UNIVERSIDADE FEDERAL DE SANTA CATARINA
PROGRAMA DE PÓS-GRADUAÇÃO EM INGLÊS

Marcos Antônio de Oliveira Santos

THE PRODUCTION OF WORD-INITIAL /S/-CLUSTERS BY BRAZILIAN FUTURE EFL TEACHERS IN BAHIA: THE ROLES OF LINGUISTIC AND NON-LINGUISTIC VARIABLES

Dissertação submetida ao Programa de Pós-graduação em Inglês da Universidade Federal de Santa Catarina para a obtenção do Grau de Mestre em Letras.
Orientadora: Prof.ª Dr.ª Rosane Silveira

Florianópolis
2016

Marcos Antônio de Oliveira Santos

THE PRODUCTION OF WORD-INITIAL /S/-CLUSTERS BY BRAZILIAN FUTURE EFL TEACHERS IN BAHIA: THE ROLES OF LINGUISTIC AND NON-LINGUISTIC VARIABLES

Esta Dissertação foi julgada adequada para obtenção do Título de "Mestre em Letras" e aprovada em sua forma final pelo Programa de Pós-Graduação em Inglês: Estudos Linguísticos e Literários

Florianópolis, 8 de março de 2016.

_____
Prof.ª Dr.ª Anelise Reich Corseuil
Coordenadora do Curso

Banca Examinadora:

_____
Prof.ª Dr.ª Rosane Silveira
Presidente e Orientadora
Universidade Federal de Santa Catarina

_____
Prof.ª Dr.ª Melissa Bettoni
Instituto Federal de Santa Catarina/Escola Técnica Federal de Santa Catarina

_____
Prof.ª Dr.ª Denise Cristina Kluge
Universidade Federal do Paraná

_____
Prof.ª Dr.ª Donesca Cristina Puntel Xhafaj
Universidade Federal de Santa Catarina

ACKNOWLEDGMENTS

I have been highly thankful for so many accomplishments in my life. I know that many goals would not be possible to reach without important people around me. Thus, I would like to express my gratitude to people who have been responsible for this.

Firstly, I would like to thank my advisor Rosane Silveira, whithout whom I could not have this work finished. She is one the most capable and inspiring people in my life and I am really proud of what we have done together so far. I also thank her for teaching me how to work with the programs and how to do a great job. I reckon my growth and improvement are a result of her support and encouragement throughout this process.

I would like to thank my parents Antônio e Maria Bethânia, my dear aunt Eliene and my brother Everton, who have supported me since I was a little child, even when sometimes I could not stop to commune with them because I was concentrated during the reading and writing process for my thesis. I thank them for all of the love and care.

I would like to thank my awesome partner, the one and only Rafael Adolfo, who has been so patient and for so many times has been the fuel for me to continue pursuing my aspirations in life. He is the person who has heard me talk, complain, cry, gladden every single day. I thank him for everything he has done to me and thank him for this wonderful relationship we have.

I would like thank important teachers in my life, who have given me the opportunity to do what I love: teaching. So, I thank Bruno e Ana Paula from Influx Language School and Marlene from Trace Idiomas. What I experienced in those schools at that time certainly contributed to the person I am today. I thank them for impelling me in so many ways. I know that there is still so much to learn and I think great things are yet to come for all of us.

I could not forget my dearest professors and friends from PGI and PGLg for every single day of hard and funny work, once discussing about language was and, still is very pleasant. Thank them all for allowing me to know and improve even more what I have been here for.

I would like to thank Soraia Morgan (my Phonetics and Phonology partner) for being such a steady support, joy and someone who I could always rely on, even when we had to talk to each other only to complain about things in life. I want her to know that those moments with her were always special and brought me so much relief when I really needed.

My gratitude is also addressed to the 7 participants who gladly accepted to take part in the present study and kindly allowed me to enter their houses to collect data.

I would like to thank CAPES for the financial support during all of these 23 months of Master's degree.

My profound gratitude to each one of the admirable people from the examination committee, dearest Melissa Bettoni, Denise Cristina Kluge and Donesca Cristina Puntel Xhafaj, who undoubtedly contributed to this work.

I would like to thank anyone I missed who deserves my attention and my boundless gratitude.

My sincere regards.

March 8th, 2016.

ABSTRACT

Many studies conducted so far showed that Brazilians tend to insert a prothetic vowel preceding English /s/-clusters, as a way to structure syllables (Bettoni-Techio, 2008; Cornelian, 2003, 2010; Rauber, 2002, 2004; Rebello, 1997). Taking into consideration the difficulty Brazilians usually face when it comes to producing /s/-clusters, the present study aimed at investigating the production of word-initial /s/-clusters by Brazilian future EFL teachers in Bahia, as a means to verify whether the participants of the present research could produce the /s/-clusters in a target-like fashion. The objective of this study was also to check whether type of cluster and preceding phonological context played a role in the participants' production. The data collection took place at the Universidade do Estado da Bahia (UNEB), with seven participants with an intermediate level of English proficiency. Furthermore, two types of tests were used (a Sentence-Reading Test and an Image-Description Test) to check whether task type affects production. Additionally, a questionnaire and a proficiency test were administered, which could also contribute to account for the results. The participants were audio recorded while they read the 24 sentences containing /s/-clusters in the Sentence-Reading test and described the images in the Image-Description Test. The present study, four different types of cluster (/sp/, /spr/, /st/ and /str/) in three different preceding contexts (a vowel, a consonant or a silence) were taken into account in order to check the most difficult type of cluster and environment. The findings of this research showed that the Sentence-Reading Test had higher rates of prothetic vowel occurrences than the Image-Description Test and the participants seemed to have more difficulty with three-member clusters, and also when the preceding context was a vowel. Another important discussion was related to the nature of the prothetic vowel that the participants produced in both tests. Considering the F1 value, which has to do with tongue height, and the F2 value, which is related to tongue retraction (Yavas, 2011), the participants produced a prothetic vowel similar to the English and BP /i/, in terms of height, but with the tongue more retracted, similar to the English /ɪ/ – a prothetic vowel of hybrid nature. Considering the results of the present study, we can see that English /s/-clusters lead to pronunciation difficulties and that this syllable pattern should be addressed and practiced in the language classroom to improve the oral production of BP learners of English.

Key-words: /s/-clusters; Production; Type of cluster; Phonological context; Prothetic vowel.

Number of pages: 38 (excluding appendices) and 74 (including appendices)
Number of words: 23268 (excluding appendices)

RESUMO

Muitos estudos conduzidos até o presente momento mostraram que brasileiros tendem a inserir uma vogal protética antecedendo os encontros consonantais iniciados em /s/ do inglês, também como um modo de estruturação de sílabas (Bettoni-Techio, 2008; Cornelian, 2003, 2010; Rauber, 2002, 2004; Rebello, 1997). Levando em consideração a dificuldade que os brasileiros geralmente teve com relação à produção de */s/-clusters*, o presente estudo teve como intenção investigar a produção de /s/-clusters em posição inicial por brasileiros futuros professores de inglês como língua estrangeira na Bahia, avaliando se os participantes desta pesquisa conseguiram atingir a produção alvo das /s/-clusters. O objetivo deste estudo foi também checar se o tipo de cluster e o tipo de contexto fonológico que o antecedia exerciam algum papel na produção dos participantes. A coleta de dados aconteceu na Universidade do Estado da Bahia (UNEB), com sete participantes de nível intermediário de Inglês como LE. Dois tipos de testes foram aplicados (um teste de leitura de sentenças e um teste de descrição de imagens) com a intenção de ver se o tipo de teste afeta de alguma forma a produção. Além desses, um questionário e um teste de proficiência foram aplicados, os quais puderam contribuir para a interpretação dos resultados. Os participantes foram gravados enquanto liam as 24 sentenças contendo /s/-clusters no teste de leitura de sentenças e enquanto descreviam imagens no teste de descrição de imagens. No presente estudo, quatro tipos diferentes de cluster (/sp/, /spr/, /st/ e /str/), em três diferentes contextos antecedentes, foram levados em consideração para que fosse analisado o tipo de cluster e contexto mais difíceis. Os resultados desta pesquisa mostraram que o teste de leitura de sentenças teve taxas de ocorrência maiores de inserção vocálica que o teste de descrição de imagens e, aparentemente, os participantes tiveram mais dificuldade com clusters de três membros e quando o contexto precedente às clusters era de vogal. Outra observação importante é em relação à natureza da vogal protética que os participantes produziram em ambos os testes. Considerando o valor de F1, o qual se refere à altura da língua e o valor de F2, o qual está relacionado à retração da língua (Yavas, 2011), os participantes produziram uma vogal protética similar ao /i/ do inglês e do português brasileiro no que diz respeito à altura, porém com a língua mais retraída, semelhante ao /ɪ/ do inglês – uma vogal protética de natureza híbrida. Considerando os resultados do presente estudo, podemos dizer que /s/-clusters do inglês levam a dificuldades de pronúncia que deveriam ser discutidas e praticadas em sala de aula de língua inglesa, a fim de melhorar a produção oral de brasileiros aprendizes do inglês.

Palavras-chave: /s/-clusters; Produção; Tipo de cluster; Contexto fonológico; Vogal protética.

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIST OF ABREVIATIONS

AOL – Age of Learning

BP – Brazilian Portuguese

COCA – Corpus of Contemporary American English

CP – Critical Period

EFL – English as a Foreign Language

H – Hypothesis

L2 – Second Language/Foreign Language

L1 – First Language/Mother Tongue

MDH – Markedness Differential Hypothesis

OM – The Ontogeny Model

OPT – Oxford Proficiency Test

P – Participant

RQ – Research Question

SLM – Speech Learning Model

SUMMARY

CHAPTER ONE

INTRODUCTION

English has played, for a considerable time, a special role in our lives. The willingness to learn another language has been a powerful instrument, which has impelled many people to pursue some goals related to learning a language, be willing to live abroad - to experience and exchange, being it for personal or professional reasons. When it comes to learning another language, many intrinsic and extrinsic factors should be taken into account, for instance, different language learning styles (Oxford, 2003), since each learner's pace of learning varies. According to Mitchell and Myles (1998), cognitive factors can be apparent in terms of intelligence and language aptitude, as "there is clear evidence that L2[1] students who are above average on formal measures of intelligence and/or general academic attainment tend to do well in second language (L2) learning, at least in formal classroom settings" (p. 18). In the same way they argue about these cognitive factors, we can perceive that when there is a certain degree of motivation for a person to learn, he/she will probably look for some ways of learning and practicing. Nonetheless, in this long process, learners are also likely to face some difficulties, which, mainly in the very beginning will make them feel frustrated sometimes; but since they decided to learn the language, coming across some trouble should not be enough to make them stop.

