (Jenkins, 2000: 14). For many reasons, RP is no longer considered as the norm, and ‘regional accents have now become the L1 rule and RP the exception’ (Jenkins, 2000: 14-15). This fact is in line with the assertion of Smith (1976: 38) that ‘there is a single English language but many varieties’ because ‘English belongs to the world and every nation which uses it does so with different tone, color, and quality’ (Smith, 1976: 39).

Accordingly, Northern Vietnamese English may be considered one more variety of English, such as Welsh English, South African English, or any other widely recognised variety

worthy of being studied. Therefore, this research does not deal with the idea of correctness because we are not considering any variety of English as a norm in the sense of Dalton, Christiane & Seidlhofer (1994), quoted by Jenkins (2000: 18): ‘If we treat RP and/or General American as a norm, we connect them strongly with ideas of correctness’. In consequence, this research treats RP as a model, i.e., as a point of reference for the comparison of the Northern Vietnamese English variety, but not as a norm that must be followed.

We can distinguish three significant varieties of Vietnamese: Northern, Central and Southern Vietnamese. This paper undertakes a study on the pronunciation of English by native speakers of the Northern Vietnamese community. In particular, it analyses some cases of phonological transfer from L1 to L2 by Northern Vietnamese speakers, not in terms of correctness, as it has been explained above, but with the view that this English is another variety of English, with the same status as any other variety in the ‘Inner Circle’¹ proposed by Kachru (1992: 355-365). He differentiated the world’s users of English from a sociolinguistic point of view into three concentric circles: The ‘Inner Circle’ (norm-providing), the ‘Outer Circle’² (norm-developing) and the ‘Expanding Circle’³ (norm-dependent). However, it is highly questionable this assumption about the restrictive three circles, at least from a linguistic perspective. According to his theory, Northern Vietnamese English would belong to the ‘Expanding Circle’, which is ‘norm-dependent’. Kachru develops his theory considering the English in his ‘Inner Circle’ as the norm, what is not the view of this research, which has been undertaken considering the Northern Vietnamese English as an established variety of English within the International English framework, worth to be studied as such.

In a study carried out by Jenkins in a multilingual group of students, ‘pronunciation emerged as by far the greatest factor in unintelligibility, and the difficulty tended to increase with the gap between interlocutors’ first languages’ (Jenkins, 2000: 19-20). This conclusion can be applied in international contexts where interaction between speakers of English as a *lingua*

¹ According to Kachru (1992: 356), ‘The Inner Circle refers to the traditional cultural and linguistic bases of English’, i.e. the native varieties of English.

² ‘The Outer Circle represents the institutionalized non-native varieties (ESL) in the regions that have been passed through extended periods of colonization’ (Kachru, 1992: 356).

³ ‘The Expanding Circle includes the regions where the performance varieties of the language are used essentially in EFL contexts’ (Kachru, 1992: 356-357).

franca is the usual means for communication. Some researchers have tried to establish a pronunciation core of intelligibility, as the Lingua Franca Core proposed by Jenkins (2000). The Lingua Franca Core is ‘an inventory of pronunciation features that she [Jenkins] suggests are necessary for maintaining intelligibility in international communication, while features outside the core are unimportant’ (Deterding & Mohamad, 2016: 60).

The problem of intelligibility is related to L2 inter-speaker variation, which ‘involves the transfer of features of the particular L1 onto the production (and, of course, reception) of the target language’ (Jenkins, 2000: 28). This transfer has been studied at large from majority languages to English, but there are few references when L1 is a minority language. The purpose of this paper is to study the phonological transfer from Northern Vietnamese to English. Phonological transfer may be a very ample area to be studied here, for that, this research focuses on two features that are characteristic of Northern Vietnamese and that differentiate it from English:

- Consonant clusters: Whereas English allows for a maximum of three consonants in syllable onset position and up to four consonants in syllable coda, Vietnamese syllables have no consonant clusters.
- Voiceless final obstruents: Only eight consonants can be found in the final position of the Vietnamese syllables, as opposed to 20 consonants that are recognised in that position in English⁴. Furthermore, when the voiceless obstruents (/p t k/) are in the final position of Vietnamese syllables, they are always unreleased, whereas these consonants in the same position are usually released in English.

After the above explanations, we can conclude that this study has been undertaken with the following criteria in mind:

- English in international contexts is a *lingua franca*, i.e., a means for communication between people from different languages and cultures.

⁴ It is generally accepted a total number of 24 consonants in English. According to some authors, any consonant except /h w j r/ may appear in final position, so there are 20 possible final consonants in English; however it is not the aim of this paper to analyse this topic.

- The English spoken by Northern Vietnamese people must not be considered worse or better English than the English spoken by English native speakers, so we must avoid the idea of correctness.
- The English of Northern Vietnamese people can be studied as a variety of English, the same than any other variety, such as, for example, American, Australian or Scottish. So, it is possible to discover some relations between the English RP⁵ phonemes and the phonemes produced in the speech of Northern Vietnamese people speaking in English.

The study developed in this paper contributes to the knowledge of the phonological transfer from L1 to L2 (English) and fills an existing gap when L1 is Vietnamese, and more particularly, Northern Vietnamese. The results of this research have an impact on the following lines of investigation:

- To establish some equivalences between both Englishes (RP and Northern Vietnamese), and thus demonstrating that Northern Vietnamese English may be considered as another variety of English, with the same status than other more ‘standard’ varieties that have been more widely studied.
- To improve the intelligibility of Northern Vietnamese English by people from different linguistic backgrounds.
- To give clues for the teaching of English to Northern Vietnamese people who want to adequate their pronunciation to that of RP.

1.2. Hypotheses

In a multilingual context, like the one in which this research develops, inter-speaker variation is prevalent; this variation involves a process of transfer of features from the source language (L1) to the target language (L2). The most noticeable of this transfer is phonological.

There are different features between Northern Vietnamese and English, both in segmental and suprasegmental areas; however, as subsection 1.1 explains, this research is focused only

⁵ As it has been explained in this paper, this research considers English RP as a model, not as a norm.

on two segmental features that are characteristic of Northern Vietnamese, and that differentiate it from English: consonant clusters and voiceless final obstruents.

Jenkins (2000: 33) refers to two phenomena that can occur between the sounds of two languages (L1 and L2): either they are very different, or they share some similarity. In the first case, L2 sounds are difficult to produce by L1 speakers, and in the second case, L1 speakers tend to identify them. She explains these phenomena as follows:

‘Sounds that are phonetically very different from those in the L1 are initially likely to prove most difficult to produce, since the articulators must be activated in new ways. On the other hand, where there is any degree of similarity between L1 and L2 sounds, there is a tendency to identify the two, and thence to categorize the new sounds in terms of the old’.

As the following section explains, consonant cluster is a feature absent in the Northern Vietnamese phonological system, and the three final obstruents in Northern Vietnamese (/p/, /t/ and /k/) also exist in English, but they are produced as unreleased in the former and released in English. Following what Jenkins states, consonant clusters are difficult to produce by Northern Vietnamese speakers because they are absent in their language; they must be included in the first case mentioned by Jenkins: ‘sounds that are phonetically very different’. On the other hand, the three Northern Vietnamese final obstruents may be identified by L1 speakers as similar to the English voiceless final obstruents. This phenomenon is the second case mentioned by Jenkins: ‘where there is any degree of similarity’.

The hypothesis that this thesis will try to prove is that both phenomena mentioned above by Jenkins may activate the phonological transfer from L1 to L2; in this case, from Northern Vietnamese to English. So that not only the differences but also the similarities of both phonological systems may trigger a phonological transfer. The difficulty in the production of consonant clusters may activate the phonemic transfer making the speakers reduce the number of consonants to accommodate their production to the Northern Vietnamese phonological system. Similarly, but relating to the other phenomenon mentioned by Jenkins, the similarity of the three voiceless final obstruents in both languages may trigger a phonemic transfer from L1 to L2 when the Northern Vietnamese speakers identify those phonemes and pronounce the English voiceless final obstruents not releasing the final burst of sound, in the way they are pronounced in Northern Vietnamese.

This research will try to discover the deviations observed when eight Northern Vietnamese bilinguals speak in English. According to Jenkins (2000: 34), there are three groups of segmental deviations: sound *substitution* and *conflation*, consonant *deletion* (or *elision*), and *addition*. These deviations may explain the phonemic transfer in consonant clusters, whereas in the case of the voiceless final obstruents the mechanism might simply be an absence of release.

1.3. Thesis Outline

Figure 1 schematises in a flowchart the steps followed in this research, which starts with the motivation for it. The reason for this paper is to undertake the final thesis of the M.A. in Applied English Linguistics. The fact that at the time of starting this study I was living in Hanoi, in a context where professionals around me used English as the *lingua franca*, and my interest in phonetics, motivated me to study the phonological transfer that I observed in the English speech of Vietnamese natives (mostly from around Hanoi). I collected as much documentation as I could to improve my knowledge of the Vietnamese language, and started to learn Vietnamese. After knowing better this language, I decided to focus this research on the two features that, in my opinion, are the most contrastive ones with English: consonant clusters and voiceless final obstruents.

Bearing in mind the hypothesis presented above, Section 2 includes a general background of knowledge of the Northern dialect of the Vietnamese language (origin, alphabet, typology and phonemic features). Section 3 explains the methodology followed in this research, the corpus, the participants and the ways of gathering and analysing the data. Section 4 includes the results of the study, after analysing the data obtained from the recordings, and Section 5 develops the interpretation and evaluation of those results, and check the fulfilment of the hypothesis.

Finally, Section 6 summarises the main findings. It will provide some consequences and the relevance of this research for the knowledge of the phonemic transfer from Northern Vietnamese to English, and it will propose further research on some questions raised by this investigation.

PHONOLOGICAL TRANSFER FROM NORTHERN VIETNAMESE TO ENGLISH IN CONSONANT CLUSTERS AND VOICELESS FINAL OBSTRUENTS

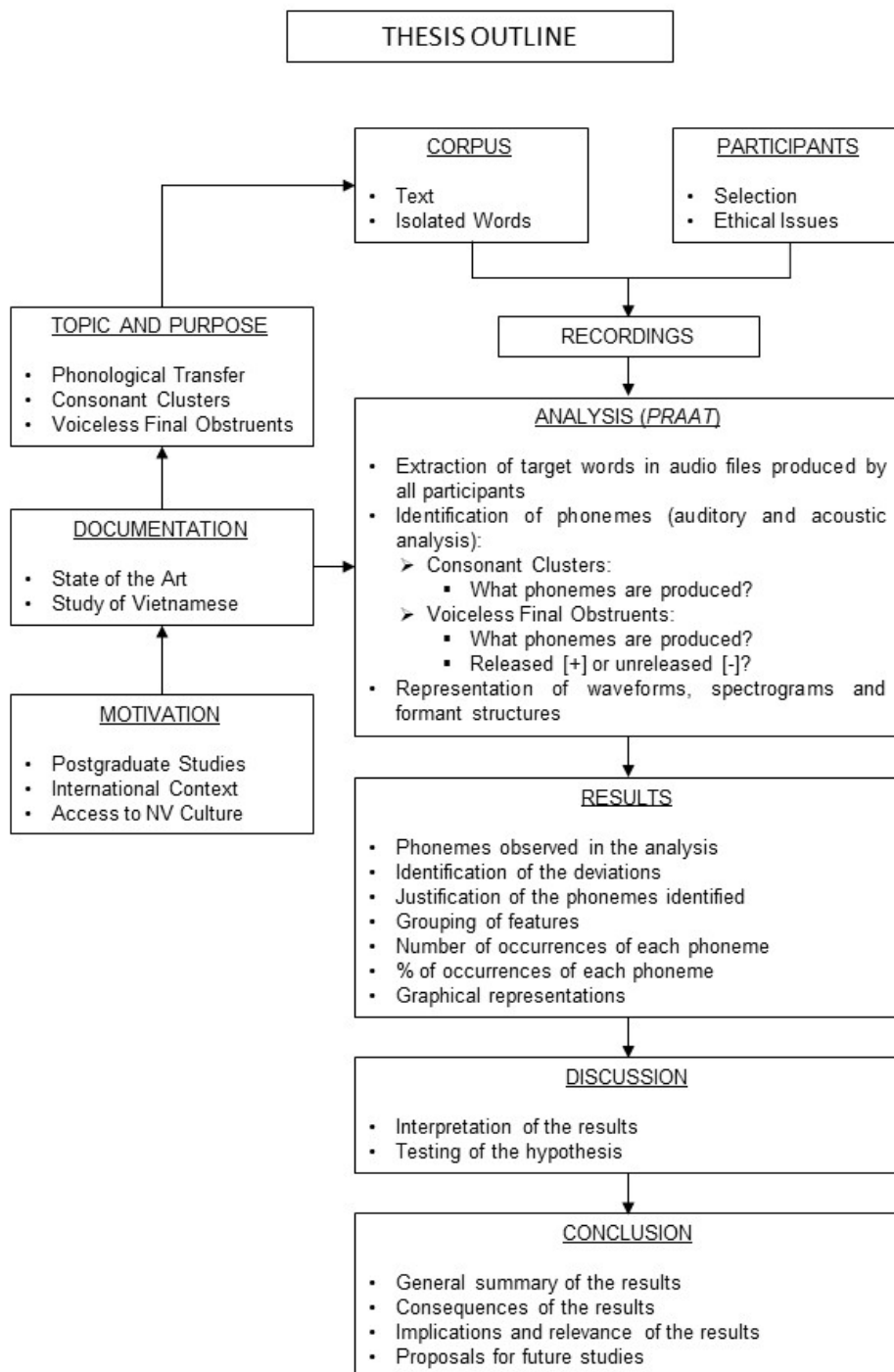


Figure 1. Thesis outline

2. STATE OF THE ART

2.1. Origin of the Vietnamese Language

Vietnamese is the primary language spoken in Vietnam, where it coexists with other minority languages; according to Alves (2006: 105), ‘Vietnamese has the largest population of speakers (over 82 million) of any language in mainland Southeast Asia’. Figure 2 shows the great linguistic diversity found in this region.



Figure 2. Languages in Mainland Southeast Asia (Enfield, 2001: 257)

Many theories have arisen about the origin of the Vietnamese language based on its lexical, phonological and typological characteristics. China occupied the northern territories of what is Vietnam today over a thousand years and, due to this fact, ‘Vietnamese shares many similarities with Cantonese in terms of lexis and grammar’ (Thai, 2004: 397). According to Alves (2009: 13), ‘Chinese loanwords constitute over a quarter of Vietnamese’. Despite this, Alves (2006: 121) states that ‘only Mon-Khmer has been shown to share a solid core of basic vocabulary with Vietnamese’. Although there are some studies which relate Vietnamese with Chinese, Austronesian, Tai and Mon-Khmer families, ‘the hypothesis of Mon-Khmer origins of Vietnamese remains the most viable’ (Alves, 2006: 105).

Alves studied the probable origin of the Vietnamese language, contrasting four hypotheses which propose their source from the Mon-Khmer, Chinese, Tai-Kadai and Austronesian families. His research concludes that ‘Vietnamese is a Mon-Khmer language with a smattering of Tai loanwords and a heavy layer of Chinese lexical and some structural influence’ (Alves, 2006: 123). Table 1 shows a summary of the results of his research.

*Table 1. Linguistic Affiliation between Vietnamese and Other Language Families
(Alves, 2006: 121)*

	Mon-Khmer	Chinese	Tai-Kadai	Austronesian
Lexical	Solid: Substantial amount of shared basic vocabulary	Weak: Little core vocabulary, highly visible borrowings	Weak: Little shared basic vocabulary	Very weak: No shared core basic vocabulary
Phonological	Solid: Numerous correspondences, but some lingering uncertainties	Some: Noticeable overlap in phonological systems	Weak: Similar typology but no patterns of sound correspondences among basic vocabulary	Weak: No identified phonological correspondences
Typological	Some: Morphological evidence, affixes and reduplication patterns, post-nominal modifiers	Weak: Various typological differences	Some: General Southeast Asian typology	Weak: General Southeast Asian typology

Alves (2006: 104) states that ‘the linguistics community places the Vietnamese language in the Mon-Khmer sub-branch of the Austroasiatic language family, thereby linking Vietnamese in its origins with over 160 languages spoken throughout mainland South-east Asia’.

As it will be explained in Subsection 2.4.2, for some authors, Vietnamese is a monosyllabic language, and this is also a general opinion among Vietnamese people; however, there are some arguments against this statement. What is clear is that Vietnamese is a tonal⁶ language, and this fact, together with the idea supported by some researchers that the Vietnamese language is also monosyllabic, makes the conclusion about its Mon-Khmer origin very controversial, since ‘Mon-Khmer languages tend to be bisyllabic and nontonal. Only through application of historical linguistic reconstructive tools can the Mon-Khmer origins of Vietnamese be more clearly demonstrated’ (Alves, 2006: 104). Furthermore, Alves (2006: 105), for whom the Mon Khmer origin is evident, states that ‘this hypothesis provides an interesting example of the development of a tonal from a nontonal language and the reduction from a polysyllabic to a monosyllabic language’.

Gage (1985: 497) also considers controversial the Mon-Khmer origin of Vietnamese and explains that ‘in spite of agreements in basic vocabulary, there has been a marked reluctance to consider Vietnamese as a Mon-Khmer language’. However, after contrasting some researches by other authors, he states that ‘it is hard not to conclude that Vietnamese bears a close relationship to the Mon-Khmer family’ (Gage, 1985: 494).

According to Gage (1985: 497), ‘the main stumbling [*sic*] block for acceptance of a genetic tie between Vietnamese and Mon-Khmer has always been the great typological gulf that separates them’ (Gage, 1985: 497). However, he quotes Maspero (1912: 115-116), for whom ‘the tones in Vietnamese could be derived from proto-Tai, while he saw no possibility of tones arising in a Mon-Khmer language’ (Gage, 1985: 498). Gage considers Vietnamese as a monosyllabic language and explains this characteristic based on the relation of Vietnamese with Chinese: ‘It was indubitably in imitation of Chinese that Vietnamese words came to consist normally of a single syllable, whereas the typical Mon-Khmer pattern is a major syllable preceded by a weak one’ (Gage, 1985: 499).

⁶ Tonal language is a language that uses tones (pitch) to distinguish lexical or grammatical meaning. As it will be explained in Subsection 2.4.2.5, tones, in Vietnamese, are phonemic features because they affect meaning, and they are sometimes referred to as *tonemes*.

In conclusion, Vietnamese can be considered as a Mon-Khmer language with a great influence of Chinese, from what the former takes many loanwords and some grammatical and phonological characteristics, such as the tones.

2.2. The Vietnamese Alphabet

The Vietnamese writing system used today is called *Quốc ngữ* and is based on the Latin alphabet, to which some diacritic signs are added. Previously, the Vietnamese script was an adaptation of the Chinese one, called *Chữ-nôm* script, that means ‘southern script’. Figure 3 shows a comparison of the two scripts.