Furthermore, these difficulties are not only classified in terms of grammar or structures of words, but also in terms of (L2) sound properties, for the difficulty of acquiring the phonology properties has been one of the reasons why learners do not feel so comfortable when learning an L2 since the phonemic mismatches between the L1 and L2 seem to be challenging in many situations, mainly in the earlier stages of learning (Eckman, Elreyes & Iverson, 2003; Yavas, 2011).

An example of a feature of the English sound system that causes difficulties to Brazilian L2 learners is word-initial /s/-clusters, which are the focus of the present study. Although /s/-clusters in word-initial position are permitted in English, they are not allowed in Brazilian Portuguese (BP). Therefore, BP learners of English tend to insert a vowel before the cluster (/sC/ or /sCC/) turning it into the less marked vowel consonant (VC) syllabic structure (Bettoni-Techio, 2008; Rebello, 1997).

Brazilians tend to produce these clusters by inserting a vowel preceding the /s/ as a strategy of structuring syllables (Cornelian, 2003, 2010; Rauber, 2002, 2004), which might also occur due to the BP syllabification patterns (Yavas, 2011) (e.g., *escola*, 'school'). Thus, the different syllabic structures of the L1 and the L2 will probably make learners face some pronunciation difficulties. Bettoni and Kluge (2014) showed that, even though the insertion of a vowel before an /s/-cluster was highly frequent in the BP participants' production, the transfer of first language (L1) voicing assimilation rules into English was even more frequent in their data. Bettoni and Kluge (2014) explain that in BP the /s/ at the end of the word *casas* in the sequence *casas amarelas* ('yellow houses') is pronounced as [z], because of the voicing quality of the phoneme, which is a sonorant sound. The same does not happen to the /s/ in the sequence *casas pretas* ('black houses'), in which /s/ is produced as [s] because of the following phoneme /p/ after '*casas*', which is unvoiced (p. 106). Therefore, Brazilian learners transfer these L1 voicing assimilation rules to the production of English /s/-clusters, thus pronouncing /s/ as [z] and inserting a vowel preceding [z], in words such as 'smile' [izmail] and 'slogan' [izloʊgã] - as a strategy to facilitate the production of L2 syllabic patterns.

As a way to back this finding, Bettoni and Kluge's (2014) results revealed that in addition to voicing the /s/ in words with the sequence /s/+sonorant[2], some BP participants did not hear any difference between the pairs [smail] – [izmail] and [slogən] – [izloʊgən]. Only after receiving some training sessions, participants who could not hear these contrasts ended up realizing how different they were.

[1] English is considered a second language (L2) in countries where it is spoken on a daily basis by the local community. The term foreign language is used to refer to the status of languages that are taught mainly in a classroom context, which is the case of English in Brazil. However, in the present study, the term L2 will be used referring to a language after a learner has learned his/her first language, according to the sequence of learning (irrespective of the context).

[2] "Approximants (liquids and glides) and nasals, because they include a relatively unobstructed flow of air between the articulator and the place of articulation, collectively form the group of consonants that is known as 'sonorants'" Yavas (2011, p. 9)

One of the many reasons why the voicing process takes place is because Brazilians' interlanguage perception is influenced by the L1 phonotactics (Flege, 1989; Hallé, Segui, Fraunflender, & Meunier, 1998; Sebastián-Gallés, 2005) and probably because of transfer in the voicing assimilation of the next phonologic context, which is common in BP, is difficult to control. Maybe the non-native perception might be influenced by the L1 co-articulatory patterns (Beddor, Harnsberger & Lindemann, 2002).

As discussed in the previous paragraph, the characteristics of a new language push L2 learners into some difficulties during the process of acquisition, and they may try to apply the L1 rules to deal with the phonetic and phonological aspects of the L2. Due to that, perceiving and consequently producing those different L2 sounds and structures may prove difficult and the learners frequently end up producing non-target forms.

Many pieces of research have been carried out in an attempt of bringing some enlightenment to the field of L2 speech and some of them are related to the production of /s/-clusters (e.g., Cardoso, 2008; Cornelian, 2003, 2010; Bettoni-Techio, 2008, 2009; Enochson, 2014; Rauber, 2002, 2004, 2006). Difficulties BP learners face with this structure are connected to the fact that this syllable structure is illicit in word-initial position in their mother tongue, and this is true for clusters with one or two consonants after /s/ (e.g., 'snow', 'strong'). Therefore, words, such as 'speak', 'spring', and 'star' are likely to be produced with an epenthetic vowel before the /s/, being pronounced as [ispik], [isprɪŋ], and [istar], respectively.

The present study investigates the production of /s/-clusters by a group of Brazilian undergraduate students who has received formal instruction on English phonetics and phonology. These students are enrolled in a *Letras-Inglês* program, which means they are being prepared to become English teachers, and consequently should have a good knowledge about the English sound system.

The present study intends to contribute to the literature on English-Brazilian Portuguese interphonology by providing data gathered from Brazilians from the Northeast region. The bulk of studies on the production of /s/-clusters by Brazilians reports data from informants who speak Southern or Southeastern varieties of BP and little is known about the interphonology features of English learners from the Northeast. Furthermore, to the best of my knowledge, /s/-cluster studies conduced in Brazil have focused on auditory perceptual analysis to describe the informants' productions. In the present study, in addition to perceptual analysis, acoustic analysis will be employed to provide information about the acoustic nature of the vowel the participants insert before the /s/-clusters.

Thereby, in chapter 2, the review of literature will be presented, as a way of providing the main basis for the present research, which is related to the difficulty of pronouncing /s/-cluster words in word-initial position, including the discussion of the probable reasons why learners' production is deviant from the L2 target most frequently in the earlier ages of learning. Chapter 3 will bring the description and details about the research instruments, participants' recruitment and profile, data collection, and data analysis. Chapter 4 will show the results by focusing on how the participants produced the /s/-clusters and on the acoustic nature of the vowel inserted before the /s/-cluster. Finally, chapter 5 will lead to the conclusion and the final remarks considering pedagogical implications and recommendations for further research.

CHAPTER TWO

REVIEW OF LITERATURE

The great body of studies that were conducted so far attempt to investigate the difficulties faced by Brazilian learners of English as a foreign language, particularly when it comes to perceiving and/or producing the vowels, consonants, and syllable structures which are absent from the Brazilian Portuguese phonetic-phonological system (e.g., Bettoni-Techio, 2008; Bion, Escudero, Rauber, Baptista, 2006; Fernandes, 1997; Koerich, 2006; Nobre-Oliveira, 2007).

The present research focuses on investigating the pronunciation of English /s/-clusters in word-initial position, assuming that BP learners of English tend to transfer the structures of their L1 to the L2, that is, they tend to transfer the VC syllabic pattern found in the Brazilian Portuguese sound inventory – in which word-initial /s/-clusters are not allowed (Bettoni-Techio, 2008; Cornelian, 2003; Rauber, 2002, 2004; Rebello, 1997; Silveira, 2002).

Bonilha and Vinhas (2005), Rauber (2006), Rebello and Baptista (2006), among others, have studied /s/-clusters produced by Brazilians. According to Bettoni-Techio (2008), "these studies found that the /s/ in /s/-stop clusters is frequently produced with an epenthetic vowel and the /s/ in the /s/-sonorant clusters is produced with an epenthetic vowel and voiced" (p. 2). Cornelian (2003, 2010) states that prothesis is frequent in the pronunciation of word-initial /s/-clusters by Brazilians. The fact that /s/-clusters pose a challenge to learners and that a prothetic vowel is used to break this cluster is also supported by Carlisle (1991, 1992, 1994, 1997), who carried out research related to the production of /s/-cluster words by Spanish-speaking English learners, which showed the usage of a vowel sound ([e]) preceding the /s/-cluster as well. Additionally, other studies (Shibuya & Erickson, 2010) have shown that speakers of Japanese insert [u] after the /s/ ('sky' [sukaɪ]). Jabbari (2012) shows that Farsi speakers may insert a vowel before ('stamp' [estæmp]) or after ('swing' [sewiŋ]) the /s/-cluster.

All these obstacles are found because of the distinct phonotactic rules across languages. In other words, speakers are likely to have difficulties with sound sequences that are not allowed in their L1 but acceptable in the L2. Thus, acquisition of some sounds or sound sequences is more likely to happen in an L2 if their sound and syllable inventories are similar to those of the mother tongue. For example, the words 'publicity' in English and *publicidade* in Portuguese have a lot of similarity regarding their second syllables /blɪ/ and /bli/, respectively. This type of structure is acceptable in both languages, that is, it is common to see this type of syllable in syllable-initial position in English (e.g. 'blank', 'blind' and in BP; '*blindagem*', 'shield'; '*Bíblia*', 'bible'). The difficulty in perceiving and producing words with particular sound structures, which are different across languages, as it is the case of clusters, is based on a syllable-related generalization (Yavas, 2011). In other words, if a specific structure is acceptable in a language, it might not be in another language. In English, for example, words such as 'scan' (CCVC) contain an onset cluster with a fricative followed by a stop. The same does not occur in Portuguese, for, in words such as *escova* 'brush' (VC.CV.CV), the fricative is preceded by a vowel and is the coda of the first syllable, while the stop is the onset of the second syllable.

One way of predicting and accounting for deviant pronunciations is to adopt The Ontogeny Model (OM) proposed by Major (1994), which argues about a distinction in the rate of occurrence of language-specific transfer factors and non-language specific-universal developmental factors. According to Major (1994), the L1 transfer processes decrease over time, whereas the developmental processes[3], although not taking place very often at the initial stages of learning, tend to increase and then decrease.

Major (1994) conducted a study that aimed at testing the Ontogeny Model claims, using a longitudinal design and collecting data of different speaking styles. The focus of his study was the acquisition of consonant clusters by Brazilian learners of English at the beginning level. The participants had to read a word list and a text while they heard an English native speaker's recording to have a model for the pronunciation of unknown words and prevent non-target pronunciations motivated by spelling. The clusters were tested in word-initial position (#CC): /sl, sr, sp, st, sk, pr, br,

[3] Devoicing the /d/ sound in the word [mold], which can be pronounced as [molt] in early L1 acquisition is an example of developmental process (Major, 1994, p. 666). Final devoicing is considered a developmental process because it is one of the stages children go through when acquiring their L1.

tr, dr, kr, gr/ and in word-final position (CC#): /rp, rb, lp, lb, rt, rd, lt, ld, rk, rg, lk, pt, bd, kt, gd, ps, bs, ts, ds, ks, gz, sp, st, zd, sk, fs, vz/. It is important to highlight that, even though clusters containing a consonant plus a rhotic sound exist in Portuguese, in BP the <r> grapheme is frequently pronounced as a flap[4]/tap[5], such as in *creme* ('cream') [kɾemi], whereas in English it is a retroflex[6], as in the word 'cream' [krim].

Major's (1994) results revealed that there were more transfer substitutions in initial consonant clusters than in final clusters; more developmental substitutions in final clusters than in initial clusters. It is noteworthy to highlight that the author considered as transfer errors those pronunciations that could be associated to the characteristics of the speakers' L1 (for example, the insertion of a vowel at the end of the cluster: 'raced' [residi]. Conversely, he considered developmental errors those which were not related to characteristics of BP phonology, such as the deletion of one of the elements of the consonant clusters ([res] 'raced').

As Zimmer (2004) shows, when pronouncing word-final consonants at the initial stages of learning, Brazilians display higher percentage rates of vowel insertion (e.g., 'big' pronounced as [bigi]), which is a common phonological process in their L1. However, as proficiency advances, vowel insertion becomes less frequent and, instead, terminal devoicing (e.g., 'big' pronounced as [bik]), a typical process found in the acquisition of L1 English, occurs more often among more proficient Brazilian learners of English. In this manner, mispronunciations are likely to happen, even at the advanced stages of learning; however, they usually occur more often in the early stages of acquisition, tending to decrease over time as proficiency develops. Having introduced and discussed the motivation for this study, and presented a brief description of some challenges Brazilian speakers face when they are learning English /s/-clusters, we turn now to the theoretical background guiding the present research. We begin by discussing issues related to learning an L2, then we review Flege's (1995) Speech Learning Model, Eckman's (1977) Markedness Differential Hypothesis, and studies focusing on the perception and production of /s/-clusters.

2.1 English as a Foreign Language and Pronunciation Teaching

Many studies investigating the acquisition of English as an L2 have been carried out so far (e.g., Doughty & Long, 2008; Long, 2007; Ortega, 2009; Swain, 1995, 2005; VanPatten & Williams, 2007; White, 1989). It takes some time to understand how some sentence structures are formed in a conversation, either in written or spoken discourse. In the very beginning of this learning process, learners tend to make mistakes more often. The more learners are exposed to a new language, the more proficient they will be – the more confident they will probably feel to use what they have learned (Schmidt, 1990).

Additionally, Lenneberg (1967) proposed an ideal time frame for language learning, which suggested a critical period (CP) having its starting point with the lateralization at the age of two, and ending at the beginning of puberty (Ellis, 1994; Singleton, 2005). Thus, studies were carried out in order to examine the advantages and disadvantages of the learning process between the two groups (adults and children learners within the CP) (Gass & Selinker, 2001; Nikolov & Djigunovic, 2006). They showed that adults were faster in terms of learning a language, but the children were capable of reaching higher levels of proficiency, even when they were not considered as good as adults at first.

On the other hand, it is important to say that there has been some discussion related to the precise causes of a CP and the results are controversial, for while Penfield and Roberts (1959) claim that the cause of a CP is loss of brain plasticity, Lenneberg (1967) states that it is due to lateralization, whereas Scovel (1988, as cited in Birdsong, 2006) points out the neuromuscular-driven articulatory obstacles. Conversely, Krashen (1985) brings an explanation about the relation CP has with a non-

[4] Some authors affirm there is a difference, in terms of articulation of both sounds, whereas others affirm the opposite, such as Lindau (1985), who does not consider the distinction.
[5] Ladefoged and Maddieson (1996) describe a tap as a result of a brief contact of the tip of the tongue with the dental/alveolar region.
[6] The same authors exemplify a retroflex by saying that it is articulated with a constriction at the lower part of the pharynx with a roundness of the lips (Delatre & Freeman (1968) as cited in Ladefoged & Maddieson (1996). Maia's (1985) point of view for BP is closer to Ladefoged & Maddieson's (1996), which states that there is a wince of the tongue touching the roof of the mouth with its back.

neurobiological process - "the affective filter"[7]. Even though these accounts differ from one another, they are bound to a certain degree, as explained by Bettoni-Techio (2008) who affirms that "age affects language learning and pronunciation seems to be the most affected skill" to be acquired (p. 69). Moreover, there are many researchers who do not believe in the existence of a CP. Instead, they propose a reduction – a loss of brain cognitive capacity over time, meaning that age affects L2 acquisition (Birdsong, 2006), which means that around the end of the critical period and after it, it is even harder for L2 learners to achieve higher levels of L2-attainment (Bongaerts, 2005).

Furthermore, when it comes to the obstacles learners frequently find while learning, the phonetic and phonological rules are some of them, because even languages that have similar sounds differ in terms of how these sounds are distributed and whether these sounds are phonemes or allophones (Yavas, 2011). For example, Brazilian Portuguese (BP) and English have the sound [p], and this is a phoneme in both languages. In English, /p/ can appear in onset position ('pet') and in coda position ('map'). However, in BP, /p/ is not allowed in coda. Furthermore, both languages have the sound [tʃ], but in English it is a phoneme, as demonstrated by the minimal pair 'tease' and 'cheese', while in BP, [tʃ] is an allophone of /t/ when this sound is followed by /i/ (e.g., *tia*, 'aunt'). Bettoni-Techio (2005) states that "palatalization is a common process in the production of alveolar stops and alveolar fricatives" (p. 54) in BP. She also points out that BP learners tend to palatalize /t/ and /d/ when producing English words followed by /i/ or /ɪ/, or even in coda position (e.g., teacher, meet). According to Bettoni-Techio (2005), "this tendency is assumed to result from language transfer, since palatalization is a salient feature in many BP dialects" (p. 54). Moreover, this process of palatalization also depends on the dialect, for /t/ and /d/ will vary according to the phonological context that comes next, that is, /t/ and /d/ are palatalized when they precede the high front vowel /i/, which makes BP learners transfer this process to loanwords and consequently to their foreign language interphonology (Bettoni-Techio & Koerich, 2008).

The same difficulty takes place when Brazilians have to contrast the English pairs /ʃ/ and /tʃ/, or /ʒ/ and /dʒ/, which are likely to pose perception and production problems for Brazilians, too (Silveira, 2002). Thereby, for some adults, perceiving and producing some characteristics of a new sound system is very hard. For children, the process is not so difficult, because they are still more open and prone to learning a language, and generally have more opportunities to be exposed to and use the L2 compared to adults, "some of whom may even live in what amounts to a first language (L1) linguistic ghetto" (Granena & Long, 2013, p. 2).

Young-Scholten and Archibald (2000) state that the majority of language learners are literate adults and their contact with the L2 is largely based on written input. Additionally, Silveira (2012) states that "these learners' first contact with L2 words generally involves written input, and constant access to the orthographic representations of words may lead learners to rely heavily on L1 sound-spelling correspondences when pronouncing L2 words" (p. 17)

On the other hand, Bettoni-techio (2008) also showed that when it comes to learning a second language at later ages, it does not necessarily mean that adults cannot learn, but they can learn with massive exposure to the language along with immediate feedback. Then, even though adults have more difficulties when perceiving and producing the L2 sounds because of factors such as age of learning, the process is not impossible, since human beings have metacognitive strategies to learn and, thus, this can make up for their loss of plasticity, helping them in the process of acquiring an L2.

Moreover, another difficulty faced by learners arises from the interference of orthography often leading learners to transfer patterns of sound-spelling correspondence from their L1 into the L2 (Silveira, 2012). Such cases can be found in the production of high front vowels, for BP learners see words such as 'sip', and think it should be pronounced as [sip], instead of [sɪp], because the <i> grapheme is pronounced as [i] in BP.

One way of helping learners improve L2 pronunciation is by providing pronunciation teaching to raise their awareness about the different sound systems of the L1 and the L2. In addition to pointing out these differences, pronunciation teaching can be an opportunity for learners to receive feedback on what they have produced in a deviant way, either from a teacher, or from a peer. This is also why corrective feedback, as discussed by Carroll and Swain (1993), has played a role in L2 interactions,

[7] The term "affective filter" discussed by Krashen (1982; 1985) claims that "the effect of affect is "outside" the language acquisition device proper. It still remains that input is the primary causative variable in second language acquisition, affective variables acting to impede or facilitate the delivery of input to the language acquisition device" (Krashen, 1982, p. 32).

because learners will not be alone in the gradual process of acquisition, but will receive, from different sources, the trigger to be aware of what they produce. Due to that, the amount of feedback (Havranek, 1999, as cited in Russell & Spada, 2006), the source of feedback (Biber, Nekrasova & Horn, 2011), among other aspects, will influence a learner's oral production considerably, especially if the learners keep being exposed to these different forms, so that they can be heedful of them.

In addition, Silveira (2002) defends the importance of formal pronunciation instruction along with practice in the classroom, particularly emphasizing pronunciation differences. According to the author, adequate instruction can raise awareness of the English-Brazilian Portuguese phonological differences and thus, learners are not only likely to perceive differences, but also to produce them accordingly. In order to do that, activities stressing perception and production should be designed and employed (Rauber et al. 2005; Rauber, et al. 2010).

Also, Albini and Kluge (2010) defend that EFL teachers should be trained in phonetics and phonology, not only to raise their awareness regarding the perception and production process, but also because students tend to imitate their teachers, taking them as reference or models. Teachers' speech, thus, is to be considered one of, if not, the most relevant source of input in class. Since students have them as models in the classroom, having a good phonetics and phonology background could incite students' eagerness to learn, practice and keep doing so, as most of the times students have the willingness to have a more target-like pronunciation. Furthermore, learners want to be understood, to be intelligible, which is important in the learning process that involves perception of how the sounds should be articulated, and consequently a target-like or at least a more intelligible production of these sounds can occur. Graddol (2006) points out that "intelligibility is of primary importance, rather than native-like accuracy" (p. 87)

Additionally, as a means to improve accuracy, if a learner is aware of the L2 sound system, how sounds are perceived, articulated and produced, the probability of being misunderstood will be lower, as the intended message is likely to be received and this is the essential point, in terms of the communication process (Munro, 2008). When when it comes to speech production, the ability of being intelligible does not mean having no accent[8].