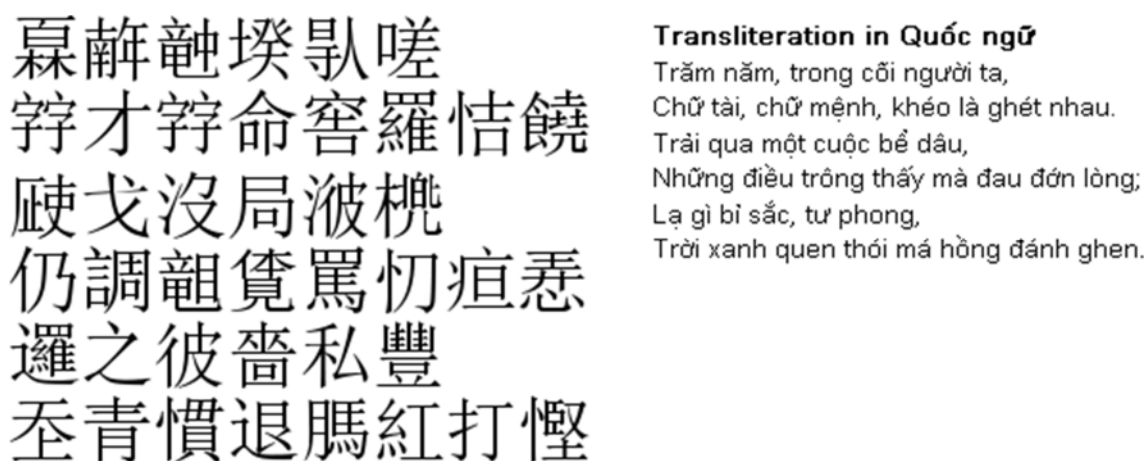


Figure 3. Comparison between Chữ-nôm (left) and Quốc ngữ (right) scripts
 (from <https://www.omniglot.com/writing/chunom.htm>)

According to Đoàn (2012: 32), ‘there is no doubt that *Quốc ngữ* is a phonetic writing system, simple and easy to access’.

Thai (2004: 397) explains that ‘Vietnamese used Chinese characters as their written language for many centuries until 1548 when Quoc Ngu –a new Vietnamese writing system introduced by Alexandre de Rhodes (a French Jesuit missionary)– was adopted and used as a national language’. The current Vietnamese orthography uses many diacritic signs above and below some vowels, some of them to mark the quality of the affected vowel and some to indicate the tone of the corresponding syllable.

According to Haudricourt (2010: 91), ‘the Vietnamese *quốc ngữ* alphabet was based on the orthography of several Romance languages, and it inherited peculiarities which can be

explained by the way the pronunciation of Latin evolved in Europe'. Haudricourt (2010: 101) also mentions that 'the notation of tones was borrowed from Ancient Greek'.

2.3. Vietnamese Typology

Regarding typology, what is clear is that Vietnamese is an analytic⁷ tonal language: 'It is noted that Vietnamese is an inflexionless language, this means that every word has exactly one form' (Lê, Nguyễn, Roussanaly, & Vinh, 2008: 241).

In words of Nguyễn (1997: 17), 'Comparative linguistics, focusing on the characteristics of the word, would label Vietnamese as an "isolating language", that is, one in which all the words are invariable and grammatical relations are primarily shown by word order'. Ngô (2001: 10) also points out that 'Vietnamese belongs to the group of *isolating* languages where there are no inflectional endings and all the words are invariable'.

There is very little inflexion in English, and word order is essential for the meaning of the sentences, so this language is also considered an analytic language.

Regarding the timing, 'Vietnamese is a syllable-timed language in which the rhythm appears to be fairly even, with each syllable giving the impression of having about the same duration and force as any other' (Ngô, 2001: 12). This characteristic differentiates it from English, which is a stress-timed language, i.e., the stressed syllables are pronounced at regular intervals, so the unstressed syllables are shortened to fit this rhythm.

2.4. Vietnamese Phonology

2.4.1. Consonant Clusters

One of the phonological features that will be studied in this paper is consonant clusters. As Subsection 1.1 states, Vietnamese syllables have no consonant clusters, and this fact may affect the pronunciation of the Vietnamese participants when they speak English, as this paper will analyse.

⁷ 'Isolating (or analytic) languages have invariable words, without flexion; every word has its own function and the grammatical and syntactic relations are expressed by an strict word order in the sentence' (own translation from Escandell et al. (2009: 379)); these languages are also called inflexionless.

It is essential to explain that all the different dialects of the Vietnamese language spoken by native speakers in Vietnam can be grouped into three main dialects; as Đoàn (2012: 15) states, ‘there are three dialects in Vietnam: the northern, the central and the southern dialects. They seem not much different in grammar, but in certain aspects of pronunciation’. Alves M. (2009: 1) extends this idea saying that ‘Vietnamese is considered to have three general regional varieties –Northern, Central, and Southern Vietnamese– which are represented by the speech of the cities of Hanoi (northern), Hue (central), and Ho Chi Minh City (southern) respectively’. According to Ngô (2001: 7),

the Vietnamese language does not have a standard pronunciation. The Hanoi dialect [or Northern dialect] represents the phonemic system of the language more fully than the other dialects. The Vietnamese language used in news broadcasts on the Vietnamese radio and television, and in Vietnamese books, newspapers and magazines is mostly based on the Hanoi dialect.

However, one characteristic of all Vietnamese dialects is that they do not have consonant clusters or blends: ‘Consonant blends occur in all word positions (i.e., initial, medial, and final) in English, whereas there are no consonant blends in Vietnamese’ (Cheng, 1987: 41). Although The Vietnamese-Portuguese-Latin dictionary by Alexander de Rhodes included some consonant clusters, as /bl-/, /ml-/, /mnh-/ and /tl-/ (De Rhodes, 1651), ‘no dialect in Modern Vietnamese has retained any of those consonant clusters, which had existed –as sounds– at least up to the seventeenth century’ (Nguyễn, 1997: 21).

Consequently, some phonological features may distinguish the three main Vietnamese dialects, but the absence of consonant clusters is a common feature of all of them.

2.4.2. The Vietnamese Syllable

The phonological system of a language is usually explained from bottom to top: consonants first, then vowels and lastly the syllable. In the case of Vietnamese, the structure of the syllable has an essential role in the behaviour of the consonants and vowels for many reasons, among them, the following ones:

- Not all the consonants that can appear in onset position can occur in coda.
- Some consonants that are phonemes in onset are allophones in coda.
- The quality of some vowels may vary depending on their place in the syllable.
- In coda position, some consonants may be produced with a secondary articulation depending on the vowel that precedes them.

For reasons as those mentioned above, Vietnamese phonology can be better understood with a top-bottom study: starting from the structure of the syllable and proceeding with each one of its parts: onset, on-glide, nucleus, coda and tone.

Many authors, such as Vu & Schultz (2009: 333), Cheng (1987: 41) or Thai (2004: 397), consider that Vietnamese words are monosyllabic, perhaps due to the fact that syllables are separated by blanks, but ‘unlike other languages, in Vietnamese blanks are not only used to separate words, but they are also used to separate syllables that make up words’ (Lê et al., 2008: 240). This statement is also affirmed by Dinh, Hoang, & Nguyen (2001: 749): ‘Unlike Euro-Indian languages, where “*Word is a group of letters having meaning separated by spaces in the sentence*” (*Definition in Webster Dictionary*), in Vietnamese and other Asian languages, whitespaces are not used to identify the word boundaries’. Thompson (1965: 116-117), more extensively, explains that

traditionally each Vietnamese syllable has been regarded as a word. As a matter of fact, a great proportion of Vietnamese words –especially those most current in the spoken language– are just one syllable long. The generalization is presumably to some extent based on this fact. Probably equally strong in the traditional attitude is another factor: Vietnamese was first written with symbols borrowed from the Chinese, and Chinese characters typically represent one syllable each and are traditionally considered to represent as well one word each.

However, it is not really accurate to say that each Vietnamese syllable is a word or each word a syllable.

Lê et al. (2008) undertake an interesting study on Vietnamese word segmentation and conclude that most of the Vietnamese words are bisyllabic. Table 2, extracted from page 242 of their paper, shows some statistics of the word length measured in number of syllables; the second column (‘#’) shows the number of words which contain the number of syllables expressed in the first column (‘Length’), and the third column (‘%’) includes the percentage of the number of words in each row over the total number of words studied.

Table 2: Length of Vietnamese words measured in number of syllables

Length	#	%
1	6,303	15.69
2	28,416	70.72
3	2,259	5.62
4	2,784	6.93
≥ 5	419	1.94
Total	40,181	100

Thompson (1965: 310) expresses the mainly bisyllabic character of the Vietnamese language in this way: ‘the Vietnamese speaker insists on a two-syllable expression of some sort – a phrase, compound, pseudo-compound or derivative’.

Henderson (1966) develops an in-depth analysis of both Northern and Southern Vietnamese syllable structure, based on the syllables attested by his informants. We will use only the results related to Northern Vietnamese in this paper. According to her research, the structure of the Vietnamese syllable may be schematised as $C_1(w)V(G/C_2)+T$, where

C_1 = initial consonant (onset)	G = off-glide coda (/j/ or /w/)
w = labiovelar on-glide /w/	C_2 = final consonant (coda)
V = vowel nucleus	T = tone

That scheme means that a syllable has an obligatory consonant in onset position, a nucleus (which is always a vowel or a diphthong) and a tone, and can have an optional on-glide /w/ and an optional consonant or an off-glide in coda position. When there is not an orthographic consonant at the beginning of the syllable, a glottal stop is produced: ‘some syllables such as *ăn*, phonetically, have an onset, that is a glottal stop, but it is not represented by any signs in writing’ (Đoàn, 2012: 7). Figure 4 represents the structure of the Vietnamese syllable schematically.

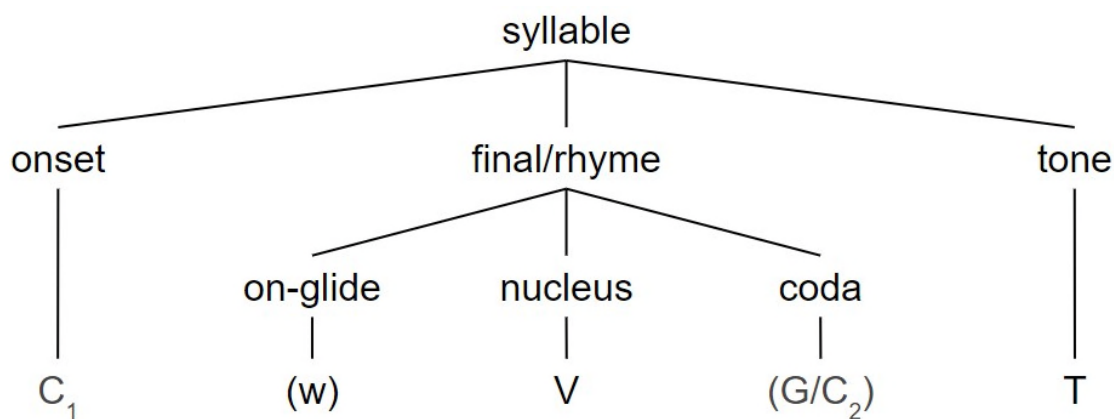


Figure 4. Vietnamese syllable structure

The following subsections explain the characteristics of each part of the Vietnamese syllable, the phonemes they include and their realisations, according to the literature, and attested by the observations from the participants in this research.

2.4.2.1. Onset

The total repertoire of the initial (onset) consonantal phonemes in the Northern Vietnamese dialect has 19 consonants (including the glottal stop), which are shown in Table 3, where the phonemes are placed in their respective cells according to their place and manner of articulation, and voice condition (voiced or voiceless).

Đoàn (2012: 15) explains that

the phonemes distributed at the initial position of a syllable are consonantal segments called the onset. There are 18 initial consonants in the northern dialects [...]. The glottal stop /ʔ/ is found to be inserted into the initial position of a syllable beginning with a vowel in all the three dialects. It is not represented by any letter in writing.

Table 3. Consonants in onset position in Northern Vietnamese

Manner \ Place		Place						
		bilabial	labio-dental	dental	alveolar	palatal	velar	glottal
Plosive	Aspirated			/t ^h /				
	unaspirated	voiceless		/t/			/k/	/ʔ/
		voiced	/b/			/d/		
Affricate						/tʃ/		
Fricative	voiceless		/f/	/s/			/x/	/h/
	voiced		/v/	/z/			/ɣ/	
Nasal		/m/			/n/	/ɲ/	/ŋ/	
Lateral				/l/				

As displayed in Table 3, Northern Vietnamese has six plosive sounds, the same number as English; however, not all of them coincide. One main difference between Vietnamese and English is that the aspiration of /t/ is an allophonic variant in English [t^h], whereas it is contrastive in Vietnamese, since /t/ and /t^h/ are responsible for differences in meaning. This phoneme is represented orthographically by *th* (see Table 4). For example, the minimal pair

tím (purple) and *thím* (aunt) is pronounced as /tim 1/ and /t^him 1/ respectively. Most probably, a native English speaker would pronounce them in a similar way, with an aspiration of the phoneme /t/ ([t^h]) in both cases. Table 3 does not include the phoneme /p/ because, in Northern Vietnamese, this phoneme is only found in loan words. Furthermore, contrary to English, Northern Vietnamese also lacks the voiced, velar plosive /g/. However, it has the glottal plosive /ʔ/, which in English is an allophonic variant of /t/.

There are two affricate phonemes in English, both post-alveolar: the voiceless /tʃ/ and the voiced /dʒ/, whereas in Northern Vietnamese there is only one, which is palatal and corresponds to the pronunciation of the orthographic groups *ch* and *tr* in onset position (/tɕ/ in Table 3). We can find some controversy regarding the pronunciation of these groups. Some researchers, such as Thomson (1965: 4) recognise an ‘unaspirated palatal, less friction than in English’, which for him is the phoneme /c/; in fact, this phoneme is plosive, contrasting with the English affricate /tʃ/. For Cheng (1987: 42) those groups of consonants are also realised with the phoneme /c/. The same fact is recognised by Ngô (2001: 8), Alves (2007: 4) and Nguyễn (1997: 20). However, according to others, such as Kirby (2011: 382), ‘in the speech of many younger Vietnamese native speakers from Hanoi, such as that of the present consultant, this segment is consistently realized as an affricate [tɕ]’. This fact is also a well-attested areal feature in Harris (2006). The palatal affricate /tɕ/ has been observed in the pronunciation and testimony of all the participants in this study. Accordingly, Tables 3 and 4 include this phoneme as the realisation of the groups of consonants *ch* and *tr* in onset position in Northern Vietnamese.

Whereas in English we can find nine fricative phonemes, in Northern Vietnamese there are only seven, five are the same than in English (/f/, /v/, /s/, /z/ and /h/) and two different (/x/ and /ɣ/), which can also be found in the Spanish phonology: /x/ is the pronunciation of the letter *j* or letter *g* when it precedes *e* or *i*, and /ɣ/ is the pronunciation of the Spanish soft *g* when it is placed between vowels and does not precede *e* or *i*, as in *agua* or *amigo*.

Besides the three nasals that also appear in the English phonology (/m/, /n/ and /ŋ/), Northern Vietnamese includes the palatal phoneme /ɲ/, which can also be found in the pronunciation of the Spanish ñ. Regarding the lateral phonemes, English and Northern Vietnamese share the same dental phoneme /l/ as the only one with this manner of articulation.

There are three approximants in English which can appear in onset position: /r/, /j/ and /w/; however, no approximants can be found in this position in Northern Vietnamese. The phoneme /w/ functions as a glide after the onset, as we will see in subsection 2.4.2.2; /j/ only appears in coda position, as it is explained in subsection 2.4.2.4; and /r/ does not occur at all, as *Đoàn* (2014: 195) states: ‘There is no /p/ nor /r/ in the Vietnamese phonological system. They are only found in the borrowings and proper names, and represented by the letters *p* and *r* respectively’. However, according to Kirby (2011: 382), ‘for many speakers, however, /p/ is realised as [b/ɓ] and /r/ as [z]’⁸. This author refers to the fact that the letter *r* is pronounced (in Northern Vietnamese) with the phoneme /z/ instead of the phoneme /r/, which is the corresponding phoneme in English. This realisation of *r* as /z/ is shown in Table 4 because it is a general feature of Northern Vietnamese; however, his observation about the phoneme /p/ can be considered idiolectal; for this reason, those allophones are not included in the tables of this subsection.

Table 4 shows the orthographic representations of the initial (onset) consonants in Northern Vietnamese.

Table 4: Orthographic representations of the consonants in onset position in Northern Vietnamese

Phoneme	Orthography	Phoneme	Orthography	Distribution
/b/	b	/tɛ/	ch	
/m/	m		tr	
/f/	ph	/ɲ/	nh	
/v/	v	/k/	k	before /i/, /e/, /ɛ/
/tʰ/	th		q	before /w/
/t/	t		c	other positions
/s/	s	/x/	kh	
	x	/ɣ/	gh	before /i/, /e/, /ɛ/
/z/	d		g	other positions
	gi	/ŋ/	ng	before /i/, /e/, /ɛ/
	r		ng	other positions
/l/	l	/h/	h	
/d/	đ	/ʔ/	-	no orthography
/n/	n			

⁸ Kirby (2011) mentions the allophone [ɓ] as a possible realisation of the phoneme /p/. Henderson (1966: 174) also refers to this allophone as a realisation of the phoneme /b/, and [d] as an allophone of /d/ in some contexts. /ɓ/ and /d/ are implosive consonants, i.e. they have a mixed glottalic ingressive and pulmonic egressive airstream mechanism. These allophones are not included in the tables of this subsection.

'While some varieties of Vietnamese maintain a distinction in the phonetic realizations of orthographic {tr-} and {ch-}, these onsets are completely merged in modern Hanoi Vietnamese' (Kirby, 2011: 382)⁹.

The voiceless dental fricative /s/ can be produced by the two spelling *s* and *x*; according to Nguyễn (1997: 21), 'Also in the north, urban speakers do not differentiate between words spelled [*sic*] with *s*- and *x*- (*sa* and *xa* sounding alike, /sa/)'.

2.4.2.2. On-glide

After the onset, there is an optional glide, referred to as on-glide to differentiate it from the also optional glide that may occur in coda position, which will be explained in subsection 2.4.2.4. The phoneme /w/ is the only one that can appear in on-glide position, as Đoàn (2014: 196) explains. According to him, the phoneme /w/ plays the role of the glide and occurs next to the onset and before the nucleus. /w/ is represented by either of the two letters *o*, if it is followed by an open or half-open vowel (/a/, /ɛ/) or *u*, if it is followed by a close or half-close vowel (/e/, /ɤ/, /i/, /i.e./). The group *qu* is a fix combination of /k/ and /w/.

The semi-vowel /w/ has a direct effect on the timbre of the syllable by lowering it; according to Đoàn (2012: 20),

in such syllable as *toán* /twan/, /w/ is the glide distributed between the onset and the nucleus. The glide changes the timbre of the syllable at the start. If we compare the two syllables *tán* and *toán*, we see that the latter has a lower timbre. It is /w/ that lowers the timbre of the syllable to make one word distinct from another.

For this reason, the occurrence of the phoneme /w/ depends on its context. As the same author explains, 'in the context that the onset contains one of /b, m, f, v/ the glide /w/ does not occur because they are of low timbre. The exceptions are the borrowings' Đoàn (2012: 20). For similar reasons, there are also restrictions in the occurrence of this phoneme related to the posterior nucleus: 'As with the nucleus, the glide /w/ does not occur before the rounded back vowels /u, o, ɔ, ɤ/ (because they are of low timbre) and the close vowel /u/' Đoàn (2012: 20-21).

⁹ 'Hanoi Vietnamese' in this quotation refers to the Northern dialect of Vietnamese.