Derwing and Munro (2009) define intelligibility (one of many factors that contribute to the effectiveness of speech) as the degree of how much a listener understands an utterance. The more a listener understands, the higher is the intelligibility level of a speaker's utterance. Thus, some obstacles might be avoided, as the case of English native speakers who move away from L2 learners because of speech/pronunciation problems (Parrino, 1998) – also avoiding interacting with them (Singleton & Ryan, 2004).

With regard to pronunciation instruction, it is noteworthy to say how important it is to improve intelligibility, especially because if a learner receives formal instruction focused on phonetic differences in both languages, added to practice and feedback in the classroom, the L2 learner will probably express ideas and words in a more intelligible way (Silveira, 2002, 2004).

Delatorre (2007) also points out the importance of perceiving the differences when comparing distinct linguistic/phonetic systems in order to accurately produce them. As the participants of this research are expected to be teachers of English after they graduate, it seems to be extremely important for them to be aware of these dissimilarities when facing situations in which they are required to put into practice what they have learned during the undergraduate program. Thereby, practice in every single stage of the learning process is likely to make a lot of difference and to appear in the form of a more target-like production.

As we shall see in the next section, Flege (1995) developed the *Speech Learning Model* (SLM), which attempts to explain why adult learners have some difficulties when they have to perceive and produce L2 sounds. In order to better understand the SLM, in the next section, I describe and analyze the postulates and hypotheses proposed in the model.

[8] However, Derwing and Munro (2005) state that having "no accent" or "heavy accent" also has to do with "a listener's perception of how different a speaker's accent is from that of the L1 community" (p. 385).

2.2 Speech Learning Model (SLM)

In an attempt to account for L2 speech, Flege (1995) proposes the Speech Learning Model (SLM), which tackles the age-factor limits related to the ability to perceive and produce vowels and consonants of an L2 in a native-like fashion, and then it is concerned with the ultimate attainment of L2 pronunciation. Due to that, the SLM claims that if an L2 learner does not have accurate perceptual "targets" to guide the sensorimotor learning of L2 sounds, his/her production of these L2 sounds will be inaccurate, so, many of the learners' errors are due to the lack of this perceptual basis that somehow they do not possess (Flege, 1995). Furthermore, the model brings four postulates and seven hypotheses, which shall be discussed next.

The Postulates state that: 1) the mechanisms that a learner uses while he/she is learning his/her L1 sound system can be used while learning the L2, for they remain intact during his/her life; 2) the characteristics of speech sounds are specified in long-term representations, called phonetic categories; 3) the phonetic categories developed in the childhood evolve to include the properties of L1 and L2 sounds experienced in the lifespan; and 4) bilinguals have to make an effort to maintain a contrast between L1 and L2 sounds that exist in a common phonological space (Flege, 1995).

Added to the postulates, Flege (1995, p. 239) still proposes seven hypotheses, which are reproduced below.

> H1 Sounds in the L1 and L2 are related perceptually to one another at a position-sensitive allophonic level, rather than at a more abstract phonemic level.
> H2 A new phonetic category can be established for an L2 sound that differs phonetically from the closest L1 sound if bilinguals discern at least some of the phonetic differences between the L1 and L2 sounds.
> H3 The greater the perceived phonetic dissimilarity between an L2 sound and the closest L1 sound, the more likely it is that phonetic differences between the sounds will be discerned.
> H4 The likelihood of phonetic differences between L1 and L2 sounds, and between L2 sounds that are noncontrastive in the L1, being discerned decreases as AOL increases.
> H5 Category formation for an L2 sound may be blocked by the mechanism of equivalence classification. When this happens, a single phonetic category will be used to process perceptually linked L1 and L2 sounds (diaphones). Eventually, the diaphones will resemble one another in production.
> H6 The phonetic category established for L2 sounds by a bilingual may differ from a monolingual's if: 1) the bilingual's category is "deflected" away from an L1 category to maintain phonetic contrast between categories in a common Ll-L2 phonological space; or 2) the bilingual's representation is based on different features, or feature weights, than a monolingual's.
> H7 The production of a sound eventually corresponds to the properties represented in its phonetic category representation. (p. 239)

The term 'equivalence classification' has been frequently used to account for the reasons why learners have some problems in L2 learning (Flege, 1995), as in the case of word-initial /s/-clusters (Bettoni-Techio, 2008). Flege (1995) defines equivalence classification as a result of a process that takes place when L2 learners end up developing inaccurate perceptual targets for L2 sounds with a direct counterpart in L1, thus fossilizing some L2 sounds. Bettoni-Techio (2008) states that "this process of equivalence classification may prevent learners from acquiring the proper cue-weighting[9] values necessary for contrasting L1-L2 and L2-L2 sound categories" (p. 9). Thereby, perceiving differences in the phonetic-phonological inventory of two languages can be challenging to learners and sometimes frustrating as well. Even so, there are ways of starting to differentiate sounds through extensive practice and enough amount of exposure to the language (Bettoni-Techio, 2008; Nobre-Oliveira, 2007). In the next section, I will discuss a theoretical proposal that has influenced most of

[9] "Cue weighting is the action of establishing a variable degree of importance to a certain cue. The weight and the cues that can be used to differentiate sounds and indicate that a set of sounds belong to one specific category or that two sounds cannot be considered exemplars of the same category vary across languages. For instance, whereas amount of aspiration is extremely important for discriminating /b/ and /d/ in English, it is irrelevant for Brazilians who successfully use voicing in this discrimination." (Bettoni-Techio, 2008, p. 9)

the research regarding /s/-clusters acquisition by L2 learners: *The Markedness Differential Hypothesis (MDH)* by Eckman (1977).

2.3 Markedness Differential Hypothesis (MDH)

In the literature, there has been some attempts to explain the difficulties faced by learners, such as the Markedness Differencial Hypothesis (MDH) (Eckman, 1977; 2009). The author defines markedness as "the relative frequency or generality of a given structure across the world's languages" (p. 198). The MDH (Eckman, 1977, p. 331) makes the following predictions about L2 learning difficulties:

> (a) Those areas of the target language which differ from the native language and are more marked that the native language will be difficult;
> (b) The relative degree of difficulty of the areas of difference of target language which are more marked that the native language will correspond to the relative degree of markedness;
> (c) Those areas of the target language which are different from the native language, but are not more marked than the native language will not be difficult.

The MDH (Eckman, 1977; 2009) predicts some probable problems faced by language learners. As Eckman (2009) explains, there are some sounds or sound sequences that exist among languages, and these frequently occurring sounds or sequences are named unmarked, but those less frequent sounds or sequences are called marked because they are not commonly found in many languages. For instance, for native speakers of Japanese, Mandarin Chinese and Cantonese, and Arabic it is very hard to pronounce L2 clusters in onset position, given that these syllabic patterns are not common in their L1. Thus, some Iraqi Arabic and Egyptian Arabic learners, for instance, will add a vowel sound between two consonants (e.g., 'fruit', becomes [fɪrut]) (Broselow, 1992).

Another example is the contrast between the voiceless and voiced stops /k/ and /g/, which are part of both the English and German inventory. This voicing contrast is allowed in word-initial and medial positions for both languages. The same does not happen to both languages when it comes to final position, because in English the contrasts can be found in any position (e.g. back – bag), whereas in German, the contrast is neutralized in final position, in which only the voiceless sound is found (Yavas, 2011). As voiced codas are less frequent in the world's languages and therefore more marked (Eckman, 2009), they are expected to pose difficulty to German learners of English. However, English learners of German are less likely to have problems learning to suppress the voicing contrast.

Eckman (1986) proposes that "the areas of difficulty that a language learner will have can be predicted on the basis of a systematic comparison of the grammars of the native language, the target language and the markedness relations stated in universal grammar" (p. 292). Yavas (2011) points out coda consonants as an example. In Japanese, the phoneme /n/ is the only type of consonant coda permitted, so, for a Japanese it is hard to produce words with any other type of coda besides a nasal (for instance, codas with an obstruent[10] or liquid[11]). However, if we take into consideration that the obstruents are more marked than sonorants in coda position (Yavas, 2011), it means that the Japanese speakers will have even more difficulties with the obstruents in coda position than with sonorants. To ground this idea, Yavas (2011) explains that:

> For speakers of languages in which some obstruents and sonorants are permitted as codas, such as Korean, Japanese, Cantonese (Eckman and Iverson, 1994), and Portuguese (Baptista and DaSilva Filho, 1997), the difficulty encountered in learning single codas of English reflects the same hierarchy of difficulty, i.e. obstruents are more difficult than sonorants (p. 209).

[10] "Stop, fricatives, and affricates, which are produced by a considerable amount of obstruction of the laryngeal airstream in the vocal tract, are collectively known as 'obstruents'" (Yavas, 2011, p. 8).
[11] Liquids is a term used to refer to "all apico-alveolar sounds of the types [l] and [r]" (Crystal, 1997, p. 226).

In the following sections, it will be seen that most /s/-cluster studies with BP learners of English have tested the predictions made by the MDH, with a few of them corroborating the predictions, and many challenging these predictions at some level.

2.4 /s/-Clusters

English has 24 consonant phonemes, which are classified according to three dimensions: voicing, place and manner of articulation. Among these consonants there is a group called fricatives, formed by consonants produced with a close approximation of two articulators so that the airstream is partially obstructed and turbulent airflow can be produced (Ladefoged, 2011)

There are nine fricatives in English, which are /f/, /v/, /θ/, /ð/, /s/, /z/, /ʃ/, /ʒ/ and /h/, each one of them having a specific place of articulation, being: a) labio-dental for the consonants /f/ and /v/, in words such as 'father' /fɒðər/ and 'value' /vælyu/; b) inter-dental for /θ/ and /ð/, in words such as 'think' /θɪŋk/ and 'though' /ðoʊ/; c) alveolar for /s/ and /z/, in words such as 'sad' /sæd/ and 'zoo' /zu/; d) palato-alveolar for /ʃ/ and /ʒ/, in words such as 'shy' /ʃaɪ/ and 'vision' /vɪʒən/; and e) the voiceless glottal /h/, as in 'hat' /hæt/.