2.4.2.3. Nucleus

Although there is some disagreement about the number of vowels, it is generally accepted that in Vietnamese, monophthongs and diphthongs can play the role of the nucleus. We will follow here the studies of Đoàn (2012: 23-25) and Kirby (2011: 384-385), for both, in Northern Vietnamese, there are nine long vowels /i, e, ε, a, u, ɤ, u, o, ɔ/, four short vowels /ĩ, ě, ă, ẫ/ and three diphthongs. Figure 5 is a diagram which shows the position and openness of the nine long vowels and the four short vowels in Northern Vietnamese; whereas the three diphthongs are represented in Figure 6.

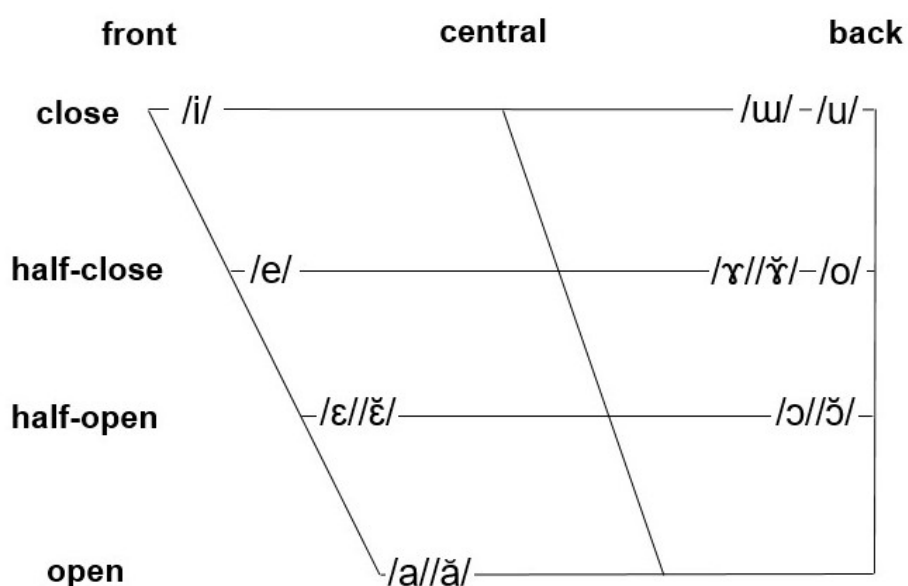


Figure 5: Northern Vietnamese vowel chart

Northern Vietnamese has six front vowels, four of which are long (/i, e, ε, a/) and two short (/ĩ, ă/); and seven back vowels, five of which are long (/u, u, ɤ, o, ɔ/) and two short (/ĩ, ɔ/). Long and short vowels only differ in duration; this fact is different from English, in which long and short vowels also differ in quality. The phonemes /u, o, ɔ, ẫ/ are rounded vowels and, as subsection 2.4.2.4 explains, they influence the pronunciation of the final /k/ and /ŋ/.

According to Kirby (2011: 384), ‘/u/ is frequently realized as mid-centralized [ũ], leading some authors to transcribe it as [i]’, as it is the case of Phạm (2006: 113). The phoneme /u/ is also included in the inventory of vowels in Cheng (1987: 42) and Sampson (1969: 132).

After observing the pronunciation of our participants and their testimony, we will adopt the phoneme /ʉ/.

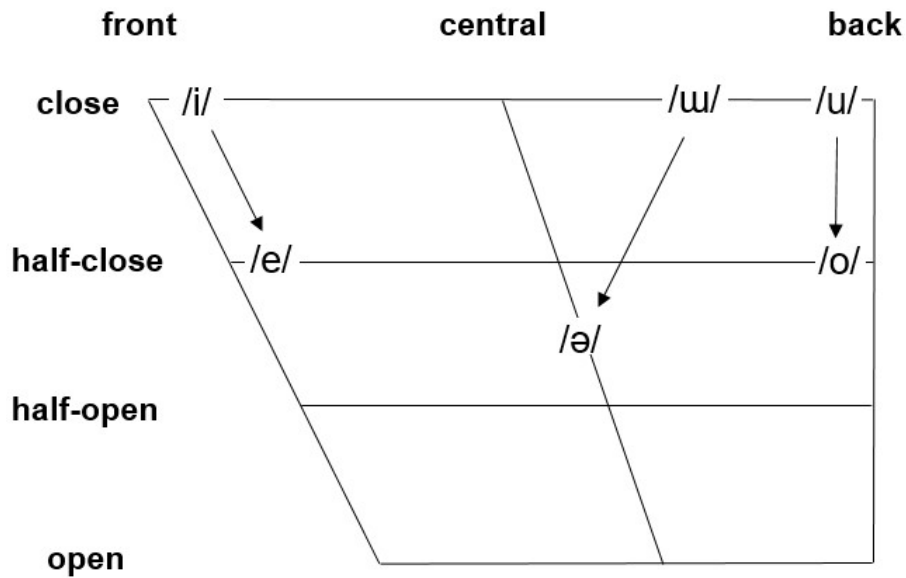


Figure 6: Northern Vietnamese diphthong chart

The three diphthongs in the Vietnamese repertoire are /ie, uɤ, uo/ for Đoàn (2012: 25), and /iə, uə, uə/ for Kirby (2011: 384). The former author states that ‘perhaps the most important thing to remember about all the diphthongs is that the first part is much longer and stronger than the second part’. There are some discrepancies between different authors about the two back diphthongs; we will adopt here the following three diphthongs: /ie, uə, uo/, which have been corroborated by the participants in this study. The phoneme /ə/ is produced only in the diphthong /uə/ and never as a monophthong. This fact is contrastive with English, in which the shwa (/ə/) is characteristic of its weak vowel system. Although Vietnamese does not have a weak vowel system, this phoneme occurs in the abovementioned diphthong.

Table 5 shows the orthographic representations of the vowels and diphthongs in Northern Vietnamese according to the explanations given above; it also includes some notes about the different representations of the short vowels and diphthongs according to their contexts.

Table 5: Orthographic representations of the vowels and diphthongs in Northern Vietnamese

Phoneme	Orthography	Distribution	Phoneme	Orthography	Distribution
Long vowels					
/i//j/	i/y		/u/	ư	
/u/	u		/e/	ê	
/ɤ/	ơ		/o/	ô	
/ɛ/	e		/a/	a	
/ɔ/	o				
Short vowels					
/ɤ̃/	â		/ɛ̃/	a	in rhymes ¹⁰ before /ŋ, k, ɲ/
/ã/	a	before semi-vowels (/w/, /j/) in the rhymes <i>au</i> and <i>ay</i>	/ɔ̃/	o	in rhymes before /ŋ, k/
	ã	Rest of cases			
Diphthongs					
/ie/	iê	in the middle of a word	/uə/	ươ	at word-initial or middle position
	yê	when follows /w/ or /ʔ/		ưa	at word-final position or in isolation
	ia	at word-final position or in isolation	/uo/	uô	at word-initial or middle position
	ya	at word-final position and after /w/		ua	at word-final position or in isolation

2.4.2.4. Coda

According to Kirby (2011: 383), ‘Hanoi Vietnamese licenses eight segments in coda position: three unreleased voiceless obstruents /p t k/ [p̚ t̚ k̚], three nasals /m n ŋ/, and two approximants /j w/. One crucial difference between Vietnamese and English with consonants in coda position is that ‘in Vietnamese, syllable-final /p, t, k/ are unreleased or “held in”, whereas these sounds may be released in English’ (Tang, 2007: 6). Table 6 includes these phonemes placed in their respective cells according to their place and manner of articulation, and voice condition (voiced or voiceless).

¹⁰ Rhyme of a syllable refers to the group of a nucleus and an optional coda.

Table 6. Consonants in coda position in Northern Vietnamese

Places Manners	bilabial	dental	alveolar	palatal	velar	labio-velar
Voiceless plosives	/p/	/t/			/k/	
Approximants				/j/		/w/
Nasal	/m/		/n/		/ŋ/	

As it has been explained in subsection 2.4.2, the place of a phoneme in the structure of the syllable determines its characteristics and, even, the possibility of its realisation. That is the case of the final consonants, since, while in onset position there are nineteen, in coda there are only nine, and whereas the phoneme /p/ does not occur in onset, it exists in coda position.

Apart from the characteristics mentioned above, there are three cases of secondary articulation in the Vietnamese final consonants. Two of these cases can be observed in the phonemes /ŋ/ and /k/ when they are pronounced after the rounded vowels (/u/, /o/ and /ɔ/). In these cases, those phonemes have a bilabial secondary articulation, expressed with the allophones [ŋ^m] and [k^p] respectively, so they are pronounced with a final closure of the lips. The other case is a secondary palatal articulation when the phoneme /ŋ/ is pronounced after the vowels /i/, /e/ and /ɛ/, and is expressed with the allophone [ɲ]. This latter sound is an allophone of the phoneme /ŋ/ in coda position whereas it is a phoneme when it occurs in the onset of the syllable, as we have seen in subsection 2.4.2.1.

Table 7 represents the phonemes in coda position with their allophonic variation (when they are produced), the orthographic representation of each case, and the corresponding notes for clarification when they are needed, according to the explanations given in the above paragraphs.

Table 7: Phonemes in coda position and their allophones, when they occur

Phoneme	Allophones	Orthography	Distribution
/m/		m	
/n/		n	
/ŋ/	[ŋ ^m]	ng	after /u/, /o/ and /ɔ̃/
	[ɲ]	nh	it occurs after /i/, /e/ and /ɛ̃/
	[ŋ]	ng	after vowels other than mentioned above
/p/	[p̄]	p	
/t/	[t̄]	t	
/k/	[k̄p]	c	after /u/, /o/ and /ɔ̃/
	[k̄]	ch	after /i/, /e/, and /ɛ̃/
		c	after vowels other than mentioned above
/w/		o	after open or half-open vowels
		u	after close or half-close vowels
/j/		y	after short vowels
		i	after long vowels

2.4.2.5. Tone

One of the main characteristics of Vietnamese is that it is a tonal language. ‘Tone, said to be “phonemic” because it affects meaning, pertains to the entire syllable’ (Nguyễn, 1997: 25). Tang (2007: 6) also includes tones in the category of phonemes and states that tones are ‘sometimes referred to as *tonemes* [...]. Vietnamese uses tones as phonemes since a change in tone indicates a change in meaning’. According to him, ‘tone is present throughout the syllable and carries lexical meaning’ (Tang, 2007: 10).

‘A syllable is produced at a certain pitch which is an important factor in Vietnamese and is used to differentiate one word from another’ (Đoàn, 2012: 7). According to Đoàn (2012: 11), the six Northern Vietnamese tones and their corresponding diacritical signs are the one shown in Table 8.

Table 8: Northern Vietnamese tones and their diacritical signs (Đoàn, 2012: 11)

Tone 1	Ngang	ex: la	High level	ˉ
Tone 2	Huyền	ex: là	Low level	˘
Tone 3	Ngã	ex: lã	High falling-rising	ˋˊ
Tone 4	Hỏi	ex: lả	Low falling-rising	ˊˋ
Tone 5	Sắc	ex: lá	High rising	ˀ
Tone 6	Nặng	ex: lạ	Low falling	ˑ

These six tones are only found in Northern Vietnamese, since ‘Southern Vietnamese is a five-tone system in which *hỏi* and *ngã* have merged in pronunciation’ (Bauman, Blodgett, Rytting, & Shamoo, 2009: 1).

One of the most important differences between Vietnamese and Indo-European languages is the use of intonation. Whereas in the Indo-European languages intonation is used to distinguish various types of sentences (declarative, imperative, interrogative or exclamatory), in Vietnamese tones trigger semantic differences at the word level. ‘As tones in the Vietnamese language are used to signal semantic distinction, intonations are rare’ (Đoàn, 2014: 194). Thus, as stated by Ngô (2001: 14), ‘the Vietnamese language uses certain grammatical patterns for assertive, negative and interrogative statements. Intonation in Vietnamese is strictly restricted by the tones’.

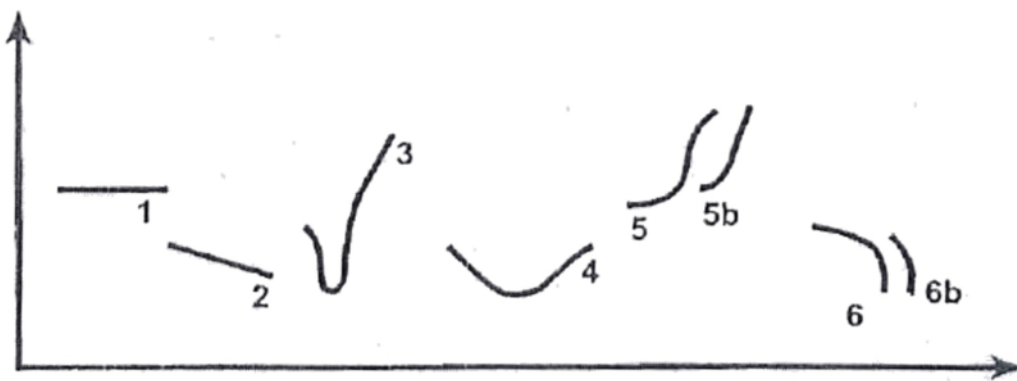


Figure 7. Scheme of the six Northern Vietnamese tones

Đoàn (2012: 12) represents the six tones in the scheme of Figure 7 in terms of register and F0 contour, and provide the following descriptions of the four more complex tones:

- a. Tone 3: the tonal pattern of this tone is a fall from high to low, and then a sudden rise; by this point the larynx is tightened, sometimes completely blocked so that no sound production is heard, the glide is interrupted and it is assumed that a glottal stop is inserted.
- b. Tone 4: this is the tone having the longest duration among the six tones.
- c. Tone 5: when distributed in a closed syllable, the syllable that ends in /p, t, k/, for example: *mát*, *bát*, *lóp*, is realised as a tone with a very short level contour, then a high rise, and the rise is fairly steep. This is one of the variants of Tone 5 (see 5b).
- d. Tone 6: when distributed in a syllable ending in /p, t, k/, this tone is also produced with an extra short level contour, then a low fall, and the fall is fairly steep. This is one of the variants of Tone 6 (see 6b).

This author does not provide examples of the variant 6b of tone 6, but we can find some: *họp* (meeting), *hạt* (seed), *học* (to study). What is common to some researchers is that this tone is the shortest: ‘In terms of differences in duration, the gap at the end of *nặng* gives the appearance that this tone is shorter than the others. Duration measurements [...] do indicate that this tone is significantly shorter than the other tones in Northern Vietnamese’ (Bauman, Blodgett, Rytting, & Shamoo, 2009: 2). Referring to this tone, the same authors state that ‘the trajectory of *nặng* also shows evidence of its expected final glottalization. [...] the apparent shortness of *nặng* is a by-product of its glottalization’ (Bauman, Blodgett, Rytting, & Shamoo, 2009: 4). However, ‘the level tone (*ngang*), the falling tone (*huyền*) and the dipping-rising tone (*hỏi*) make the syllable somewhat longer’ (Nguyễn, 1997: 26).

2.5. Final Remarks

In section 2, a succinct description about the origin of the Vietnamese language, and its alphabet, typology and phonology has been included. The first three sub-sections contain an overview of the language that will be studied in this paper. In subsection 2.4, the main characteristics of the Vietnamese phonology, focusing on the Northern dialect, have been analysed and compared to RP English.

As stated in this chapter, the phonemic differences between Northern Vietnamese and RP are numerous not only at the segmental and syllabic domains but also at the suprasegmental level, where it has been observed that ‘intonation in Vietnamese is strictly restricted by the tones’ (Ngô, 2001: 14). We must insist here that tone, in Vietnamese, is a segmental feature, as it has been explained in subsection 2.4.2.5, contrary to what happens in English, where it is considered suprasegmental.

The study of so many different phonemic features between these two languages would deserve vast research, which is far beyond the scope of this paper, so we will focus here exclusively on the analysis of two features, which we consider to be the most interfering on intelligibility: consonant clusters and voiceless final obstruents.

The following sections will undertake the analysis of those two phonemic features. This study will be based on the corpus collected from some participants, both from Northern Vietnamese origin and from England. In the end, we will be able to reach to some conclusions, which will try to fill a gap in the field of the phonological transfer between languages in international contexts, and to give clues for further investigations.

3. METHODOLOGY

3.1. Experimental Procedure

Although traditionally the distinction between quantitative and qualitative methodologies was based on the use or not of numerical data, this ‘distinction has been the source of a great deal of discussion in the past at every conceivable level of abstraction’ (Dörnyei, 2007: 25). In the actual state of research, it is more coherent the view of Brown (2004: 488); according to him, ‘perhaps a more constructive and accurate approach would be to view qualitative and quantitative research as a matter of degrees, a continuum, rather than a clear-cut dichotomy’. With this idea in mind, the methodology used in this thesis can be classified as a mixed methodology, somewhere in between the QUAL-QUAN extremes because features of both methodologies have been taken into account. This work starts following a quantitative methodology because it collects and analyses data that shows the number of occurrences of particular sounds and combinations of sounds among a group of Northern Vietnamese speakers. Furthermore, it also includes a qualitative analysis of the data which will be undertaken by observing the acoustic representations and auditory perceptions of the target productions.

This research is not prescriptive, and the participants were informed of that. As the introduction of this paper explains, we do not consider RP as the norm but as a model, the variety of English with which Northern Vietnamese will be compared; therefore, we avoid the idea of correctness and work under a descriptive perspective. RP has been chosen as model in this paper because it is still one of the primary references and one that is being used in most studies, learning and education.

The practical phase of this research starts with the selection of the corpus and the participants, which will be explained in sections 3.2 and 3.3. The participants read the texts of the corpus while they were recorded, and those audio files are the primary material for this research. Section 3.4 explains the analysis undertaken with the software *Praat* (Boersma & Weenink, 2005). The audio files, four hundred in total, have been analysed observing the phonemes produced by the participants in each of the features (consonant clusters and voiceless final obstruents).

3.2. Corpus

The corpus of this research has been obtained from two different sources, which are included in Appendix A: a literary text and a list of words. Usually, the participants read more naturally a text than isolated words; that is because, while reading a text, they fix their attention on the content rather than on the form of the words. On the other hand, the participants may read the text using weak forms and mechanisms of connected speech. So, we may test if this fact has any influence in the production of the studied phonemic features, especially when the same phonemes appear in both sources. However, when the same word appears in the text and in the list of words, we have preferred to analyse it from the list to avoid the mechanisms of connected speech that may interfere in the study.

The text selected is the beginning of the novel *Pride and Prejudice* (Austen, 2007: 201). These paragraphs –perhaps, the first of them is the most famous beginning in the English literature– have been chosen because they contain many common words, so there is no problematic vocabulary for speakers with an upper-intermediate level of English, and words with a variety of phonemic features which are relevant for this study (consonant clusters and voiceless final obstruents). The list of words increases the number of phonemic features studied. Participants usually read these words more carefully and focus their attention on their pronunciation. The following list includes the target words classified according to the phonemes studied:

- Consonant clusters: Consonant clusters in English can contain up to three consonants in onset position and four in coda position. This research studies the following consonant clusters classified according to their position in the word (onset, medial and coda), and the words studied are listed after the corresponding phoneme:
 - Onset:
 - /br/: *brain* and *breath*.
 - /fr/: *freeze* and *friction*.
 - /gr/: *grace*.
 - /kl/: *clouds*.
 - /kr/: *crane*, *creep* and *cried*.