In this study, I analyze /s/-clusters at the beginning of words, as in 'spend' /spɛnd/, 'spring' /sprɪng/, 'still' /stɪɬ/ and 'street' /strit/, as Brazilians tend to have problems with the production of these clusters in word-initial position. Brazilian learners tend to add an epenthetic vowel before words beginning with the phoneme /s/ when it is part of a consonant cluster (Bettoni-techio, 2008; Cornelian, 2003; Rauber, 2004). This is a syllable simplification strategy that helps learners to deal with L2 syllable structure (Carlisle, 1991, 1992, 1997) which is different from their L1, concerning some aspects such as sonority sequence[12] and syllabification (Yavas, 2011).

Additionally, in a sense of structuring syllables, BP allows a limited number of clusters in word-initial position. These clusters are formed by stops plus liquids (for example, *três* 'three'; *bloco* 'block') or the voiceless labio-dental fricative plus liquids (for example, *frio* 'cold'; *flor* 'flower') (Cristófaro-Silva, 2002). On the other hand, English, allows a number of onset clusters, including /s/, which can be followed by one or two consonants (Rauber, 2004), such as 'spring', 'smell', 'splendid'. This is why Brazilian learners (as well as Spanish speakers), for instance, face difficulties in terms of perceiving and producing words beginning with /s/ followed by other consonants, as shown by the findings of studies investigating this topic (e.g. Bettoni-Techio, 2008, 2009; Bettoni & Kluge, 2014; Cornelian, 2003, 2010; Rauber, 2004). Thus, the addition of a prothetic vowel ends up being the most common strategy in the production of /s/-clusters by BP learners of English (Cornelian, 2003, 2010; Rauber, 2004; Rauber, 2006; Rebello, 1997; Silveira, 2002).

Eckman (1977, 1985) proposes that difficulties in L2 speech perception and production are related to how marked L2 structures are; in other words, how frequent a particular L2 structure is in relation to the structures found in other world languages (see Section 2.3). For example, in English, two and three-member /s/-clusters in word-initial position are allowed. In languages such as Spanish or Brazilian Portuguese, this is illicit, since these languages follow the principle of sonority sequencing. According to this principle, the sonority values of the sounds forming a syllable should increase towards the peak (normally a vowel) and not decrease (Hooper, 1976). According to the sonority principle adopted by this author, the most sonorous sounds are vowels (sonority values ranging from 10 to 8), followed by flaps (7), laterals (6) and nasals (5); and the least sonorous sounds are fricatives (ranging from 4 to 3), followed by stops (ranging from 2 to 1).

It is predicted that the most sonorous sounds are the best candidates to occupy the syllable peak, and that sonority sequence increases from the syllable onset to its peak. Thus, a syllable like 'sit' follows the sonority principle, as it starts with a sound with a lower degree of sonority (a fricative) and in its peak there is a vowel, which is the group of sounds with the highest degree of sonority. In other words, this example shows that there is a smooth increasing motion from the syllable's margin to the peak – nucleus (Yavas, 2011). However, words such as 'stop' /stɒp/ and 'speak' /spik/ end up

[12] Yavas (2011, p. 135) defines sonority as "the degree of opening of the vocal tract" during the articulation of a sound. Yavas (2011) presents a 10-point scale (based on McCully, 1987, as cited by Yavas, 2011) to display the degree of sonority for groups of vowels and consonants, where the sonority value of 10 is assigned to the most sonorous sounds, and 1 is assigned to the least sonorous ones.

violating the sonority principle because /s/ is a voiceless fricative (with sonority value 3) and /p/ is a voiceless stop - with sonority value 1 (Yavas, 2011). In other words, the expected motion of the syllable margin to the peak does not happen; it decreases, instead of increasing. Thus, /s/-clusters are seen as marked in relation to other types of clusters, and are known for posing difficulties to L2 learners.

Having discussed some important theoretical background for this research, including some pronunciation problems learners face and the probable reasons for these difficulties, the following section presents a brief review of some studies with Brazilian learners concerning the perception and production of /s/-clusters.

2.5 Brief Review of /s/-clusters studies with Brazilians

Since I have been discussing about /s/-clusters and the difficulty Brazilians have to perceive and produce them, this section reviews studies with /s/-clusters carried out so far that corroborate and/or refute some hypotheses raised by authors investigating L2 speech (e.g., Carlisle, 1991; Eckman, 1977; Flege, 1995).

Rebello (1997) replicated Carlisle's studies (1991, 1992, 1997), in which EFL Spanish speakers had to read unrelated sentences, containing /s/-clusters in word-initial position with different phonological contexts. The participants for Rebello's (1997) study were six EFL Brazilian students (with ages ranging from 19 to 31), from different courses in the Extracurricular program at UFSC. The students were chosen from three different levels (3, 6 and 9), so that the researcher could examine whether level of instruction influenced their performances. They had to read aloud isolated sentences with /s/-clusters in word-initial position in controlled environments while they were recorded. The clusters within the 312 sentences were separated according to the number of segments, as follows. Seven two-segment /s/-clusters (sl, sw, sp, st, sk, sm, sn), and five three-segment /s/-clusters (spr, str, skr, spl, skw). All of the clusters used in the sentences had different preceding environments, including the 21 consonants (/p, t, ik, s, f, ʃ, θ, b, d, g, z, v, ʒ, ð, m, n, ŋ, ɹ, l, tʃ, dʒ/), 2 vowels and 4 diphthongs (/i, u, oʊ, aɪ, aʊ, ɔɪ/) – distributed at random – and silence (i.e., with the /s/-cluster word appearing at the beginning of the sentence).

The author could see – different from Carlisle's studies and results – that Brazilians voiced /s/+sonorant more than /s/+stop. Thereby, Brazilians transferred voicing assimilation rules from their mother tongue in order to produce the L2 structures /sC(C)/. The researcher could also see that in contexts in which the /s/-cluster was preceded by silence, the participants tended to produce more prothetic vowels and the length of the syllable (two-member versus three-member clusters) did not influence occurrence of vowel insertion.

Silveira (2002) conducted a study which involved perception and production of /s/-clusters by Brazilians, in which she selected nine (three female and six male) Brazilian Portuguese speakers – students who were attending the fourth-semester Extracurricular English course at the Universidade Federal de Santa Catarina (UFSC), which presumes a low-intermediate level of proficiency. Their ages ranged from 18 to 39 and two of them had already graduated from UFSC, whereas the other seven were undergraduate students of many areas at the same university. For the production test, they had to translate 14 sentences from Portuguese into English, and each sentence was intended to elicit a word containing an initial /s/-cluster. Silveira recorded the participants translating the sentences and they could do so as many times as they wanted to. With regard to the perception test, there were 26 sets of three sentences that were recorded by a native speaker. Nine of them contained target sets (e.g., 'asleep', 'sleep', 'sleep') and one of the target sets contained a catch trial (i.e., the tree target words were the same). The selection of words was based on finding minimal pairs, i.e., the only difference among them is in the contrast between initial /s/-cluster (initial /sC(C)/) or /VsC(C)/, as we can find in the words 'spire' and 'aspire'. Thus, the participants had to circle the sentence that contained the word that was odd (different from the other two sentences) for each set, but if they thought all the sentences sounded the same, they would circle the option 'none of them'.

Silveira's (2002) results confirmed the use of prothesis as the most common strategy learners use to produce /s/-clusters (occurred in 100% of the tokens in the production test), and that the contrast between initial /sC(C)/) and /VsC(C)/ was difficult to perceive (29.6% of correct responses in the perception test). It is important to say that this study investigated the relationship between perception

and production. In the perception test, learners had some problems to classify the distinction between the syllabic patterns /sC(C)/ and /VsC(C). Thereby, among /skr, sp, sl, st, str/, the most difficult type of cluster for the participants to detect the target contrast in the perception test was /skr/ followed by /sp/. For the production test, all clusters proved difficult.

Cornelian (2003) carried out a study to partially replicate Rebello's (1997) study related to the /s/-clusters, in which he worked with the effects of pronunciation practice and phonological environment. The 20 participants chosen for Cornelian's (2003) research were Brazilian EFL students selected from two different university undergraduate programs and two different language schools in Santa Catarina. As for proficiency level, they were classified as lower-intermediate, intermediate and upper intermediate.

The participants had to read a list of sixty-five topically unrelated sentences, being forty-four of them test sentences containing /s/-clusters and twenty-one distractor sentences. They had to read sentences with /s/-clusters beginning with /sC(C)/ which were preceded by vowels and consonants. The clusters Cornelian (2003) decided to work with were /sp, st, sk, sm, sn, sl, spr, spl, str, skr, skw/, which were distributed in the sentences. For each cluster, there were four sentences, two with a vowel in the preceding environment, one preceded by a stop and one preceded by a fricative. To check for the effects of a brief-pronunciation practice, half of the participants (1 to 10) did not hear or read previously any of the sentences and the other half of participants (11 to 20) listened to and read the sentences before the recording. Therefore, this second group was the experimental group who received some pronunciation practice with the target sentences.

Cornelian's (2003) results show that the length of the cluster seemed not to influence the amount of modifications. However, similar to Rebello's (1997), clusters that began with /s/+sonorant were even more modified than /s/+stop. Voicing the /s/ of /s/+ sonorant influenced the rates of prothesis and the Brazilians produced more prothesis when a cluster was preceded by a vocalic environment than when it was preceded by a consonant. Furthermore, the results revealed that voiceless obstruents did not yield higher frequency of prothesis than voiced obstruents; a preceding fricative consonant yielded more prothesis than a stop environment and a preceding environment with [+ sibilant] fricatives caused a higher rate of prothesis than a [- sibilant] fricative context. As for the effects of pronunciation practice, the results are inconclusive, as it seems that proficiency was an interviewing variable that did not allow the researcher to draw conclusion about possible benefits of providing participants with a model.