- /pr/: *property*.
 - /sk/: *sculpture*.
 - /sp/: *spain*.
 - /str/: *street* and *stretch*.
 - /tr/: *trip* and *truth*.
 - /ʃr/: *shrink*.
 - /θr/: *threat*.
- Medial:
- /kʃ/: *friction* and *objection*.
 - /lptʃ/: *sculpture*.
 - /ntl/: *impatiently*.
 - /pl/: *replied*.
- Coda:
- /dz/: *clouds*.
 - /kst/: *next*.
 - /ksts/: *texts*.
 - /kt/: *deduct*.
 - /nt/: *environment*, *giant* and *measurement*.
 - /st/: *first*, *last* and *suggest*.
 - /ŋk/: *shrink*.
- Voiceless Final obstruents: The three final obstruents in the Northern Vietnamese phonemic repertoire are /p/, /t/ and /k/. The words analysed in this study are:
 - /p/: *backup*, *cheap*, *creep*, *gap*, *soup*, *top* and *trip*.
 - /t/: *bennet*, *coat*, *deduct*, *environment*, *first*, *giant*, *it*, *last*, *measurement*, *next*, *street*, *suggest* and *threat*.
 - /k/: *park*, *shrink* and *take*.

Table 9 shows the forty target words of the corpus with the corresponding phonemes of the features studied represented with IPA characters according to the RP model; the rest of the words function as distractors, they are included in the corpus for the participants not to identify which features will be analysed, and so they do not alter their productions.

Table 9: Target words analysed in this research

Words	Final Obstruent	Consonant Cluster			Words	Final Obstruent	Consonant Cluster		
		Onset	Medial	Coda			Onset	Medial	Coda
backup	/p/				last	/t/			/st/
bennet	/t/				measurement	/t/			/nt/
brain		/br/			next	/t/			/kst/
breath		/br/			objection			/kʃ/	
cheap	/p/				park	/k/			
clouds		/kl/		/dz/	property		/pr/		
coat	/t/				replied			/pl/	
crane		/kr/			sculpture			/lptʃ/	
creep	/p/	/kr/			shrink	/k/	/ʃr/		/ŋk/
cried		/kr/			soup	/p/			
deduct	/t/			/kt/	spain		/sp/		
environment	/t/			/nt/	street	/t/	/str/		
first	/t/			/st/	stretch		/str/		
freeze		/fr/			suggest	/t/			/st/
friction		/fr/			take	/k/			
gap	/p/				texts				/ksts/
giant	/t/			/nt/	threat	/t/	/θr/		
grace		/gr/			top	/p/			
impatiently			/ntl/		trip	/p/	/tr/		
it	/t/				truth		/tr/		

3.3. Participants

The participants in this research are eight Northern Vietnamese native speakers and two English native speakers. In order to ensure their anonymity, they have been assigned numbers from 1 to 10; the first eight correspond to the Vietnamese participants and the last

two, to the English ones. For ethical reasons, this paper does not include any clues to identify them.

The selection has followed the strategy called *convenience sampling*, i.e. the participants were the available ones at the moment of the beginning of this research. The participants – six women and four men– were between 30 and 50 years old. The productions of the two English participants have been used as models. One of them is a woman from near Cambridge, teacher of English as a foreign language and trainer for official exams of English; her pronunciation is very close to RP English. The other is a man from around Manchester, who lives in Spain and teaches English as a foreign language; he has a slight West Midland accent.

The eight Vietnamese participants are native from areas less than 100 km away from Hanoi, so their pronunciation can be considered Northern Vietnamese. All the participants were informed that they would be recorded to undertake a study of their pronunciation, and that, after this study, we could get to conclusions about how the Vietnamese phonemic system could influence the pronunciation of their speech in English. To avoid a reluctant attitude towards their participation, they were explained that this research was not an assessment of their skill in English. The ethical aspect of this research has been fulfilled because the participants have been sincerely informed of the general aspects of its purpose, and the anonymity has been preserved. However, the participants were not informed of the specific goal of this study (consonant clusters and voiceless final obstruents), so they could not alter their productions.

The Vietnamese participants have different levels of proficiency in English; two of them are teachers of English as a foreign language, other two are translators and interpreters between Vietnamese and English, and all of them use English as a *lingua franca* for their daily professional communication.

3.4. Data Recording and Analysis

The participants were given the two texts that are the source of the corpus and were explained the general purpose of this research. According to their availability, they were recorded in a

silent room with a digital voice recorder while reading the two texts. Two audio files (*.wav) per participant were obtained, one per each text.

With the help of the software *Praat* (Boersma & Weenink, 2005), forty audio files were obtained per participant corresponding to the production of the target words. Overall, four hundred audio files have been analysed in this research.

This analysis has considered state of the art provided by the documentation consulted, our knowledge of the Vietnamese language and the reports from the participants. The analysis consists of the identification of the phonemes produced for every one of the features studied: twenty-three consonant clusters and three voiceless final obstruents. Two types of analyses have been undertaken: acoustic with the software *Praat*, and auditory with the observations and reporting of the participants. The auditory observation has been corroborated in some cases by the acoustic study of the waveforms, spectrograms and formants to identify the phonemes produced, and it has been supported by the reporting of the participants.

4. RESULTS

As explained in Section 3.4, the target words have been extracted from the two texts that are the source of the corpus with the software *Praat*. The analysis of the productions of the forty target words read by the eight Northern Vietnamese participants has been undertaken mainly with auditory observation and the reporting of the participants. The results of this analysis are included in Section 4.1. Furthermore, these results have been supported, in some cases, with acoustic analysis with *Praat*, as Section 4.2 explains. It is important to reiterate here that only the productions of the eight Northern Vietnamese participants are the object of this analysis and that the productions of the two English (RP) speakers are used as a model.

4.1. Results of the Auditory Analysis

The results obtained from the auditory analysis of the production of the two features studied (consonant clusters and voiceless final obstruents) are included in Appendix B. The following subsections explain and quantify those results. Since these results consist of a significant amount of data, each one of the two features is explained in one different subsection so that the exposition of the results may improve clarity.

4.1.1. Consonant Clusters

Table 10 shows the phonemic transcription in IPA signs of the pronunciation of each consonant cluster by each participant; these phonemes correspond to the ones included in the columns headed ‘CC’ in the table of Appendix B.

The second column of Table 10 shows the phonological transcription of the corresponding consonant cluster in RP, classified according to their position in the word (onset, medial or coda). The cells shadowed in light blue are those where the phoneme observed is the same as in the RP model for the corresponding consonant cluster and word.

Table 10: Production of consonant clusters

Consonant Cluster		Words	Participants								RP	%	
			1	2	3	4	5	6	7	8	phoneme	word	CC
Onset	/br/	brain	/br/	/tr/	/br/	/br/	/br/	/pr/	/br/	/br/	6	75%	75%
		breath	/br/	/bæt/	/br/	/br/	/br/	/br/	/bæt/	/br/	6	75%	
	/fr/	freeze	/pr/	/fr/	/fr/	/fr/	/tr/	/fr/	/fr/	/fr/	6	75%	75%
		friction	/fr/	/fr/	/fr/	/fr/	/br/	/pr/	/fr/	/fr/	6	75%	
	/gr/	grace	/kr/	/gr/	/gr/	/br/	/br/	/br/	/br/	/gr/	3	38%	38%
	/kl/	clouds	/kl/	/kl/	/kl/	/kl/	/kl/	/kl/	/kl/	/kl/	8	100%	100%
	/kr/	crane	/kr/	/kr/	/br/	/kr/	/kr/	/kr/	/kr/	/kr/	7	88%	88%
		creep	/kr/	/kr/	/kr/	/kr/	/kr/	/kr/	/kr/	/kr/	8	100%	
		cried	/kr/	/kr/	/gr/	/kr/	/kr/	/br/	/kr/	/kr/	6	75%	
	/pr/	property	/pr/	/pr/	/pr/	/pr/	/pr/	/pr/	/pr/	/p/	7	88%	88%
	/sk/	sculpture	/sk/	/sk/	/sk/	/sk/	/sk/	/sk/	/sk/	/sk/	8	100%	100%
	/sp/	spain	/sp/	/sp/	/sp/	/sp/	/sp/	/sp/	/sp/	/sp/	8	100%	100%
	/str/	street	/stē/	/str/	/sr/	/str/	/str/	/str/	/str/	/sr/	5	63%	69%
		stretch	/əstē/	/str/	/str/	/str/	/str/	/str/	/str/	/sr/	6	75%	
/tr/	trip	/tē/	/tr/	/tr/	/tē/	/tr/	/tr/	/tē/	/tr/	5	63%	63%	
	truth	/tē/	/tr/	/tē/	/tē/	/tr/	/tr/	/tr/	/tr/	5	63%		
/ʃr/	shrink	/swə/	/sr/	/ʃw/	/ʃr/	/sr/	/sr/	/sr/	/str/	1	13%	13%	
/θr/	threat	/tr/	/θr/	/tr/	/tr/	/tr/	/tr/	/tr/	/θr/	2	25%	25%	
Medial	/kʃ/	friction	/s/	/ks/	/ks/	/kʃ/	/kʃ/	/kʃ/	/kʃ/	/kʃ/	5	63%	69%
		objection	/ʃ/	/kʃ/	/ʃ/	/kʃ/	/kʃ/	/kʃ/	/kʃ/	/kʃ/	6	75%	
	/lptʃ/	sculpture	/tē/	/tē/	/pte/	/mtʃ/	/mp/	/lp/	/l/	/pte/	0	0%	0%
	/ntl/	impatiently	/nl/	/ntl/	/nl/	/ntl/	/ntl/	/nl/	/tel/	/nl/	3	38%	38%
	/pl/	replied	/pl/	/pl/	/pl/	/pl/	/pl/	/pl/	/fl/	/pl/	7	88%	88%
Coda	/dz/	clouds	/z/	/dz/	/d/	/z/	/dz/	/z/	/d/	/d/	2	25%	25%
	/kst/	next	/s/	/st/	/kst/	/kst/	/kst/	/kst/	/k/	/t/	4	50%	50%
	/ksts/	texts	/st/	/kst/	/kst/	/kst/	/kst/	/st/	/ks/	/k/	0	0%	0%
	/kt/	deduct	/kt/	/kt/	/kt/	/kt/	/k/	/-/	/x/	/kt/	5	63%	63%
	/nt/	environment	/n/	/nt/	/n/	/nt/	/nt/	/n/	/n/	/nt/	4	50%	63%
		giant	/st/	/nt/	/n/	/nt/	/nt/	/n/	/n/	/nt/	4	50%	
		measurement	/nt/	/nt/	/nt/	/nt/	/nt/	/nt/	/-/	/nt/	7	88%	
	/st/	first	/k/	/st/	/st/	/st/	/st/	/k/	/st/	/st/	6	75%	71%
		last	/st/	/st/	/st/	/st/	/st/	/st/	/st/	/st/	8	100%	
suggest		/s/	/st/	/s/	/st/	/st/	/tē/	/s/	/t/	3	38%		
/ŋk/	shrink	/ŋ/	/ŋk/	/ŋk/	/ŋk/	/ŋk/	/ŋ/	/ŋk/	/ŋk/	6	75%	75%	

Columns 12, 13 and 14 are the quantification of the data obtained. Column 12 includes the number of occurrences of the RP phonemes in the production of each consonant cluster (the number of light blue cells). Column 13 contains the percentage of occurrence of the RP

phonemes over the total number of productions of that consonant cluster in that word (eight, one per participant); and column 14 is the percentage of occurrence of the RP phonemes over the total number of productions of the corresponding consonant cluster, taking into account that some consonant clusters are present in more than one word.

To have a view of these results in a way that help us to achieve some conclusions, we can order the consonant clusters in decreasing order of percentage of similarity of their productions to RP as Table 11 shows.

Table 11: Consonant clusters ordered according to their similarity to RP

position	CC	%			
		CC	positon	total	
onset	/kl/	100%	72%	64%	
	/sk/	100%			
	/sp/	100%			
	/kr/	88%			
	/pr/	88%			
	/br/	75%			
	/fr/	75%			
	/str/	69%			
	/tr/	63%			
	/gr/	38%			
	/θr/	25%			
/jr/	13%				
medial	/pl/	88%	53%	64%	
	/kj/	69%			
	/ntl/	38%			
	/lptʃ/	0%			
coda	/ŋk/	75%	56%		64%
	/st/	71%			
	/kt/	63%			
	/nt/	63%			
	/kst/	50%			
	/dz/	25%			
	/ksts/	0%			

The bar chart of Figure 8 represents graphically the results included in Table 11. As this figure shows, we might evaluate an average of 64 % of accommodation to the RP model in the production of the consonant clusters.

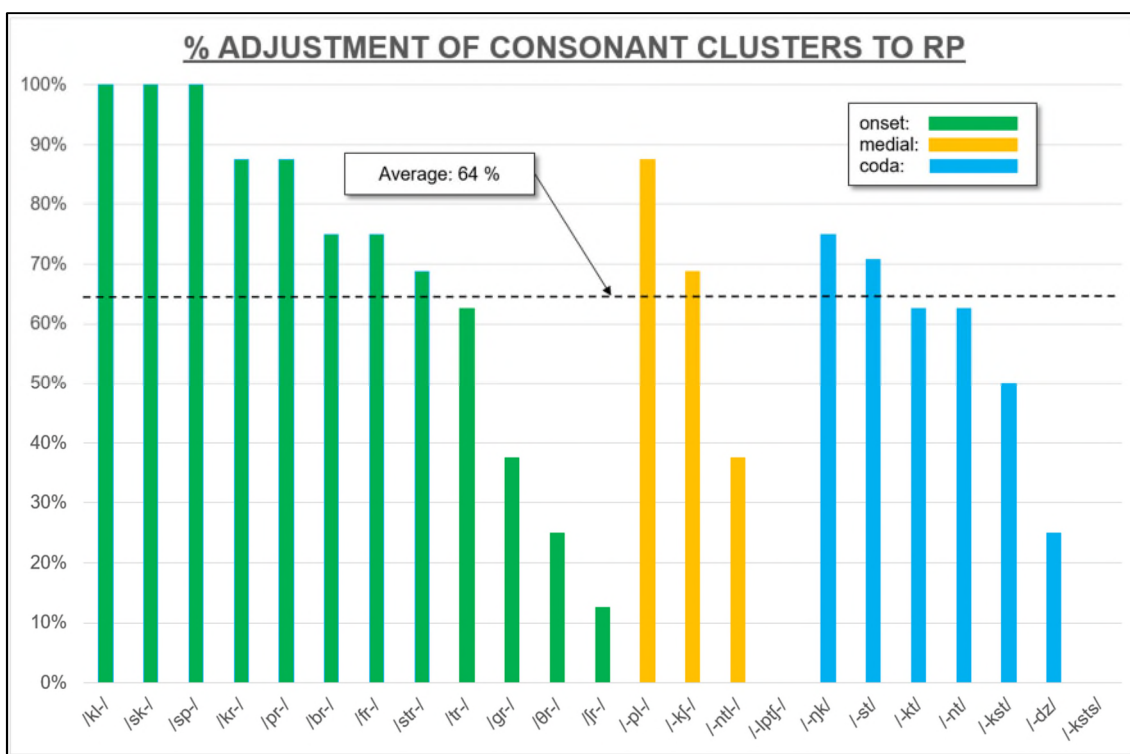


Figure 8. Consonant clusters and their percentage of similarity to RP

The production of the consonant clusters, classified by their position in words, and their possible effects in the phonemic transfer will be analysed in the Discussion of this paper.

4.1.2. Voiceless Final Obstruents

This subsection shows the study of the three voiceless final obstruents (/p/, /t/ and /k/). The data for this study has been extracted from the table of Appendix B. These data will be quantified to allow a better evaluation of the results.

Final /p/

Table 12 shows the pronunciation observed of the final obstruent /p/ in seven target words. These realisations have been extracted from the columns headed 'FO' in the table included in Appendix B for each word. The symbols '[+]' or '[-]' have been added after /p/ depending on whether the production is released or unreleased, respectively. The cells shadowed in

light blue are those that contain ‘/p/ [+]’, which is the phoneme and mechanism considered the model in this research (RP).

Table 12: Production of final /p/ (‘[+]’ released or ‘[-]’ unreleased)

Words	Participants							
	1	2	3	4	5	6	7	8
backup	/p/ [-]	/p/ [+]	/p/ [+]	/p/ [+]	/p/ [+]	/p/ [-]	/-p/ [+]	/p/ [-]
cheap	/p/ [+]	/p/ [+]	/p/ [+]	/p/ [+]	/p/ [+]	/p/ [-]	/-p/ [+]	/p/ [-]
creep	/p/ [+]	/p/ [+]	/p/ [+]	/p/ [+]	/p/ [+]	/p/ [+]	/-p/ [+]	/p/ [+]
gap	/p/ [+]	/p/ [+]	/p/ [+]	/p/ [+]	/p/ [+]	/p/ [-]	/-p/ [+]	/p/ [-]
soup	/p/ [+]	/p/ [+]	/p/ [+]	/p/ [+]	/p/ [-]	/p/ [+]	/-p/ [+]	/-p/ [+]
top	/p/ [-]	/p/ [+]	/p/ [+]	/p/ [-]	/p/ [+]	/p/ [-]	/-p/ [+]	/p/ [-]
trip	/p/ [+]	/p/ [+]	/p/ [+]	/p/ [+]	/p/ [+]	/p/ [-]	/-p/ [+]	/-p/ [+]

The results included in Table 12 have been quantified in Table 13, where columns 2, 3 and 4 include, for each word, the number of occurrences of the following productions:

- The corresponding phoneme in RP (/p/).
- The corresponding phoneme and mechanism (/p/ released = ‘/p/ [+]’).
- Other phonemes that are different than /p/.

Columns 5, 6 and 7 include the percentages of the previous occurrences over the number of productions of each word (eight, one per participant). The last three columns contain the percentages of the occurrences over the total number of productions of this final obstruent (7 words x 8 participants = 56 productions).