Rauber (2004) conducted a study involving the production of initial /s/-clusters by EFL Brazilian and Spanish speakers, aiming at revisiting and explaining different findings by other authors who investigated the production of /sC(C)/ by Portuguese and Spanish speakers, such as Carlisle's (1991, 1992,1997) and Rebello's (1997) studies. In this manner, the participants were nine native Spanish speakers from Argentina, city of Posadas, in the province of Misiones, plus ten native Portuguese speakers from Brazil (city of Florianópolis). These participants had to read 180 topically-unrelated sentences, similar to those in Carlile's and Rebello's studies. All the sentences the participants had to read contained one occurrence of two-member and three-member /s/-clusters: /sp, st, sk, sw, sm, sn, sl, spr, str, skr, spl, skw/. For each of the twelve types of cluster, the participants read a set of thirteen sentences, five of them preceded by a vowel, five by a consonant and three preceded by silence, with a total of 156 target sentences, plus 24 distractor sentences.

The results showed that Portuguese and Spanish EFL learners inserted an epenthetic vowel more often before three-member than before two-member clusters, as MDH predicts – the more marked a structure is, the more frequently modified they will be. These results confirmed the MDH prediction (Eckman, 1977) but did not match Rebello's (1997), Cornelian's (2003) and Bettoni-Techio's (2008) findings for Brazilian learners. Additionally, the low-proficient learners presented similar rates of vowel insertion for both two and three-member clusters, suggesting that at lower proficiency levels, both types of cluster are equally difficult.

The second hypothesis proposed by Rauber (2004) stated that clusters in violation of the Syllable Structure Condition (i.e., clusters containing /s/+plosives, as in 'spit') would be modified more frequently than those not in violation (i.e., clusters containing /s/+nasal or liquid, as in 'snail') by Spanish speakers. Conversely, clusters not in violation would be more frequently modified than clusters in violation by Portuguese speakers. This hypothesis was confirmed for Spanish speakers, but not for Portuguese speakers, who showed no clear pattern in their results. Finally, the third hypothesis that aimed at investigating the influence of the preceding environment was one more time confirmed for Spanish speakers, but in the case of Portuguese participants, it was partially confirmed, as the

production of prothesis was more frequent when the /s/-cluster was preceded by vowels than by consonants; the silence contexts, which was found to trigger more prothesis in Rebello (1997) had a very low rate of prothesis.

Bettoni-Techio (2008) conducted a study that investigated the perception and production of /s/-clusters with 23 EFL Brazilian learners, as a means to check the effects of perceptual training on learners' performance. Twenty-three Brazilian learners of English with at least 200 hours of prior formal instruction in English participated in her study. Fifteen participants were selected for the experimental group (six male adults with ages ranging from 16-31 and seven female adults with ages ranging from 20-55; the other two were a nine and an eleven-year-old girl) and 8 for the control group.

The participants were recorded and they completed the following tasks: 1) a structured interview to elicit some /s/-cluster words in a more naturalistic style; 2) a short story reading test; 2) two text reading tests – one to elicit production of /s/-clusters and the other aiming at providing some practice on word-initial /s/-clusters, originally designed for native English speaking children); 4) a phrase-reading test (to evaluate production in different phonological contexts that were controlled in a sequence of words); 5) a perceptual discrimination test; 6) a perceptual identification test, and 7) a perceptual identification training task. The clusters were given in different contexts according to different levels of complexity in the pretest and the participants had to be trained on the identification of word-initial /s/-clusters. Bettoni-Techio's (2008) study also collected base line data by including reading tests for Brazilian Portuguese in which the participants had to read a short text containing words such as *esmeralda* [ezme'rawda]; in the text-reading test and phrase-reading test, the clusters used were /sl/, /sm/, /sn/, /sk/, /sp/, /st/, /skr/ and /spr/. Turning to the perception tests, the contrasts tested in the perceptual discrimination test were /sC-isC, sC-izC/ and /sC-zC/. It is important to say that the target clusters for this perceptual discrimination test were /st/, /sp/, /sk/, /sl/, /sm/ and /sn/ in four phonological contexts: a voiced consonant (e.g. 'move'), a voiceless consonant (e.g. 'if'), a vowel-like sound (e.g. 'how') and silence. The clusters tested in the perceptual identification test were /st/, /sp/, /sk/, /sl/, /sm/ and /sn/ and in the perceptual identification training test /st/, /sp/, /sl/ and /sm/. Additionally, the experimental group completed the pretest, the training, the posttest and the eight-month-retention test, while the control group completed the pre- and posttest only. The main results for the Experimental Group are summarized in Table 1, and for the Control Group, in Table 2.

Table 1

Percentages of Correct responses from Bettoni-Techio's (2008) study: Experimental Group

Tests	Pre-Tests	Post-Tests	Retention Tests[a]
Production Reading Tests	71.92%	94.84%	91.90%
Identification Test	85.92%	94.33%	92.34%
Discrimination Test	74.84%	87.46%	85.42%

[a] Data from 8 participants from the Experimental Group.

Table 2

Percentages of Correct responses from Bettoni-Techio's (2008) study: Control Group

Tests	Pre-Tests	Post-Tests
Production Reading Tests	54.05%	57.57%
Identification Test	69.84%	70.47%
Discrimination Test	66.07%	64.58%

Regarding the Experimental Group (Table 1), the production data showed that in the pretest, the mean accuracy was 71.92% and that it improved in both the post-test and retention test. In the perception tests, the percentages of correct responses were higher than in the production tests, and improvement was also found for both the Post-tests and the Retention Tests. Overall, the phonological context preceding the /s/-clusters did not affect the perception and production results significantly, there was no effect related to the length of clusters on production and the /s/+sonorant clusters were more difficult to be produced than those of /s/+stop clusters contrary to what is predicted by the MDH, due to the transfer of the phonological processes of voicing in BP into English, as attested by Rebello (1997).

As for the Control Group (Table 2), the results show lower rates of correct responses for the production and the perception tests than those obtained for the Experimental Group. Note that rates for the Control Group retained pretty much the same for the pre and posttests, thus indicating that improvement found for the Experimental Group should be attributed to the positive effects of training.

Focusing on the Experimental Group performance, with regard to correlational results, a positive relation was found between the identification and discrimination tests, which showed that those participants who performed better on one test would do so on the other, as well as between the perception tests and the production tests. In summary, Bettoni-Techio's (2008) results demonstrate a positive effect of instruction at the production level, as her study was concerned with the contrast between /sC/ and /sCC/. The results did not confirm some of the predictions made by the MDH, thus suggesting that Markedness alone cannot account for how the participants perceive or produce the /s/-clusters. Besides the effect of syllable structure, voicing was another significant factor influencing the production of /s/-clusters by BP learners of English.

Moreover, Bettoni-techio's (2008) outcome, including the posttest and retention test results, also confirmed that there was solid improvement in the identification and discrimination tasks, in the production, and in the interview for trained and untrained clusters, which provides strong evidence that "adults are able to learn new sounds through massive exposure to the target language and immediate feedback" (p. 148).

In sum, the pieces of research that were conducted so far and presented here have some results in common, for all findings discussed here showed that Brazilians tend to add a vowel before the clusters. However, their results differ in terms of the phonological context and the type of cluster that yields higher percentages of vowel insertion. For instance, Rebello's (1997) study was the only one that showed a higher percentage of vowel insertion before silent phonological environments, followed by vowels and consonants; Cornelian (2003) and Bettoni-Techio (2008) had some results in common, such as the phonological context, in which vowels seemed to be the most problematic context which influences the occurrence of prothesis, followed by sonorant consonants (more than the voiceless consonants). The length of the clusters were mostly found not to play an important role in Rebello (1997), Cornelian (2003) and Bettoni-Techio (2008), but seemed relevant in Rauber (2004). Cornelian's work seemed not to find a positive effect for short pronunciation practice, contrary to Bettoni-Techio (2008), who suggests that intensive training positively affects perception and production of /s/-clusters. Most of the studies with BP learners show that /s/+sonorant led to higher frequencies of vowel insertion than /s/+stop, just as in Rebello (1997), Cornelian's (2003) and Bettoni-Techio (2008).

Due to the results obtained from the studies carried out so far, I decided to select students enrolled in the Advanced level English course at a Brazilian University to check whether the addition of a vowel sound before the /s/-clusters would also persist in the pronunciation of more advanced learners. The present research aims at investigating the /s/-clusters, the influence of the preceding environment, cluster type, and the roles of proficiency, instruction and task type. Information about the type of clusters, the participants and their actual proficiency level, the tests and procedures will be provided in the next chapter.

The present study does not aim at testing all variables included in the previous studies, although some of them will be present in the research questions, as well as the hypotheses, which guided and grounded this study, which are described next.

2.6 Research Questions (RQs) and Hypotheses (Hs)

RQ 1: How does the preceding phonological context affect the production of word-initial /s/-clusters by future EFL teachers at UNEB?

H1: The participant's production will show a higher rate of prothesis before a preceding vocalic environment than a preceding consonantal or silent environment in the tests. (Bettoni-Techio, 2008; Cornelian, 2003, 2010; Rauber, 2004)

RQ 2: How does type of cluster (two-member clusters versus three-member clusters) affect the production of word-initial /s/-clusters by future EFL teachers at UNEB?

H2: The three-member clusters will present a higher rate of modification than the two-member clusters. (Carlisle 1991, 1992, 1997, 1998, 2006; Rauber (2004).

RQ 3: How does task type (Sentence-Reading Test versus Image-Description Test) affect the production of /s/-clusters?

H3: The Sentence-Reading Test will cause higher rates of prothesis than the Image-Description Test, because in the latter the participants will not have the interference of orthography, which often leads learners to transfer patterns of sound-spelling correspondence from their L1 into the L2 (Bettoni-Techio, 2008; Silveira, 2012; Tarone, 1985)

RQ 4: What is the acoustic nature of the prothetic vowel produced by Brazilians before the /s/-clusters? This last question is exploratory and there is no formal hypothesis to examine it, as the researcher's goal is to understand better the acoustic nature of the prothetic vowel - in comparison to previous studies.

To provide an overview of the present study, information about the research instruments, participants, procedures for data collection and analysis are all provided in the next chapter: The Method.

CHAPTER THREE

METHOD

The present study aims at investigating how a group of future EFL teachers produces word-initial /s/-clusters. The main reason why this research was developed has to do with the fact that Brazilian learners have some difficulties related to phonetic and phonological structures and the study is intended to contribute to the bulk of research that aims at describing these difficulties, to inform both research and pedagogy. This chapter begins with a description of the participants, the participants' profile questionnaire and the proficiency test. Next, the production tests are described, and the procedures for data collection and data analysis are presented.