Table 13: Quantification of the production of final /p/ (‘[+]’ released or ‘[-]’ unreleased)

Words	/p/	/p/ [+]	other	% over words			% over FO		
				/p/	/p/ [+]	other	/p/	/p/ [+]	other
backup	8	5	0	100 %	63 %	0 %	100 %	77 %	0 %
cheap	8	6	0	100 %	75 %	0 %			
creep	8	8	0	100 %	100 %	0 %			
gap	8	6	0	100 %	75 %	0 %			
soup	8	7	0	100 %	88 %	0 %			
top	8	4	0	100 %	50 %	0 %			
trip	8	7	0	100 %	88 %	0 %			

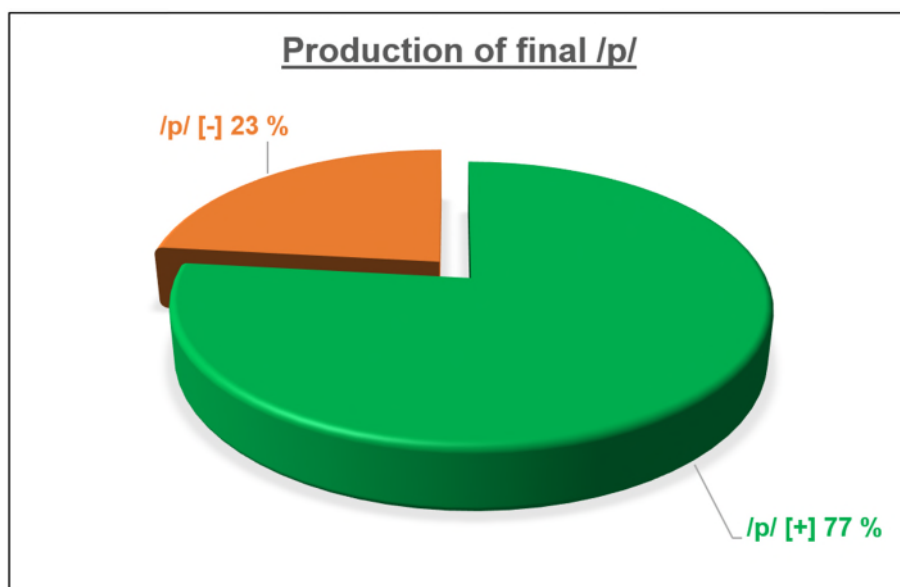


Figure 9. Production of final /p/ by the Vietnamese participants

Figure 9 represents the percentages of the different realisations of the final /p/. The interpretation of this figure is that 77 % of times the participants pronounce a released final /p/, i.e. following the RP model, and 23 % of times the final /p/ is unreleased. In this latter case, there is a phonological transfer from Northern Vietnamese to English. We can infer, from the results obtained, that Northern Vietnamese speakers of English always pronounce the final /p/, and more than three-fourths of times this pronunciation is released, so mostly they can adapt it to the RP pronunciation.

Final /t/

Table 14 includes the pronunciation observed of the final obstruent /t/ in the thirteen target words that end with this phoneme. The structure of this table is similar to that of Table 12, so its interpretation is the same. A hyphen between two slashes ‘/-/’ means that no phoneme has been produced in those cases, and the cells shadowed in light blue correspond to the production of a released /t/ (/p/ [+]), in a similar way that the corresponding RP model.

Table 14: Production of final /t/ ('[+]') released or '[-]' unreleased)

Words	Participants							
	1	2	3	4	5	6	7	8
bennet	/tɛ/	/tɛ/	/θ/	/t/ [-]	/t/ [-]	/θ/	/t/ [-]	/t/ [+]
coat	/st/ [-]	/t/ [+]	/t/ [+]	/t/ [+]	/t/ [+]	/t/ [-]	/t/ [+]	/t/ [+]
deduct	/t/ [-]	/t/ [+]	/t/ [+]	/t/ [+]	/-/	/-/	/-/	/t/ [+]
environment	/-/	/t/ [-]	/-/	/t/ [+]	/t/ [+]	/-/	/-/	/t/ [+]
first	/-/	/t/ [+]	/t/ [-]	/t/ [+]	/t/ [+]	/-/	/t/ [-]	/t/ [-]
giant	/z/	/t/ [-]	/-/	/t/ [+]	/t/ [+]	/-/	/-/	/t/ [+]
it	/t/ [-]	/tɛ/	/t/ [-]	/t/ [-]	/t/ [+]	/t/ [-]	/z/	/t/ [+]
last	/t/ [+]	/t/ [+]	/t/ [+]	/t/ [+]	/t/ [+]	/t/ [-]	/t/ [-]	/t/ [+]
measurement	/t/ [-]	/t/ [-]	/t/ [-]	/t/ [-]	/t/ [+]	/t/ [-]	/-/	/t/ [+]
next	/-/	/t/ [+]	/t/ [+]	/t/ [+]	/t/ [+]	/-/	/-/	/t/ [+]
street	/z/	/t/ [+]	/t/ [-]	/t/ [+]	/t/ [+]	/t/ [+]	/θ/	/t/ [+]
suggest	/t/ [-]	/t/ [+]	/-/	/t/ [+]	/t/ [-]	/-/	/-/	/t/ [-]
threat	/z/	/t/ [+]	/t/ [+]	/t/ [-]	/ts/	/z/	/z/	/t/ [+]

The productions included in Table 14 have been quantified in Table 15, where columns 2, 3 and 4 show, respectively, the number of occurrences of /t/ (either released or unreleased), of /t/ released ('/t/ [+]'), and the number of times that the phoneme /t/ has been changed for a different one.

Table 15: Quantification of the production of final /t/ ('[+]') released or '[-]' unreleased)

Words	/t/	/t/ [+]	other	% over words			% over FO		
				/t/	/t/ [+]	other	/t/	/t/ [+]	other
bennet	4	1	4	50 %	13 %	50 %	68 %	43 %	32 %
coat	7	6	1	88 %	75 %	13 %			
deduct	5	4	3	63 %	50 %	38 %			
environment	4	3	4	50 %	38 %	50 %			
first	6	3	2	75 %	38 %	25 %			
giant	4	3	4	50 %	38 %	50 %			
it	6	2	2	75 %	25 %	25 %			
last	8	6	0	100 %	75 %	0 %			
measurement	7	2	1	88 %	25 %	13 %			
next	5	5	3	63 %	63 %	38 %			
street	6	5	2	75 %	63 %	25 %			
suggest	5	2	3	63 %	25 %	38 %			
threat	4	3	4	50 %	38 %	50 %			

Columns 5, 6 and 7 include the percentages of those occurrences over the number of productions of each word (eight, one per participant); and the last three columns show the

percentage of the number of occurrences of each type of production over the total number of productions of final /t/ (13 words x 8 participants = 104 productions).

Figure 10 is the graphical representation of the percentages of the different realisations of the final /t/.

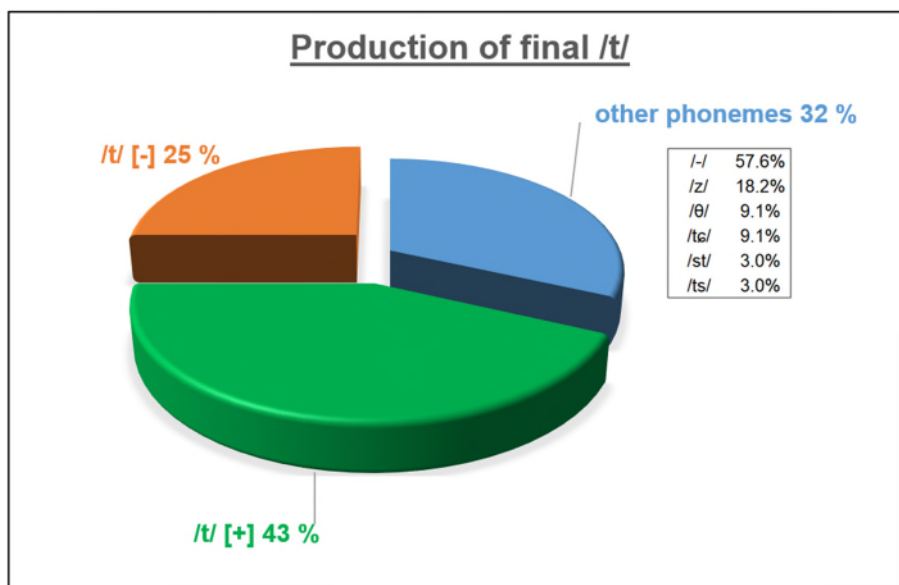


Figure 10. Production of final /t/ by the Vietnamese participants

The final obstruent /t/ has been pronounced according to the RP model (released /t/) in 43 % of cases; 25 % of times, it has been pronounced /t/ but unreleased, following the Northern Vietnamese characteristic of final obstruents, and in 32 % of cases, three kinds of alterations have been observed; the percentage of each kind over the total number of alterations (33 alterations) is as follows:

- a) Substitution of final /t/ for a fricative (/z/ or /θ/) or affricate (/tɛ/): 36.4 %.
- b) Deletion of final /t/: 57.6 %.
- c) Addition of /s/ after or before the phoneme /t/: 6.0 %.

These results might indicate that final /t/ constitutes a very problematic phoneme for Northern Vietnamese speakers of English because they produce many deviations from the RP model. However, analysing this phenomenon in more detail, we observe that the cases where final /t/ has been deleted occur on words where this phoneme is part of a consonant cluster (*deduct, environment, first, giant, measurement, next* and *suggest*). Therefore, we

must remove these words from the analysis of this final obstruent to avoid the influence that the effect of the consonant clusters has in its production.

If we consider, in the analysis of final /t/, only the target words where this phoneme is not part of a consonant cluster, we obtain the results included in Table 16 and the corresponding quantifications included in Table 17.

Table 16: Production of final /t/ ('[+]’ released or ‘[-]’ unreleased), excluding consonant clusters

Words	Participants							
	1	2	3	4	5	6	7	8
bennet	/tɛ/	/tɛ/	/θ/	/t/ [-]	/t/ [-]	/θ/	/t/ [-]	/t/ [+]
coat	/st/ [-]	/t/ [+]	/t/ [+]	/t/ [+]	/t/ [+]	/t/ [-]	/t/ [+]	/t/ [+]
it	/t/ [-]	/tɛ/	/t/ [-]	/t/ [-]	/t/ [+]	/t/ [-]	/z/	/t/ [+]
street	/z/	/t/ [+]	/t/ [-]	/t/ [+]	/t/ [+]	/t/ [+]	/θ/	/t/ [+]
threat	/z/	/t/ [+]	/t/ [+]	/t/ [-]	/ts/	/z/	/z/	/t/ [+]

Table 17: Quantification of the production of final /t/ ('[+]’ released or ‘[-]’ unreleased), excluding consonant clusters

Words	/t/	/t/ [+]	other	% over words			% over FO		
				/t/	/t/ [+]	other	/t/	/t/ [+]	other
bennet	4	1	4	50 %	13 %	50 %	67 %	42 %	33 %
coat	7	6	1	88 %	75 %	13 %			
it	6	2	2	75 %	25 %	25 %			
street	6	5	2	75 %	63 %	25 %			
threat	4	3	4	50 %	38 %	50 %			

Surprisingly, the percentages of occurrence of /t/ ('/t/' column), released /t/ ('/t/ [+]' column) and other phonemes are very similar to those in Table 15. However, this analysis is more realistic since it studies the behaviour of final /t/ excluding the interference with the effect of consonant clusters.

Figure 11 shows the results of Table 17 graphically; according to it, 42 % of times the production of final /t/ is aligned with the RP model (released /t/), whereas 25 % it is produced as an unreleased /t/, and 33 % other alterations can be observed as follows:

- a) Substitution for fricatives /z/ and /θ/, or for affricate /tɛ/.
- b) Addition of phoneme /s/ before or after /t/.

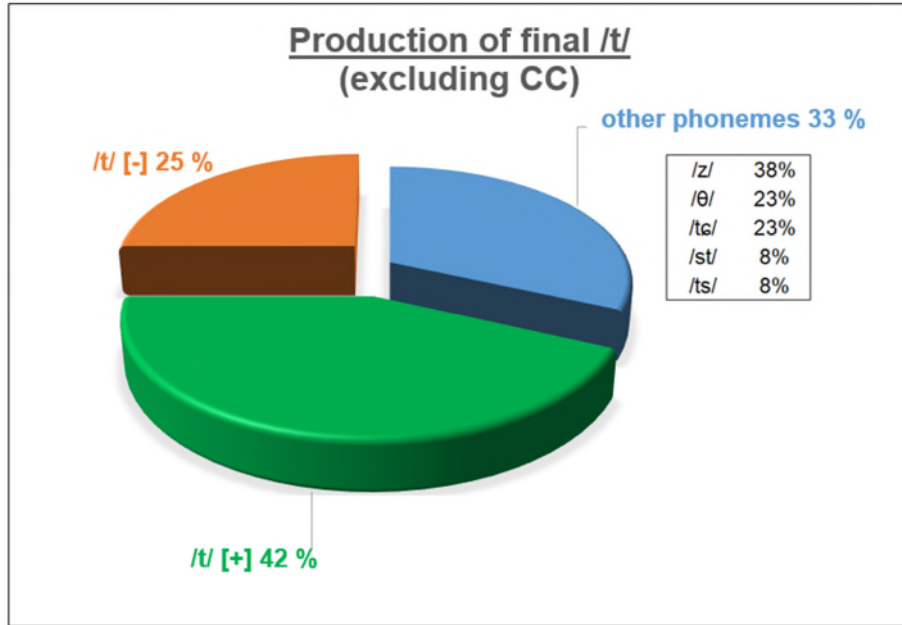


Figure 11. Production of final /t/ by the Vietnamese participants, excluding consonant clusters

According to these results, a phonological transfer from Northern Vietnamese to English is produced in one-fourth of cases (when unreleased /t/ occurs), one-third of times final /t/ is either substituted for a fricative or affricate consonant, or the phoneme /s/ is added before or after it. In 42 % of times final /t/ is pronounced according to the RP model, i.e. with the phoneme /t/ released. Although this research is not related to intelligibility, we may consider that the substitution of final /t/ for other phonemes may affect negatively to it, but this problem may be the topic of another research.

Final /k/

Table 18 includes the pronunciation of the final obstruent /k/ by the eight Vietnamese participants in the three target words with this final phoneme.

Table 18: Production of final /k/ ('[+] released or '[-] unreleased)

Words	Participants							
	1	2	3	4	5	6	7	8
park	/k/ [+]	/k/ [+]	/k/ [+]	/k/ [+]	/k/ [-]	/k/ [-]	/k/ [-]	/k/ [+]
shrink	/-/	/k/ [+]	/k/ [+]	/k/ [+]	/k/ [+]	/-/	/k/ [-]	/k/ [+]
take	/k/ [-]	/k/ [+]	/k/ [+]	/k/ [+]	/k/ [+]	/k/ [+]	/k/ [-]	/k/ [+]

This table has a similar structure than Tables 12, 14 and 16, so its interpretation is the same, and their data have been extracted from Appendix B. Table 19 is the quantification of the data included in Table 18.

Table 19: Quantification of the production of final /k/ ('[+] released or '[-]' unreleased)

Words	/k/	/k/ [+]	other	% over words			% over FO		
				/k/	/k/ [+]	other	/k/	/k/ [+]	other
park	8	5	0	100 %	63 %	0 %	92 %	67 %	8 %
shrink	6	5	2	75 %	63 %	25 %			
take	8	6	0	100 %	75 %	0 %			

Figure 12 is the graphical representation of the percentages of the different realisations of the final /k/.

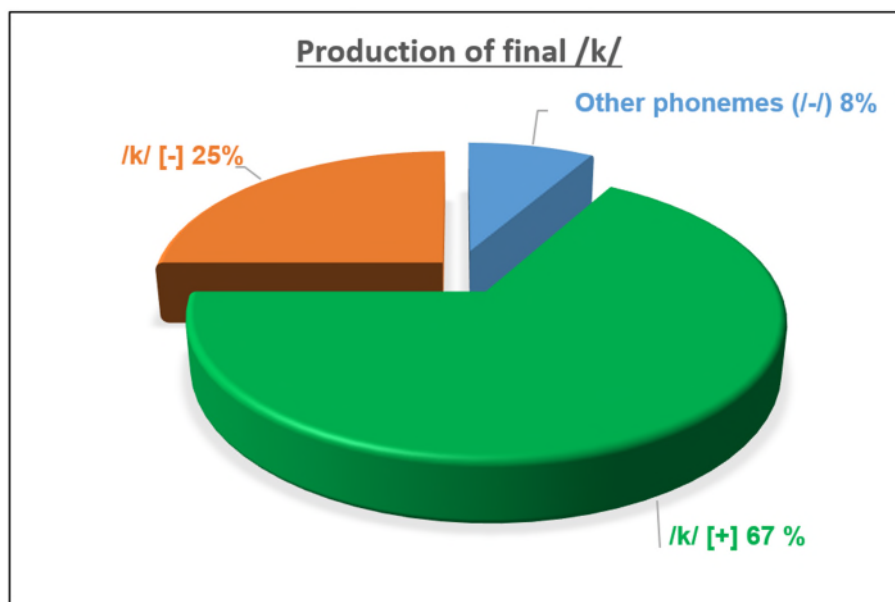


Figure 12. Production of final /k/ by the Vietnamese participants

As this figure shows, final /k/ is pronounced as the RP model (released /k/) 67 % of times; 25 % of times this phoneme has been observed unreleased, and 8 % it has not been observed at all (/-/). Similarly that it happened with final /t/, there are some cases of absence of the final /k/ in the word *shrink*, in which the phoneme /k/ is part of a consonant cluster. To achieve a more realistic analysis, we must isolate the production of the final obstruent from the effect of the consonant cluster, so we should not take into account the word *shrink* in this study, similarly that we did with the final /t/. Table 20 includes the results of the other two words ending with /k/ but not with consonant clusters.

Table 20: Production of final /k/ ('[+]') released or '[-]' unreleased), excluding consonant clusters

Words	Participants							
	1	2	3	4	5	6	7	8
park	/k/ [+]	/k/ [+]	/k/ [+]	/k/ [+]	/k/ [-]	/k/ [-]	/k/ [-]	/k/ [+]
take	/k/ [-]	/k/ [+]	/k/ [+]	/k/ [+]	/k/ [+]	/k/ [+]	/k/ [-]	/k/ [+]

Table 21 is the quantification of the data included in Table 20.

Table 21: Quantification of the production of final /k/ ('[+]') released or '[-]' unreleased), excluding consonant clusters

Words	/k/	/k/ [+]	other	% over words			% over FO		
				/k/	/k/ [+]	other	/k/	/k/ [+]	other
park	8	5	0	100 %	63 %	0 %	100 %	69 %	0 %
take	8	6	0	100 %	75 %	0 %			

Figure 13 is the graphical representation of the results shown in Table 21.

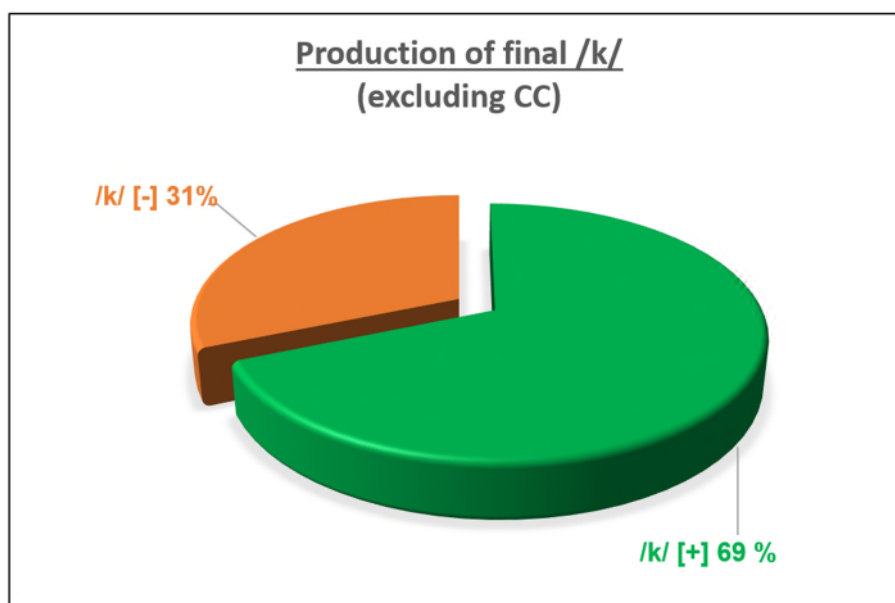


Figure 13. Production of final /k/ by the Vietnamese participants, excluding consonant clusters

As we can see in Figure 13, 31 % of times the pronunciation of final /k/ is unreleased. This phenomenon is associated with a phonological transfer from Northern Vietnamese to English because it is in this way how this phoneme is pronounced in Northern Vietnamese. In 69 % of productions, final /k/ is pronounced with a released burst; therefore, accommodating its pronunciation to that of the model RP.

4.2. Results of the Acoustic Analysis

The following subsections explain the acoustic analysis undertaken to support some results obtained from the auditory analysis explained in Section 4.1. Each feature studied (consonant clusters and voiceless final obstruents) is analysed in a separate subsection to achieve more clarity in the exposition.

Appendix C includes the graphs obtained with the software *Praat* (waveform, spectrogram and formant structure) for some target words produced by every participant.

4.2.1. Consonant Clusters

As it has been stated in subsection 2.4.1, the absence of consonant clusters is a common feature in all Vietnamese dialects. This fact makes it difficult for Vietnamese speakers to pronounce the numerous consonant clusters in the English phonological system, where there may occur clusters of up to three consonants in word onset position and up to four consonants in word coda position. According to Jenkins (2000: 101), ‘the desire to avoid clusters has been traced to a universal preference for the CV (consonant-vowel) syllable’, in this case, Vietnamese syllable structure adheres to this universal, and this fact has an essential effect on the phonological transfer from Vietnamese (not only Northern) to English.

The target words of this research contain a variety of clusters in onset, medial and coda positions, and the results of the observation of their pronunciations obtained through auditory analysis are included in Table 10. According to these results the cluster represented orthographically by the group *tr*, whose RP pronunciation is /tr/, has been produced in some cases with the affricate /tʃ/.

Sometimes the presence or absence of friction is difficult to distinguish. In the case of /tr/, the phoneme /r/ is devoiced, so when observing this cluster, slight friction appears, and it is not possible to differentiate it from /tʃ/. The only factor that may help is the transition of the formants of the approximant /r/ to the vowel since F2 and F3 rise from the production of /r/ to the following vowel; this rise is more visible for F2. Figure 14 is an example of this effect; it shows the formant structure of the word *trip* pronounced by the English participant 9. The rise of F2 and F3 (mainly F2) can be observed from their initial to their final positions, in which they correspond to the vowel /ɪ/.

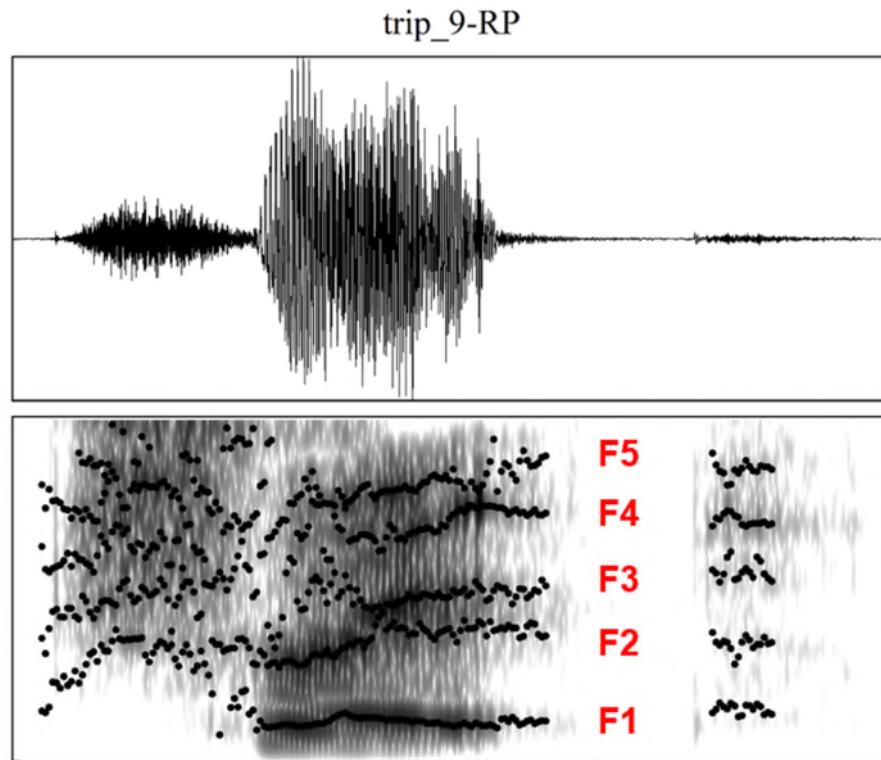


Figure 14. Waveform, spectrographic representation and formant structure of the word *trip* pronounced by participant 9

Figure 15 shows the graphs of the same word, *trip*, pronounced by the Vietnamese participants 3 and 4.

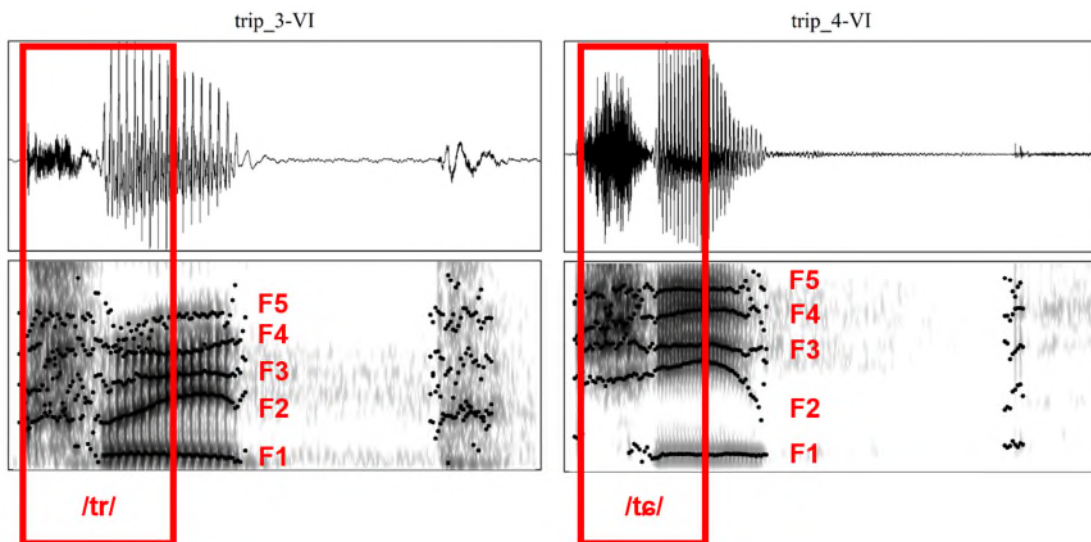


Figure 15. Waveform, spectrographic representation and formant structure of the word *trip* pronounced by participants 3 and 4

We can observe that F2 and F3 in participant 3 rise from the beginning to the end of the phoneme /r/; this fact supports the presence of the approximant /r/. The observed production of the group *tr* in participant 3 is the cluster /tr/. However, F2 and F3 are steady or even fall in the production of participant 4, supporting the idea of an absence of the approximant /r/ before the vowel. The observed production of the group *tr* in participant 4 is the affricate /tɕ/.

Another example of the same consonant cluster is shown in Figure 16, what represents a comparison between productions of participants 1 and 4 of the word *street*.

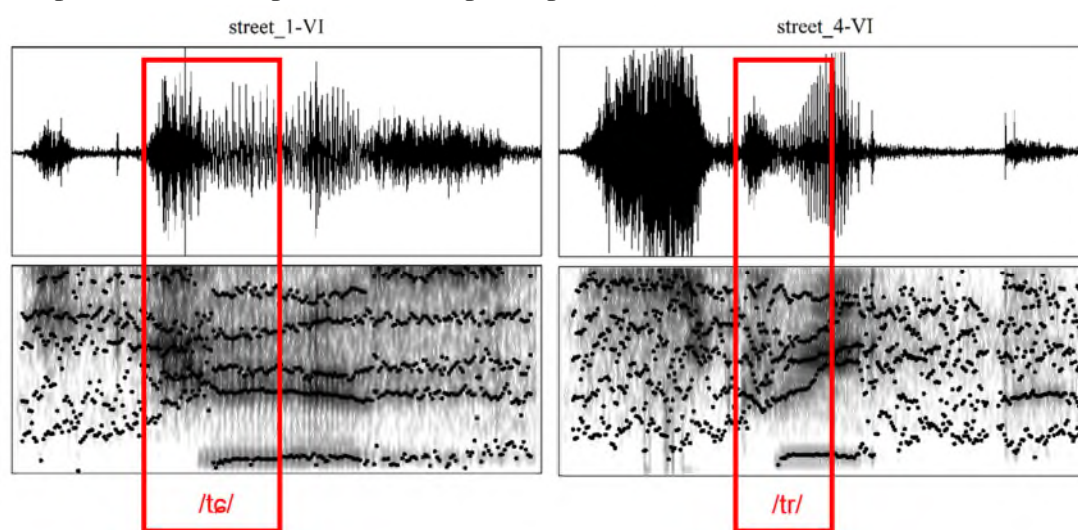


Figure 16. Waveform, spectrographic representation and formant structure of the word *street* pronounced by participants 1 and 4

The formants F2 and F3 in the acoustic analysis of participant 1 keep steady, which supports the auditory perception of the affricate /tɕ/. In contrast, the rise in those formants shown in the acoustic analysis of participant 4 indicates the presence of the approximant /r/ between the plosive /t/ and the following vowel

4.2.2. Voiceless Final Obstruents

In section 2.4.2.4 we saw that one crucial difference between Vietnamese and English regarding the voiceless final obstruents (/p/, /t/ and /k/) is that these phonemes are unreleased in all varieties of Vietnamese, but they are usually released in English. According to Raphael, Borden and Harris (2011: 131), two features characterise stop production: a ‘silent gap’

during which there is no flow of air out of the vocal tract, and a noise burst at the moment of release. These features may be well observed in the acoustic analysis of the corresponding audio files. Figures 17, 18 and 19 show the waveforms, spectrograms and formant structures of the words *creep*, *coat* and *take* respectively, pronounced by the two English participants (numbers 9 and 10), which are used as a model.

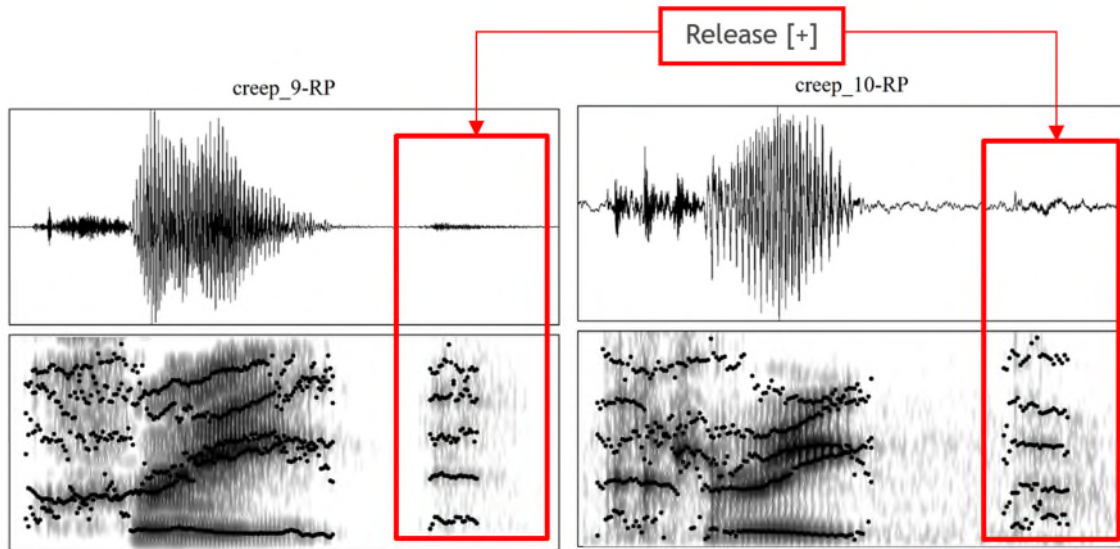


Figure 17. Waveform, spectrographic representation and formant structure of the word *creep* pronounced by participants 9 and 10

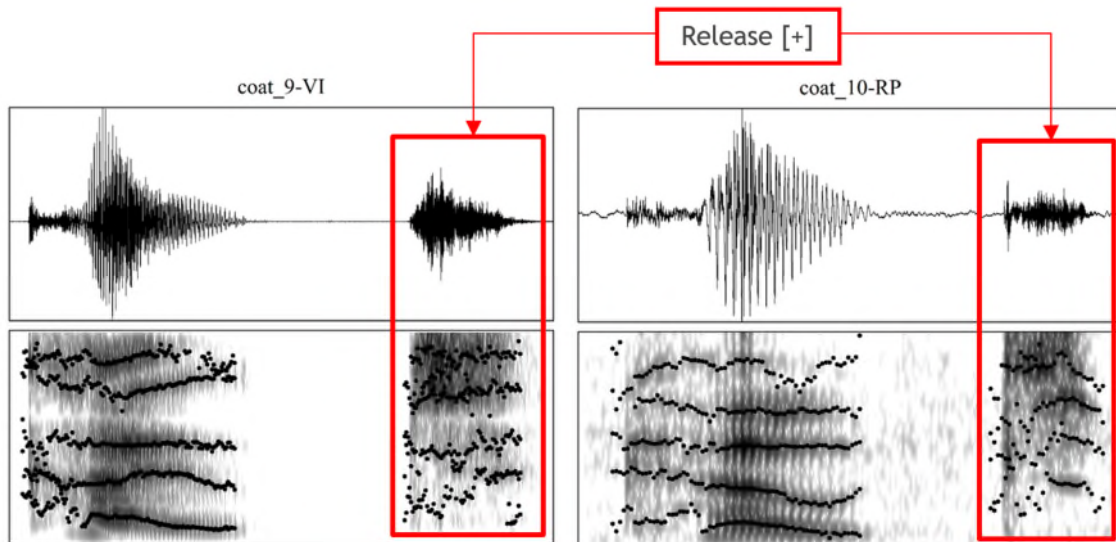


Figure 18. Waveform, spectrographic representation and formant structure of the word *coat* pronounced by participants 9 and 10

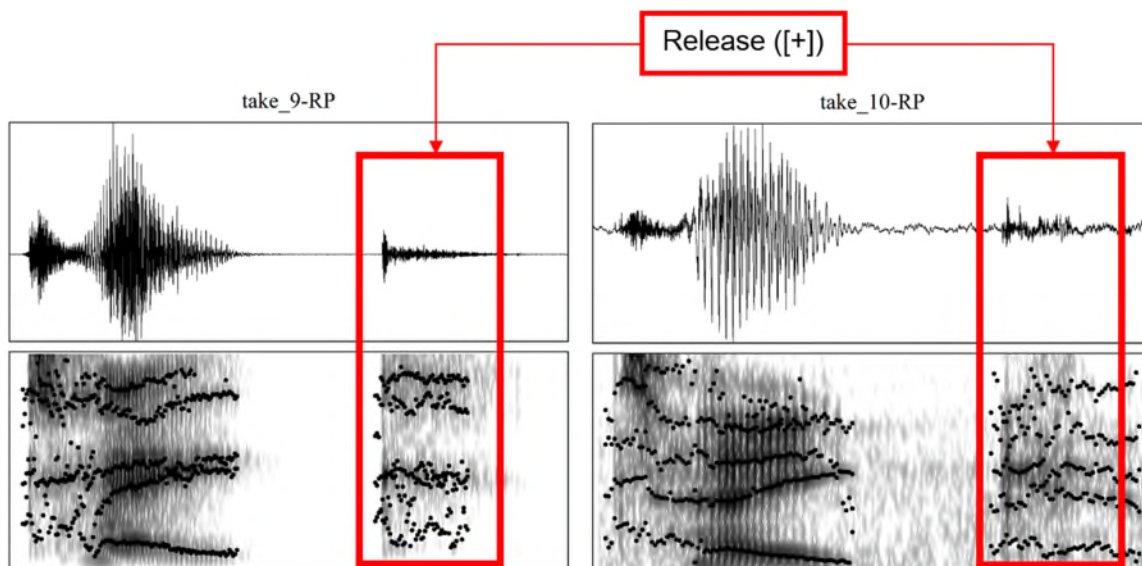


Figure 19. Waveform, spectrographic representation and formant structure of the word *take* pronounced by participants 9 and 10

When we observe the production of the voiceless final obstruents by the eight Vietnamese participants, we can detect two phenomena, which are shown in Tables 12, 16 and 20:

1. Some participants change the final obstruent for other phonemes (mainly affricate and fricative), or even they omit that final consonant. This effect is mainly observed with the phoneme /t/.
2. When the participants keep the right final phoneme (according to RP pronunciation), some of them produce them with an absence of release.

Figures 20, 21 and 22 show some examples of the absence of release in the production of words ending in /p/, /t/ and /k/ respectively, whereas Figure 23 shows the graphs of the words *street* and *threat*, where the final obstruent has been produced with the fricatives /θ/ and /z/ respectively. According to Raphael, Borden and Harris (2011: 124), ‘the aperiodic source that marks fricatives is created in the vocal tract by sending the breath stream (either phonated or unphonated) through constrictions formed in the tract’. The presence of a fricative is observed in the spectrogram by a prolonged aperiodic sound with little or no formant structure because they are nonresonant consonants.