3.1 Participants

The 7 participants were selected by having a list of the learners regularly enrolled in the English course: Advanced I in the Undergraduate program of *Letras Língua Inglesa e Literaturas at Universidade do Estado da Bahia (UNEB)*, in Jacobina - BA. These participants were chosen because one of the main intentions of this study was to examine how these future EFL teachers, who have attended English phonetics and phonology courses, produce /s/-clusters. Therefore, selecting these learners for the study would probably give us some indirect answers related to the impact of instruction and proficiency on the production of /s/-clusters. Because these learners were enrolled in the Advanced English course at UNEB, they were expected to possess an advanced proficiency level. Furthermore, students who were enrolled in the Advanced I course had completed all the three Phonetics and Phonology courses, with a total of 90 hours and a total 825 hours of English courses by the time they are able to enroll in Advanced English I – taking into account courses in which EFL was used as a medium of instruction trained and practiced, once courses taught in Portuguese were not included in these 825 hours. (See Appendix A for the Phonetics and Phonology syllabuses at UNEB[13]). In the three Phonetics and Phonology courses, the participants were expected to have studied many topics concerning pronunciation of consonants and vowels, intonation, and so on. All participants were given a copy of a Consent Form (See Appendix B), which informed them about the general objective of the present study (examining speech produced by English learners) and tasks they were expected to complete. This research was submitted to the UFSC Board of Ethics in Research (CEP) and approved under the protocol number 096097/2015.

3.2 Participants' Profile Questionnaire

In order to gather some additional information about the participants, a questionnaire (See Appendix C) was designed, and the participants had to fill it out, answering questions related to several details, which were considered at the time the researcher analyzed the data. Therefore, questions such as age, time of experience with the language - living abroad or studying, whether they considered that receiving instruction on phonetics and phonology properties really helps students learn how to pronounce words in a target-like way, questions about the knowledge of /s/-clusters, among others that were considered important to support the analysis.

[13] The syllabuses refer to the two semesters in 2013 and one semester in 2014, that is, 2013.1, 2013.2 and 2014.1.

3.3 Proficiency Test

Additionally, as a way of having a better look and understanding of the participants' English proficiency level, a proficiency test (Oxford Placement Test (Allan, 2004)) was administered (see Appendix D) after the data collection - taking into consideration that proficiency could influence the participants' production (Major, 1994; Silveira, 2012; Zimmer, 2004) as well. The questions in the Oxford Proficiency Test (2004) are divided according to degree of complexity, so the easiest questions come first followed by the most difficult questions.

When a study is conducted, many factors should be taken into consideration, since single details might play an important role in the findings. Due to that, a questionnaire and a pen and paper version of the Oxford Proficiency Test (Allan, 2004) (OPT) were administered, in order to investigate the participants' background and level, among other factors. As the level of proficiency of the EFL learners was such an important characteristic, the OPT was given to the participants to see if they indeed possessed an advanced proficiency level, as expected in the course they were enrolled in.

The pen and paper OPT assesses three types of skills, which are Reading, Vocabulary and Grammar. The test is divided into two parts: The first part brings reading tasks with simple texts, supported by some graphics. The second part aims at assessing core competence by presenting test-takers with multiple-choice cloze plus discrete multiple-choice questions. All the test questions are distributed in a multiple-choice format (Allan, 2004).

In order to have a better understanding of how a learner is placed in each level – based on the Council of Europe Levels, Table 3 demonstrates the distribution of learners, according to the level of proficiency.

Table 3

Level of proficiency according to the Council of Europe Levels

ALTE[14] Level	Paper and Pen Test Score		Council of Europe Level
	Part 1 score out of 40	Part 1 score out of 60	
0 beginner	0-15	0-17	A1
1 elementary	16-23	18-29	A2
2 lower intermediate	24-30	30-39	B1
3 upper intermediate	31-40	40-47	B2
4 advanced		48-54	C1
5 very advanced		54-60	C2

Source: Oxford Placement Test (Allan, 2004)

Regarding the scores of each participant in the present study, it is important to say that both Part 1 (score out of 40 and score out of 60) were taken into consideration, as a means to bring the rates and every participant proficiency rank, once the pen and paper OPT measures the three skills Reading, Vocabulary and Grammar. Table 4 shows the grades of each participant (from P1 to P7), in which P7 was the one who obtained the highest score of correct answers (41), being ranked at level 3 (upper intermediate), whereas the other participants were ranked at level 2 (lower intermediate, with values ranging from 37 to 30). Thus, the distribution of participants' grades in Table 4 follows a descending order, in which the first participant (who obtained the highest rate of correct answers) comes at the top, whereas the last individual (who achieved the lowest rate of correct answers) comes at the bottom. The table also shows the percentage of correct answers for each participant, which was obtained by dividing the number of correct responses by the maximum score (60) possible in the OPT.

[14] Association of Language Testers in Europe

Table 4

Frequency and percentages of correct answers in the OPT for each participant

Participants	Correct Answers in the OPT	%
P7	41	68,33
P1	37	61,66
P6	34	56,66
P2	34	56,66
P3	33	55
P4	32	53,33
P5	30	50
7	241	57,38

Maximum score in this test = 60. Percentages were obtained by dividing the number of correct answers by the amount of questions (60).

3.4 Sentence-Reading Test

The Sentence-Reading Test (Appendix E) contains 24 sentences with the target /s/-cluster words. The Sentence-Reading Test is based on Cornelian's (2003) study, which was changed and shaped according to the needs of the present research, in which only the following clusters were used: /sp/, /spr/, /st/, /str/. The test was designed based on the four types of cluster I had chosen to work with, which appear in words such as 'spot', 'spring', 'still' and 'strawberry'. As can be seen in Table 5, for each type of cluster, there were six sentences with three different preceding environments – the /s/-cluster words could come after a silence, a stop consonant, and a high-back vowel, with two target words for each type of cluster and type of context. As the target words were embedded in different sentences, we expected that the participants would not guess easily the research focus.

Table 5

Type of cluster and preceding phonological context in the Sentence-Reading Test

	High-front vowel context	Stop context	Silence context	Total
/sp/	2	2	2	6
/spr/	2	2	2	6
/st/	2	2	2	6
/str/	2	2	2	6
Total	8	8	8	24

The selected words for the Sentence-Reading Test were taken from WordReference.com, a website containing a large amount of words, their meanings and examples of usage. In order to know how frequent all the tested words are, the researcher used a free and up-to-date website called Corpus of Contemporary American English (COCA)[15]. It is a creation of Mark Davies, Professor of Linguistics at Brigham Young University in Provo, Utah, USA. COCA is the largest freely-available corpus of English, and the only huge and balanced corpora of American English, it contains over 520 million word from different styles of contemporary American English (1990-2012), that is,

[15] Davies, M. *The corpus of contemporary American English*. Retrieved from: http://corpus.byu.edu/coca/.

transcriptions of conversations, fiction, popular magazines, newspapers and academic journals. This corpus also allows observing the frequency of usage over time – how it is being used, whether a word or meaning has been increasing or decreasing, type of genre that uses it the most, etc. Table 6 brings the words used in the Sentence-Reading Test and their rank of frequency taken from COCA, displayed in parentheses. Note that the higher the number in the frequency rank, the more frequent the word is. Thus, the least frequent word used in the Sentence-Reading Test was 'spoilt' and the most frequent one was 'stop'.

Table 6

/s/-cluster words used in the Sentence-Reading Test and their frequency in COCA.

Clusters	Words
/sp/	spoilt (49), spits (994), Spain (11786), space (92589), spoon (8072), spend (50182)
/spr/	sprawl (1607), sprung (1813), spray (9799), sprints (783), spring (52496), spread (36838)
/st/	stop (99809), stays (8208), study (177816), star (57980), starring (5181), still (410362)
/str/	strong (86826), strangely (3760), streets (34925), struck (22803), stress (31646), strengthen (6411)

3.5 Image-Description Test

The Image-Description Test (Appendix F) was used to collect /s/-cluster production data without orthographic information. Due to that, the images selected contained the same types of clusters used in the Sentence-Reading Test. Besides, an effort was made to use frequent words (based on COCA frequency ranks, section 3.4) to increase the chances that the participants would produce the target words. It is noteworthy to mention that the selection of the target images for the Image-Description Test (Section 3.6) was based on the estimate degree of familiarity, that is, how familiar the researcher judged the participants could be with the images, so that the chances of the participants actually producing the words would increase. Furthermore, the target word had to be easily depicted by a simple image, which was easy in cases like 'spider' and 'strawberry', but much harder with words such as 'spring', which often triggered the word 'flower'.

Table 7 shows the thirteen target words included in the Image-Description Test and their rank frequency in COCA, displayed in parentheses. The least frequent word, and probably the least familiar one to the participants was 'sprout', and 'stop' was the most frequent one. Thus, our goal was to have each participant produce at least one word for each type of cluster added additional images to the test as distractors, so the participants could not find out the pronunciation focus of the tests, as this could end up influencing the results.

Table 7

Type of cluster, target words, and their frequency in the Image-Description Test

Clusters	Words
/sp/	spider (3198), spoon (7180), spot (30469), spaceship (996)
/spr/	spring (45390), spray (8602), sprout (965)
/st/	stop (86134), star (49641), stairs (13620)
/str/	strong (75492), street (103326), strawberry (2737)

3.6 Data Collection

The first step was to briefly explain to the participants the general objective of the research and ask them to read and sign the Consent Form (Appendix B). As the participants had to read the sentences from the Sentence-Reading Test and say what the images of the Image-Description Test made them think of, they were recorded with PRAAT, version 5.4.10 (Boersma, Paul & Weenink, 2015). Each participant was recorded individually in a quiet room according to their time availability. The recruited participants received some instructions in Portuguese about how they had to act while the researcher recorded them reading the sentences and describing the images. Before the recording time, the participants had some time, so as not to feel nervous because of the process, and then the PRAAT program began to record them and they started talking whenever they felt like doing this.

The sentences were presented to the participants in a word file, on the screen of a laptop, so that they could easily handle the laptop keyboard, without the researcher's interference at the time they were being recorded. In this manner, the participants received instruction to look at the sentences and read each one of them aloud, not too slowly and not too fast, so that the words could be clearly pronounced and, consequently, the microphone could capture the sound clearly.