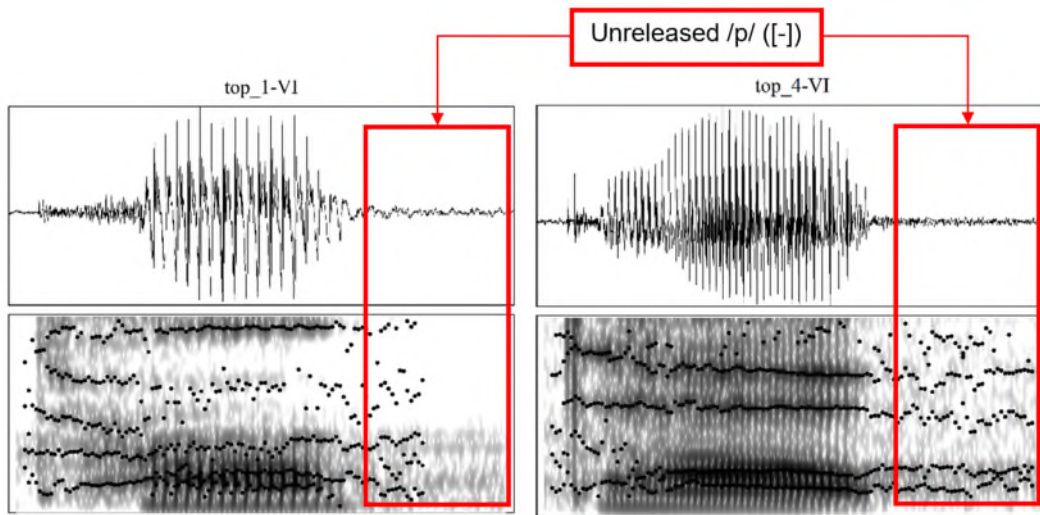


Figure 20. Waveform and spectrogram representation and formant structure of the word top pronounced by participants 1 and 4

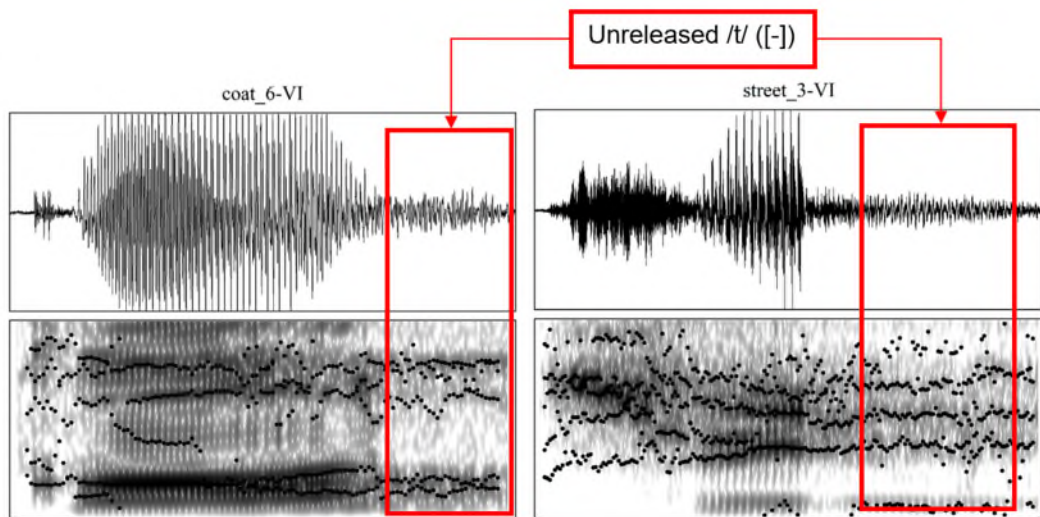


Figure 21. Waveform, spectrographic representation and formant structure of the word coat pronounced by participant 6 and street by participant 3

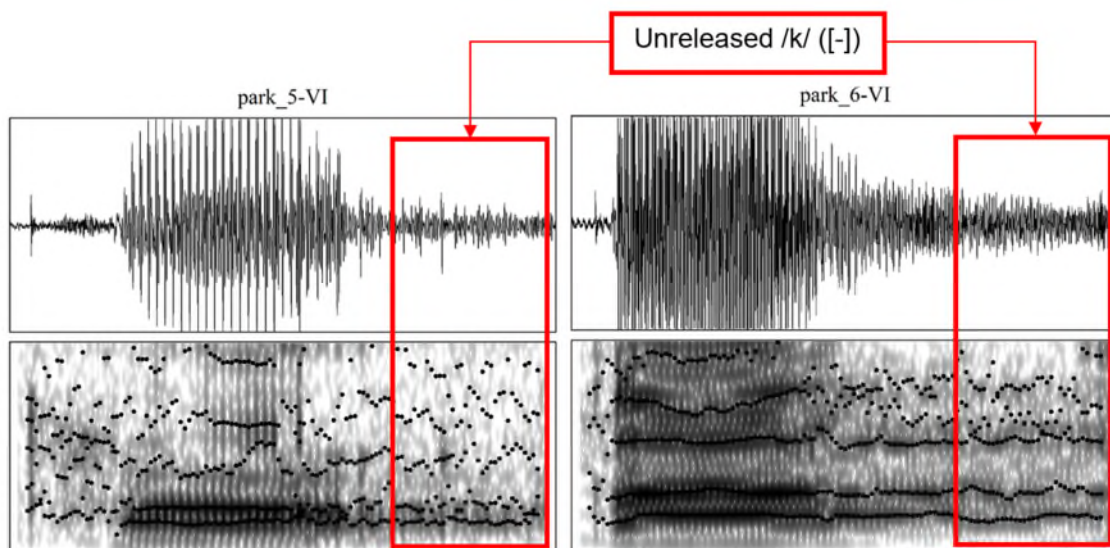


Figure 22. Waveform, spectrographic representation and formant structure of the word park pronounced by participants 5 and 6

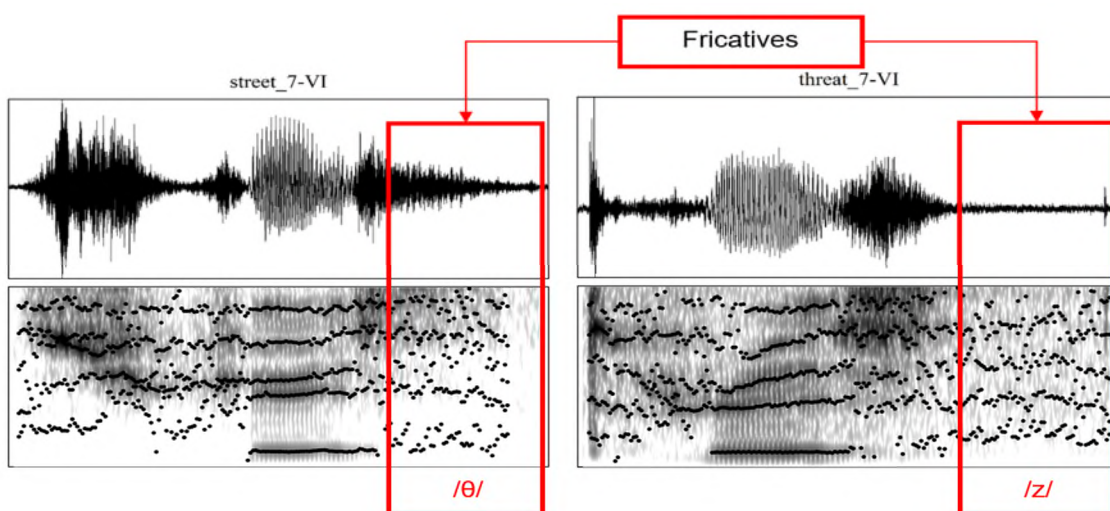


Figure 23. Waveform, spectrographic representation and formant structure of the words street and threat pronounced by participant 7

5. DISCUSSION

5.1. Interpretation of the Results

This section interprets the results included in Section 4 and evaluates whether the hypothesis introduced in Section 1.2 can be verified. The objective of this thesis, explained in Section 1.1, is to study some aspects of the phonological transfer from Northern Vietnamese to English. In this section, we will be able to detect the phonological transfer features observed in the production of the consonant clusters and the voiced final obstruents by the eight Vietnamese participants.

5.2. Comparative Study of Consonant Clusters

5.2.1. Onset Consonant Clusters

There is one cluster of three consonants in onset position in the target words (/str/) and eleven clusters of two consonants (/kl/, /sk/, /sp/, /kr/, /pr/, /br/, /fr/, /tr/, /gr/, /θr/ and /ʃr/). These clusters are shown in Table 11 and Figure 8.

According to the results, the clusters /kl/, /sk/ and /sp/ are pronounced following the RP model. The rest of them, which have the approximant /r/ as the last consonant, show some kind of deviations from the model. The forty-five segmental deviations observed in these consonant clusters can be categorised into the following groups:

- a) Substitution. There are thirty-six cases of substitution of one consonant for another (80 %); these cases can be classified as follows:
 - i) Substitution for a plosive. There are twenty cases of this deviation in the clusters /br/, /fr/, /gr/, /kr/ and /θr/, all of them ending with the approximant /r/. The first plosive or fricative has been substituted for the plosives /p/, /t/, /k/, /b/ or /g/, and the approximant remains.
 - ii) Substitution for an affricate. There are eight cases where the cluster /tr/ has been substituted by the affricate /tʃ/.
 - iii) Substitution of fricatives. This deviation has been observed six times only with the cluster /ʃr/, where the fricative /ʃ/ has been substituted for the also fricative /s/.

- iv) Substitution of approximants. There are two residual cases, where the approximant /r/ has been substituted by the also approximant /w/. This phenomenon has been observed with the cluster /ʃr/.
- b) Consonant deletion. There are four cases of consonant deletion (9 %), three of them in the cluster /str/, where the plosive /t/ has been deleted, and one in /pr/ with deletion of the approximant.
- c) Addition. Five cases (11 %) of epenthesis¹¹ have been observed: a schwa (/ə/) has been added twice between the two consonants of the cluster /br/, once before the cluster /str/, and once after the cluster /ʃr/. The last case of epenthesis is the addition of the plosive /t/ between the two consonants of the cluster /ʃr/.

5.2.2. Medial Consonant Clusters

There are two clusters of three consonants (/lptʃ/ and /ntl/) and two clusters of two consonants (/kʃ/ and /pl/) in medial position. The deviations observed are of two kinds: substitutions and deletions. Besides, some consonant clusters have been affected by both, as it is explained below:

- a) Substitution. The most common substitution appears with the affricate /tʃ/ in the cluster /lptʃ/ and the plosive /t/ in the cluster /ntl/; those phonemes have been changed for the affricate /tʃ/ in five occurrences. Three times, we can observe the substitution of the post-alveolar /ʃ/ for the alveolar /s/ in the cluster /kʃ/. One residual case is the substitution of the plosive /p/ for the fricative /f/ in the cluster /pl/.
- b) Deletion. The plosive /k/ has been deleted three times in the cluster /kʃ/, and the plosive /t/ has been deleted in the cluster /ntl/ four times. In eight occurrences, the cluster /lptʃ/ has suffered deletion of one or two consonants.
- c) Merging of deviations. The case of the cluster /lptʃ/ deserves a separate group because, apart from the substitution for the affricate /tʃ/ and the deletions mentioned above, the productions by all participants have some kind of deviation: deletions, substitutions or a combination of both.

¹¹ 'Epenthesis refers to the intrusive sound placed between two other sounds to facilitate a "difficult" articulation' (Jenkins 2000: 34).

5.2.3. Coda Consonant Clusters

There are seven consonant clusters in coda position, five of two consonants (/dz/, /kt/, /nt/, /st/ and /ŋk/), one of three consonants (/kst/) and one of four consonants (/ksts/). The productions of all consonant clusters have some kind of deviations, thirty-nine in our observation, which can be grouped as follows:

- a) Substitution. There are five cases of substitution. These substitutions are varied: /x/ in the cluster /kt/, /st/ in /nt/, /k/ in /st/ and /tə/ in /st/.
- b) Deletion. This is a common deviation with thirty-four cases observed, most of them in the clusters /dz/, /kt/, /nt/, /st/ and /ŋk/. The clusters /kst/ and, especially, /ksts/ lead to deletions of different consonants in each case. The latter cluster has never been pronounced with all its consonants according to the RP model.

5.2.4. Evaluation of Consonant Clusters

The previous subsections described the deviations from the RP model observed in the production of the consonant clusters in onset, medial and coda position of the word. It is possible to group these deviations into three main categories: substitution, consonant deletion and addition; which corroborates what Jenkins (2000: 34) proposed and has been quoted in Section 1.2.

In this subsection, we will determine what deviations in consonant clusters are cases of phonological transfer from Northern Vietnamese to English taking into account the content of Section 2. The deviations observed in all positions are the following:

- a) Substitution. Table 22 represents the substitutions observed in consonant clusters in onset, medial and coda positions according to the explanations given in the corresponding previous subsections. For each position in the word (onset, medial and coda), this table shows the phonemic transcription according to the RP model of some phonemes of the consonant clusters in the target words ('Source' column), the transcriptions of the productions by the Vietnamese participants ('Target' column), and the number of substitutions observed. The arrows represent the direction of the substitutions.

Table 22: Substitutions observed in consonant clusters

Onset			Medial			Coda		
Source	Target	No.	Source	Target	No.	Source	Target	No.
/br/ → /fr/ → /gr/ → /kr/ → /θr/ →	/pr/	3	/tʃ/ → /nt/ →	/tʃ/	5	/kt/ →	/x/	1
	/tr/	8				/nt/ →	/st/	1
	/kr/	1	/kʃ/ →	/s/	3	/st/ → /tʃ/ →	/k/	2
	/br/	7	/pl/ →	/fl/	1		/tʃ/	1
	/gr/	1						
/tr/ →	/tʃ/	8						
	/s-/	5						
/ʃr/ → /ʃw/ →	/sw/	2 (*)						
	/ʃw/	1						
Onset substitutions: 36			Medial substitutions: 9			Coda substitutions: 5		
Total substitutions: 50								

(*) Only one case but two substitutions: /ʃ/ → /s/ and /r/ → /w/

The most crucial substitution is where the target phoneme is the affricate /tʃ/, it appears fourteen times in all positions (28 % over the total number of substitutions). The observation of this phoneme in the productions of the Vietnamese participants corroborates the statement of Kirby (2011) and Harris (2006) expressed in Subsection 2.4.2.1. According to these authors, the groups of consonants *ch* and *tr* are realised in Northern Vietnamese as the palatal affricate /tʃ/. This fact and the absence in Northern Vietnamese of consonant clusters explain why this substitution is a clear case of phonological transfer from Northern Vietnamese to English. Northern Vietnamese speakers tend to pronounce the English cluster represented by *tr* as this group is pronounced in their language.

Another phenomenon observed in Table 22, is the substitutions of the first consonant in the clusters /br/, /fr/, /gr/, /kr/ and /θr/ for the plosives /p/, /t/, /k/, /b/ or /g/, apparently at random, without fixed rules. These substitutions appear twenty times in this research, and they might be explained as caused by a hypercorrection¹² effect

¹² 'Hypercorrection' may be defined as 'the use of an erroneous word form or pronunciation based on a false analogy with a correct or prestigious form' (Oxford Dictionary).

over the participants. In the absence of consonant clusters in Vietnamese, the participants make an effort to maintain the consonant cluster but changing in some cases the first consonant for another one.

One last remarkable substitution is that of the post-alveolar /ʃ/ for the alveolar /s/ in nine cases. This phenomenon is also a phonological transfer since the phoneme /ʃ/ does not exist in Northern Vietnamese, and sometimes it is changed for the also unvoiced fricative /s/, which exists in this language. The other seven substitutions observed can be considered residual and accidental and do not deserve more analysis.

b) Deletion.

There are not systematic rules regarding the fifty-three cases of deletion observed. Northern Vietnamese has no consonant clusters, and the deletions are used to simplify them. The deletions observed can be considered cases of phonological transfer to accommodate the structure of the syllables to that of Northern Vietnamese.

The more consonants the cluster has, the more consonants are deleted, this effect is observed in the clusters /lptʃ/, /kst/ and /ksts/, where there are cases of deletion of any consonant. However, it is remarkable that when the coda clusters /nt/ and /ŋk/ suffer deletion (nine times), the nasal consonant remains; this is an influence of the Northern Vietnamese phonology since those nasals belong to its repertoire.

c) Addition.

Five cases of addition have been observed, and they occur only in onset position, they are epenthesis of shwa (/ə/) in four cases and of /t/ in one case. This phenomenon is a case of phonological transfer from Northern Vietnamese to English because it is a mechanism to adapt the structure of the English syllables with consonant clusters to the structure of the Northern Vietnamese syllable, explained in subsection 2.4.2.

Northern Vietnamese phonological system lacks consonant clusters, so, according to the above explanations, L1 speakers tend to adequate their production of L2 to their phonological system.

Consonant clusters is a case where, in words of Jenkins (2000: 33), ‘sounds that are phonetically very different from those in the L1 are initially likely to prove most difficult to produce, since the articulators must be activated in new ways’. Therefore, these results confirm the first aspect of the hypothesis: ‘the differences of both phonological systems may trigger a phonological transfer’.

5.3. Comparative Study of Voiceless Final Obstruents

Table 23 summarises the characteristics of the productions of the three voiceless final obstruents, which are included in Section 4. This table shows the percentage of occurrence observed for each characteristic: pronunciation according to RP model (‘/RP/ [+]’), pronunciation with the RP phoneme but unreleased (‘/RP/ [-]’), and pronunciation of other phonemes in its place.

Table 23: Production of voiceless final obstruents

Final obstruent	/RP/ [+]	/RP/ [-]	other phonemes
/p/	77 %	23 %	0 %
/t/	42 %	25 %	33 %
/k/	69 %	31 %	0 %

The highest level of accommodation with the RP model (/RP/ [+]) is achieved by final /p/, and the lowest by final /t/, that is the only phoneme in which we have observed substitutions for other phonemes: fricatives /z/ and /θ/, and affricate /tʃ/. On the other hand, the column headed by ‘/RP/ [-]’ represents the rating of phonological transfer from Northern Vietnamese to English for each final obstruent because it indicates how often Northern Vietnamese speakers produced the L2 voiceless final obstruents similarly than those consonants in L1. Final /k/ has the highest level of transfer.

Voiceless final obstruents is a case where ‘there is any degree of similarity between L1 and L2 sounds’, as Section 1.2 explains based on the statement of Jenkins (2000: 33). These results confirm the second aspect of the hypothesis: ‘similar sounds may activate a phonological transfer’. Furthermore, the results of this research corroborate the unreleased

character of the Vietnamese final obstruents observed by Tang (2007: 6), as it has been explained in Subsection 2.4.2.4.

What seems evident from the study of voiceless final obstruents is that the phoneme /t/ in final position results to be the most problematic for the production by Northern Vietnamese speakers. It has a low level of accommodation to the RP model; and it is the phoneme in which we observe substitutions for other phonemes, what might lead to problems of intelligibility. However, research on this topic is out of the scope of this thesis.

6. CONCLUSIONS

This paper analysed how the phonological transfer can be observed in the production of English consonant clusters and voiceless final obstruents by eight Northern Vietnamese speakers. The hypothesis was that two opposite phenomena, similarities and differences in the phonological systems of L1 and L2, can lead to a transfer from the former to the latter.

The deviations in the production of consonant clusters have been classified into three categories: substitution, consonant deletion and addition. We have found phonological transfer in each one of those groups. One frequent phonological transfer is the substitution of the English cluster /tr/ for the Northern Vietnamese affricate /tʃ/. This transfer has its explanation in the fact that the consonantal group *tr* is pronounced in Northern Vietnamese as /tʃ/. This phoneme also appears as the target phoneme of other consonant clusters in medial and coda positions. There are also substitutions of the phoneme /ʃ/, inexistent in Vietnamese, for the alveolar /s/. The cases of deletion and addition are caused by an adaptation of the English syllabic structure to that of Northern Vietnamese. The fact that Vietnamese lacks consonant clusters leads to a reduction in the number of consonants observed or the addition of other phonemes through epenthesis.

Regarding voiceless final obstruents, the results showed an average phonological transfer of 26 % (23 % for /p/, 25 % for /t/ and 31 % for /k/). Thus, /k/ is the final obstruent with more rate of transfer; however, the differences are not substantial. What is important to mention here is that in 33 % of cases final /t/ has been suffered deviations, such as substitutions for a fricative or affricate (/z/, /θ/, /tʃ/), or addition of the phoneme /s/. This phenomenon is important to be taken into account in terms of intelligibility.

In summary, defining phonological transfer as the influence of L1 phonology on L2 pronunciation, we can conclude that the existence of either different or similar features between the two phonological systems –consonant clusters and voiceless final obstruents, respectively– triggers this transfer, corroborating in this way the hypothesis of this research. In both cases, L1 speakers tend to adapt their production of L2 features according to the phonological system of L1. We have observed that there is a tendency to pronounce the group *tr* with the phoneme /tʃ/, the substitution of /ʃ/ for /s/, or epenthesis in some cases to adapt L2 syllabic system to that of L1. Regarding voiceless final obstruents, although

phonemically they are similar in both languages, there is a tendency to pronounce them with an unreleased mechanism by L1 speakers. There are also some cases of substitution of final obstruent for the affricate /tʃ/; as explained above, this phoneme has a significant influence in the production of L1 speakers.

Additionally, we have observed cases of hypercorrection in some consonant clusters ending in /r/; the participants keep this phoneme but change the first one, perhaps in the effort to get correctness. In any case, the differences in both phonological systems cause some kind of deviations.

This paper has not analysed the effect of the observed phonological transfers on intelligibility, which might be the object of further research. Likewise, the idea of correctness has been out of this investigation. However, the conclusions of this study have an impact on the following fields:

- The interpretation of Northern Vietnamese English as another variety of English, with its particular characteristics, as explained above.
- The intelligibility levels of speakers of other linguistic backgrounds when speaking English with Northern Vietnamese natives in international contexts.
- The English teaching methodology to Northern Vietnamese students, making them focus on aspects that they should improve in order to accommodate their production to that of the RP model.

This paper contributes to fill the existing gap in the studies of the phonological transfer from Northern Vietnamese to English in an international environment. However, further investigations will be needed both in the segmental and suprasegmental levels to get ample knowledge of these phenomena.

7. REFERENCES

- Alves, M. J. (2006). Linguistic Research on the Origins of the Vietnamese Language: An Overview. *Journal of Vietnamese Studies*, 1(1-2), 104-130.
- Alves, M. J. (2007). A look at North-Central Vietnamese. *12th Annual Meeting of the Southeast Asian Linguistics Society (2002)* (pp. 1-10). Rockville (Maryland): Pacific Linguistics: Research School of Pacific and Asian Studies.
- Alves, M. J. (2009). Loanwords in Vietnamese. *Loanwords in the World's Language: A Comparative Handbook*, 617-637.
- Austen, J. (2007). *Pride and Prejudice*. In J. Austen, *Jane Austen, Seven Novels* (pp. 199-405). New York: Barnes & Noble.
- Bauman, J., Blodgett, A., Rytting, C., & Shamoo, J. (2009). The ups and downs of Vietnamese tones: A description of native speaker and adult learner tone systems for Northern and Southern Vietnamese. *University of Maryland Center for Advanced Study of Language*, 1-23.
- Boersma, P., & Weenink, D. (2005). *Praat: doing phonetics by computer* [computer program]. Retrieved from <http://www.praat.org>
- Brown, J. D. (2004). Research Methods for Applied Linguistics: Scope, Characteristics, and Standards. In A. Davies, & C. Elder (Eds.), *The Handbook of Applied Linguistics* (pp. 476-500). Oxford: Blackwell Publishing.
- Cheng, L. L. (1987). *Assessing Asian language performance: Guidelines for evaluating limited-English-proficient students*. Rockville, MD: Aspen Publishers.
- Dalton, Christiane, & Seidlhofer, B. (1994). Is pronunciation teaching desirable? Is it feasible? In T. Sebbage, & S. Sebbage (Ed.), *Proceedings of the 4th International NELLE Conference*. Hamburg: NELLE.
- De Rhodes, A. (1651). *Dictionarium Annnamiticum [sic] Lusitanum, et Latinum*. Roma: Sacrae Congregationis de Propaganda Fide.
- Deterding, D., & Mohamad, N. R. (2016, December). The Lingua Franca Core and Englishes in East and Southeast Asia. (M. A. Quayum, Ed.) *Asiatic: IIUM Journal of English Language and Literature*, 10(2), 60-77.
- Dinh D., Hoang K., & Nguyen T. V. (2001). Vietnamese Word Segmentation. (págs. 749-756). HCM City (Vietnam): NLPRS.

- Đoàn T. T. (Ed.). (2012). *A Concise Vietnamese Grammar (for Non-native Speakers)* (4th ed.). (Nguyễn Quốc Hùng, Trans.) Hà Nội, Việt Nam: Thế Giới Publishers.
- Đoàn T. T. (Ed.). (2014). *Click Tiếng Việt (Sách dành cho người nước ngoài) trình độ A - Tập 1*. Hà Nội, Việt Nam: Thế Giới Publishers.
- Dörnyei, Z. (2007). *Research Methods in Applied Linguistics*. Orford: Oxford University Press.
- Enfield, N. (2001). On Genetic and Aereal Linguistics in Mainland South-East Asia: Parallel Polyfunctionality of 'acquire'. In A. Aikhenvald, & R. Dixon (Eds.), *Aereal Diffusion and Genetic Inheritance. Problems in Comparative Linguistics* (pp. 255-290). Oxford University Press.
- Escandell, M., Marrero, V., Casado, C., Gutiérrez, E., & Ruiz-Va, P. (2009). *El lenguaje humano*. Madrid: Lavel, S.A.
- Gage, W. W. (1985). Vietnamese in Mon-Khmer Perspective. *Southeast Asian Linguistic Studies Presented to Andre-G. Haudricourt*, 493-524.
- Harris, J. G. (2006). A Palatographic study of places of articulation in Thai and some other Southeast Asian languages: Dentals, alveolars, and palatals. In J. E. Harris (Ed.), *Readings in articulatory phonetics 1: Consonants and phonation types* (pp. 63-91). Bangkok: Ek Phim Thai Co.
- Haudricourt, A. G. (2010). The origin of the peculiarities of the Vietnamese alphabet. *Mon-Khmer Studies*(39), 89-104.
- Henderson, E. (1966). Towards a prosodic statement of Vietnamese syllable structure. In C. Bazell, J. Catford, M. Halliday, & R. Robins (Eds.), *In Memory of JR Firth* (pp. 163-197). London: Longmans.
- Jenkins, J. (2000). *The Phonology of English as an International Language*. Oxford: Oxford University Press.
- Kachru, B. (1992). *The Other Tongue. English Across Cultures* (2 ed.). Urbana, IL: University of Illinois Press.
- Kirby, J. K. (2011). Vietnamese (Hanoi Vietnamese). *Journal of the International Phonetic Association*, 41(3), 381-392. doi:10.1017/S0025100311000181

- Lê, P. H., Nguyễn, H. T., Roussanaly, A., & Vinh, H. T. (2008). A Hybrid Approach to Word Segmentation of Vietnamese Texts. *2nd International Conference on Language and Automata Theory and Applications* (pp. 240-249). Tarragona (Spain): Springer.
- Maspero, H. (1912). Etudes sur la phonétique historique de la langue annamite. Les initiales. *Bulletin de l'Ecole française d'Extrême-Orient*, 12, 1-124.
- Ngô B. N. (2001). The Vietnamese Language Learning Framework. *Journal of Southeast Asian Language Teaching*(10), 1-24.
- Nguyễn Đ. H. (1997). *Vietnamese: Tiếng Việt không son phần* (Vol. 9). (London Oriental and African Language Library, Ed.) Amsterdam, PA, USA: John Benjamins.
- Phạm, A. H. (2006, January). Vietnamese Rhyme. *Southwest Journal of Linguistics*(25), 107-142.
- Raphael, L. J., Borden, G. J., & Harris, K. S. (2011). *Speech Science Primer. Psychology, Acoustics, and Perception of Speech* (6th Ed. ed.). Philadelphia: Lippincott Williams & Wilkins.
- Sampson, G. (1969). Hanoi Dorsal Finals. *Bulletin of the School of Oriental and African Studies, University of London*, 32(1), 115-134.
- Smith, L. E. (1976, December). English as an International Auxiliary Language. *RELC Journal*, 7(2), 38-42.
- Tang, G. (2007). Cross-linguistic analysis of Vietnamese and English with implications for Vietnamese language acquisition and maintenance in the United States. *Journal of Southeast Asian American Education and Advancement*, 2(1). doi:10.7771/2153-8999.1085
- Thai D. M. (2004). Metafunctional profile of the grammar of Vietnamese. In A. Caffarel, & J. Martin (Eds.), *Language Typology: A Functional Perspective* (pp. 397-432). Sydney: John Benjamins.
- Thompson, L. C. (1965). *A Vietnamese Grammar*. Seattle, WA: University of Washington.
- Vu, T. N., & Schultz, T. (2009). Vietnamese Large Vocabulary Continuous Speech Recognition. (pp. 333-338). Karlsruhe: Cognitive Systems Lab (CLS), Institute for Anthropomatics, University of Karlsruhe.

APPENDIX A

This appendix includes the texts used in this research, recorded while the participants were reading them:

Text 1

(The target words are underlined in the text)

It is a truth universally acknowledged, that a single man in possession of a good fortune, must be in want of a wife.

However little known the feelings or views of such a man may be on his first entering a neighbourhood, this truth is so well fixed in the minds of the surrounding families, that he is considered the rightful property of some one or other of their daughters.

“My dear Mr. Bennet,” said his lady to him one day, “have you heard that Netherfield Park is let at last?”

Mr. Bennet replied that he had not.

“But it is,” returned she; “for Mrs. Long has just been here, and she told me all about it.”

Mr. Bennet made no answer.

“Do you not want to know who has taken it?” cried his wife impatiently.

“*You* want to tell me, and I have no objection to hearing it.”

This was invitation enough.

Pride and Prejudice (Austen, 2007: 201)

Text 2

(The target words are underlined in the list)

Aloof	Amazing	Avoid	<u>Backup</u>
Beach	Beer	Belonged	<u>Brain</u>
Breath	Change	<u>Cheap</u>	<u>Clouds</u>
<u>Coat</u>	<u>Crane</u>	<u>Creep</u>	<u>Deduct</u>
<u>Environment</u>	Fair	<u>First</u>	<u>Freeze</u>
<u>Friction</u>	<u>Gap</u>	Garage	Genre
<u>Giant</u>	<u>Grace</u>	Here	Horse
Jungle	Language	Laugh	Launched
Ledge	Marched	Massage	<u>Measurement</u>
Mouth	<u>Next</u>	Northern	<u>Objection</u>
Poor	Road	<u>Sculpture</u>	Serious
<u>Shrink</u>	<u>Soap</u>	<u>Spain</u>	<u>Street</u>
<u>Stretch</u>	<u>Suggest</u>	<u>Take</u>	Television
<u>Texts</u>	Thirteenth	Those	<u>Threat</u>
<u>Top</u>	<u>Trip</u>	Zoo	

APPENDIX B

The table included in this Appendix shows the forty target words in alphabetic order, and for each word, the features included in those words (CC - consonant cluster or FO - voiceless final obstruent), the corresponding phonological transcription of those features in the RP variety of English using IPA signs¹³, and the phonemes observed in the pronunciation of those features by each Vietnamese participant. The suffixes ‘[+]’ and ‘[-]’ after the voiceless final obstruents indicate that the participant has produced them with a released or unreleased mechanism, respectively. A hyphen between two slashes ‘/-/’ means that no phoneme has been produced in those cases.

Word	backup	bennet	brain	breath	cheap	clouds		coat	crane	
CC/FO	FO	FO	CC	CC	FO	CC		FO	CC	
RP	/p/	/t/	/br-/	/br-/	/p/	/kl-/	/-dz/	/t/	/kr-/	
Participants	1	/p/ [-]	/tə/	/br/	/br/	/p/ [+]	/kl/	/z/	/st/ [-]	/kr/
	2	/p/ [+]	/tə/	/tr/	/bət/	/p/ [+]	/kl/	/dz/	/t/ [+]	/kr/
	3	/p/ [+]	/θ/	/br/	/br/	/p/ [+]	/kl/	/d/	/t/ [+]	/br/
	4	/p/ [+]	/t/ [-]	/br/	/br/	/p/ [+]	/kl/	/z/	/t/ [+]	/kr/
	5	/p/ [+]	/t/ [-]	/br/	/br/	/p/ [+]	/kl/	/dz/	/t/ [+]	/kr/
	6	/p/ [-]	/θ/	/pr/	/br/	/p/ [-]	/kl/	/z/	/t/ [-]	/kr/
	7	/p/ [+]	/t/ [-]	/br/	/bət/	/p/ [+]	/kl/	/d/	/t/ [+]	/kr/
	8	/p/ [-]	/t/ [+]	/br/	/br/	/p/ [-]	/kl/	/d/	/t/ [+]	/kr/

Word	creep		cried	deduct		environment		first		freeze	
CC/FO	CC	FO	CC	CC	FO	CC	FO	CC	FO	CC	
RP	/kr-/	/p/	/kr-/	/-kt/	/t/	/-nt/	/t/	/-st/	/t/	/fr-/	
Participants	1	/kr/	/p/ [+]	/kr/	/kt/	/t/ [-]	/n/	/-/	/k/	/-/	/pr/
	2	/kr/	/p/ [+]	/kr/	/kt/	/t/ [+]	/nt/	/t/ [-]	/st/	/t/ [+]	/fr/
	3	/kr/	/p/ [+]	/gr/	/kt/	/t/ [+]	/n/	/-/	/st/	/t/ [-]	/fr/
	4	/kr/	/p/ [+]	/kr/	/kt/	/t/ [+]	/nt/	/t/ [+]	/st/	/t/ [+]	/fr/
	5	/kr/	/p/ [+]	/kr/	/k/	/-/	/nt/	/t/ [+]	/st/	/t/ [+]	/tr/
	6	/kr/	/p/ [+]	/br/	/-/	/-/	/n/	/-/	/k/	/-/	/fr/
	7	/kr/	/p/ [+]	/kr/	/x/	/-/	/n/	/-/	/st/	/t/ [-]	/fr/
	8	/kr/	/p/ [+]	/kr/	/kt/	/t/ [+]	/nt/	/t/ [+]	/st/	/t/ [-]	/fr/

¹³ In the case of consonant clusters, a hyphen is added after the RP phonemes when the cluster is in onset position of the word; before, when it is in coda position, and one hyphen is added before and another after when the cluster is in medial position.

Word	friction		gap	giant		grace	impatiently	it	last		
CC/FO	CC		FO	CC	FO	CC	CC	FO	CC	FO	
RP	/fr-/	/-kʃ-/	/p/	/-nt/	/t/	/gr-/	/-ntl-/	/t/	/-st/	/t/	
Participants	1	/fr/	/s/	/p/ [+]	/st/	/z/	/kr/	/nl/	/t/ [-]	/st/	/t/ [+]
	2	/fr/	/ks/	/p/ [+]	/nt/	/t/ [-]	/gr/	/ntl/	/te/	/st/	/t/ [+]
	3	/fr/	/ks/	/p/ [+]	/n/	/-/	/gr/	/nl/	/t/ [-]	/st/	/t/ [+]
	4	/fr/	/kʃ/	/p/ [+]	/nt/	/t/ [+]	/br/	/ntl/	/t/ [-]	/st/	/t/ [+]
	5	/br/	/kʃ/	/p/ [+]	/nt/	/t/ [+]	/br/	/ntl/	/t/ [+]	/st/	/t/ [+]
	6	/pr/	/kʃ/	/p/ [-]	/n/	/-/	/br/	/nl/	/t/ [-]	/st/	/t/ [-]
	7	/fr/	/kʃ/	/p/ [+]	/n/	/-/	/br/	/tel/	/z/	/st/	/t/ [-]
	8	/fr/	/kʃ/	/p/ [-]	/nt/	/t/ [+]	/gr/	/nl/	/t/ [+]	/st/	/t/ [+]

Word	measurement		next		objection	park	property	replied	sculpture		
CC/FO	CC	FO	CC	FO	CC	FO	CC	CC	CC		
RP	/-nt/	/t/	/-kst/	/t/	/-kʃ-/	/k/	/pr-/	/-pl-/	/sk-/	/-lptʃ-/	
Participants	1	/nt/	/t/ [-]	/s/	/-/	/ʃ/	/k/ [+]	/pr/	/pl/	/sk/	/te/
	2	/nt/	/t/ [-]	/st/	/t/ [+]	/kʃ/	/k/ [+]	/pr/	/pl/	/sk/	/te/
	3	/nt/	/t/ [-]	/kst/	/t/ [+]	/ʃ/	/k/ [+]	/pr/	/pl/	/sk/	/pte/
	4	/nt/	/t/ [-]	/kst/	/t/ [+]	/kʃ/	/k/ [+]	/pr/	/pl/	/sk/	/mtʃ/
	5	/nt/	/t/ [+]	/kst/	/t/ [+]	/kʃ/	/k/ [-]	/pr/	/pl/	/sk/	/mp/
	6	/nt/	/t/ [-]	/kst/	/-/	/kʃ/	/k/ [-]	/pr/	/pl/	/sk/	/lp/
	7	/-/	/-/	/k/	/-/	/kʃ/	/k/ [-]	/pr/	/fl/	/sk/	/l/
	8	/nt/	/t/ [+]	/t/	/t/ [+]	/kʃ/	/k/ [+]	/p/	/pl/	/sk/	/pte/

Word	shrink		soap	spain	street		stretch	suggest			
CC/FO	CC		FO	FO	CC	CC	FO	CC	CC	FO	
RP	/ʃr-/	/-ŋk/	/k/	/p/	/sp-/	/str-/	/t/	/str-/	/-st/	/t/	
Participants	1	/swə/	/ŋ/	/-/	/p/ [+]	/sp/	/ste/	/z/	/əste/	/s/	/t/ [-]
	2	/sr/	/ŋk/	/k/ [+]	/p/ [+]	/sp/	/str/	/t/ [+]	/str/	/st/	/t/ [+]
	3	/ʃw/	/ŋk/	/k/ [+]	/p/ [+]	/sp/	/sr/	/t/ [-]	/str/	/s/	/-/
	4	/ʃr/	/ŋk/	/k/ [+]	/p/ [+]	/sp/	/str/	/t/ [+]	/str/	/st/	/t/ [+]
	5	/sr/	/ŋk/	/k/ [+]	/p/ [-]	/sp/	/str/	/t/ [+]	/str/	/st/	/t/ [-]
	6	/sr/	/ŋ/	/-/	/p/ [+]	/sp/	/str/	/t/ [+]	/str/	/te/	/-/
	7	/sr/	/ŋk/	/k/ [-]	/p/ [+]	/sp/	/str/	/θ/	/str/	/s/	/-/
	8	/str/	/ŋk/	/k/ [+]	/p/ [+]	/sp/	/sr/	/t/ [+]	/sr/	/t/	/t/ [-]

Word	take	texts	threat		top	trip		truth	
CC/FO	FO	CC	CC	FO	FO	CC	FO	CC	
RP	/k/	/-ksts/	/θr-/	/t/	/p/	/tr-/	/p/	/tr-/	
Participants	1	/k/ [-]	/st/	/tr/	/z/	/p/ [-]	/tɛ/	/p/ [+]	/tɛ/
	2	/k/ [+]	/kst/	/θr/	/t/ [+]	/p/ [+]	/tr/	/p/ [+]	/tr/
	3	/k/ [+]	/kst/	/tr/	/t/ [+]	/p/ [+]	/tr/	/p/ [+]	/tɛ/
	4	/k/ [+]	/kst/	/tr/	/t/ [-]	/p/ [-]	/tɛ/	/p/ [+]	/tɛ/
	5	/k/ [+]	/kst/	/tr/	/ts/	/p/ [+]	/tr/	/p/ [+]	/tr/
	6	/k/ [+]	/st/	/tr/	/z/	/p/ [-]	/tr/	/p/ [-]	/tr/
	7	/k/ [-]	/ks/	/tr/	/z/	/p/ [+]	/tɛ/	/p/ [+]	/tr/
	8	/k/ [+]	/k/	/θr/	/t/ [+]	/p/ [-]	/tr/	/p/ [+]	/tr/

APPENDIX C

This appendix contains the graphical representations of the waveforms, spectrograms and formants structure of some of the target words. The graphs are the outputs of the program *Praat*, used for the analysis, all of them are headed with the corresponding word, the number of participant and their native language ('VI' for the eight Northern Vietnamese and 'RP' for the two English).