The reason to include two types of task was because it would be important to know if the orthography of the words would influence the participants' performance, because some interference could come from the orthography of words, that often leads learners to transfer patterns of sound-spelling correspondence from their L1 into the L2. Furthermore, reading tasks are considered more formal in style than Image-Description tasks, and some research has shown that different speaking styles lead to different production (Major, 1986; Silveira, 2012; Tarone, 1985).

Regarding the presentation of the images included in the Image-Description Test, it was used a Power Point file containing 26 slides. Each slide contained two similar images that were expected to lead the participants to say the same word twice or at least once. Thirteen slides contained target /s/-cluster words, and thirteen contained distractors, and the two types of slides were presented in a randomized order.

The participants were also audio-recorded while they described the images. The participants were instructed to say just words, related to the images they saw. For example, the first two images were a 'spider' – target /s/-cluster image – and the second image showed two flowers (one blue and the other pink) – used as distractors. Furthermore, with regard to the program and equipment used to record the participants' voices, I chose to use PRAAT version 5.4.10 (Boersma, Paul & Weenink, 2015) and a Panasonic Audio 655 Stereo Headset, speaker driver size 40mm diameter, speaker frequency response 20Hz-20kHz, microphone frequency response 100Hz-10kHz, high-fidelity 24-bit stereo, digital signal processing.

As soon as the participants finished the recordings, they were asked to complete the background questionnaire and the Oxford Placement Test. Each participant spent about 60 minutes to complete all tasks (10 minutes for the recordings, 5 minutes for the questionnaire, and 45 minutes for

the placement test). The procedure for data analysis will be described and explained in the next subtopic.

3.7 Data analysis

The data were saved into .wav files. Each file was opened in the PRAAT program, which was used to segment and transcribe the target /s/-cluster words and any words immediately preceding them. In order to do this, both acoustic and auditory analysis were combined. The same procedure was used with data from the Sentence-Reading and the Image-Description tests, in order to detect whether a prothetic vowel was added before the /s/-clusters, whether the /s/-cluster was produced as a voiceless alveolar fricative or another consonant, and whether the environment influenced the production of these clusters. Furthermore, the researcher had the aid of another specialist in analyzing acoustic data in a second round of analysis.

As a way of giving some examples of the procedures for data analysis, below I show spectrogram images to illustrate the production of /s/-clusters by two Brazilians who were invited to participate in the Pilot study[16]. The first spectrogram (Fig. 1) shows the production of the target word 'spray', taken from the sentence 'Spray cans are cheap this time of the year', in which the cluster is preceded by silence. As we can see, the spectrogram shows that there was no addition of a vowel before the /s/-cluster, as the acoustic signal shows a random noise pattern in the higher frequencies (Ladefoged, 2001) at the beginning of the word 'spray', which is typical of fricative sounds.

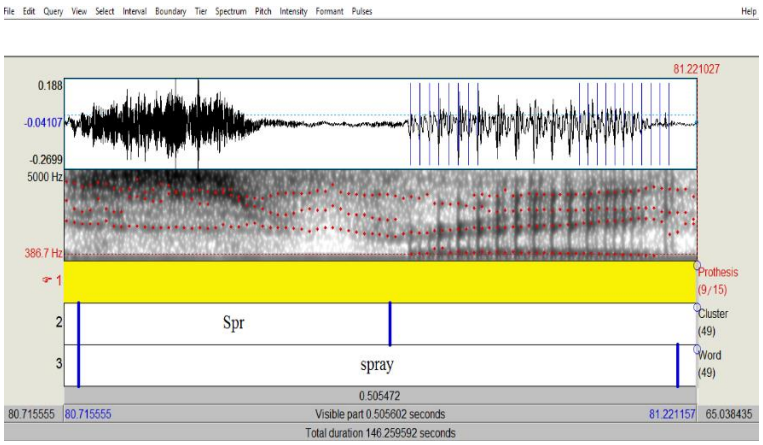


Figure 1. Spectrogram showing segmentation of the target word 'spray' produced by Participant A (Pilot study)

The second spectrogram (Fig. 2) shows the production of another participant who inserted a vowel before the /s/-cluster for the target word 'spoon', taken from the sentence 'Spoon is an object'. The image shows the presence of the vowel formants at the time the participant started saying the word 'spoon'. The low F1 and high F2 formant values clearly indicate the presence of a high-front vowel (probably [i]).

[16] Before gathering the data for this study, I conducted a pilot study to evaluate all instruments and procedures. For the pilot study, data from 2 BP learners of English from different regions, one participant from the South of Brazil (3 upper intermediate, from Balneário Camboriú - SC) and another participant from the Northeast of Brazil (2 lower intermediate, from Jacobina - BA) were collected. After conducting the pilot study, the instruments and procedures were improved in terms of how the images were displayed and how the participants should read the sentences.

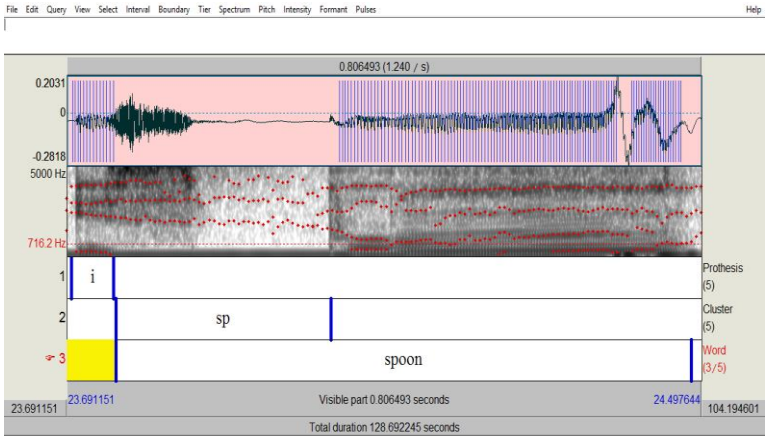


Figure 2. Spectrogram showing segmentation of the target word 'spoon' produced by Participant B (Pilot study)

Once the segmentation of the data set was concluded, the data were arranged in spreadsheets in Excell and SPSS[17] and were organized in order to identify the frequency of non-target productions of the /s/-clusters (i.e., productions in which a prothetic vowel was produced before the /s/-clusters)[18]. The spreadsheet also brings some information about the independent variables tested in this study, namely, (a) the type of context preceding each cluster (three levels: silence, vowel, and consonant), (b) type of cluster tested (two levels: two-member and three-member clusters), and (c) type of test (two levels: Sentence-Reading and Image-Description). A closer examination of the words included in the Sentence-Reading and Image-Description tests were conducted, aiming at identifying any particular words that yielded different production patterns. For this analysis, only percentages of correct responses are reported. Furthermore, the participants' profile variables gathered with the help of the background questionnaire were examined qualitatively in order to unveil the participants' profiles and observe how these characteristics (gender, time abroad, opinion about pronunciation instructions classes, etc.) may have influenced the production test results.

The data to answer research questions 1, 2 and 3 were submitted to statistical analysis. Given the small number of tokens, most variables were not normally distributed, thus non-parametric tests were used to compare groups and conditions, and non-parametric Spearman correlations were run to check for relationships among variables (Larson-Hall, 2010). To be considered significant, all tests had to reach a probability level of .05 or less (Larson-Hall, 2010). Further details about the statistical tests used will be provided throughout Chapter 4, which brings the results of the present study.

[17] SPSS stands for the software Statistics Package for Social Sciences. In this study version 17.0 was used.
[18] No participant replaced the /s/ with another consonant or deleted it in the present study.

CHAPTER FOUR

RESULTS AND DISCUSSION

This chapter aims at presenting the results of the present study and discussing them taking into account the literature reviewed in Chapter 2. In order to do so, a brief review of the hypotheses is shown with the intention of checking whether they were corroborated or not. The way the research questions and hypotheses are shown and discussed follows the sequence of their presentation in Chapter 2.

The central goal of the present study was to investigate the production of /s/-clusters in onset position by Brazilian learners of English. In order to pursue this goal, the study looked into the role played by the preceding phonological context, type of /s/-cluster and task type in the production of /s/-clusters. Furthermore, the study examined some acoustic features of the prothetic vowel produced by the participants. We open this chapter by presenting the overall results for prothesis and percentages of occurrence of prothetic vowel for both the Sentence-Reading Test and the Image-Description Test.

4.1 Overall Results for Prothesis

We begin this section by presenting the frequency of occurrence of prothesis for the tested words in the Sentence-Reading Test. As Table 8 shows, the total number of tokens produced was 168 (i.e., 24 words times 7 participants), and 85 of these words were produced with prothesis. In other words, the participants inserted a vowel before the /s/-cluster in 50.59% of the tokens.

Table 8

Summarizing results per tested words in the Sentence-Reading Test

Words	N (%) of epenthesis	Words	N (%) of epenthesis
Spoilt	7 (100%)	Sprung	3 (42,85%)
Spits	1 (14.28%)	Spray	5 (71,42)
Spain	2 (28,57%)	Sprints	1 (14,28%)
Space	0	Spring	4 (57,14%)
Spoon	4 (57,14%)	Spread	6 (85,71%)
Spend	6 (85,71%)	Strong	6 (85,71%)
Stop	6 (85,71%)	Strangely	2 (28,57%)
Stays	2 (28,57%)	Streets	4 (57,14%)
Study	2 (28,57%)	Struck	1 (14,28%)
Star	1 (14,28%)	Stress	3 (42,85%)
Starring	2 (28,57%)	Strengthen	5 (71,42%)
Still	6 (85,71%)		
Sprawl	6 (85,71%)	**Total**	**85/168 (50.59%)**

N for each word equals 7

Additionally, as a means to understand better the amount and percentage of prothetic vowel in the Sentence-Reading Test, it can be seen, firstly, by looking at the results in Table 8, that the words that presented higher rates of prothesis were ‘spoilt’, ‘spend’, ‘stop’, ‘still’, ‘sprawl’, ‘spread’, and

'strong', all of them yielding over 85% of occurrence of prothesis. Conversely, the word 'space' was always produced in target-like fashion.

Turning to the Image-Description Test, Table 9 shows that the participants produced 55 words starting with an /s/-cluster, and that they inserted a vowel in eight of these words. The results show a much smaller rate (14.54%) of prothetic vowel for the Image-Description Test than for the Sentence-Reading Test (50.59%). For the Image-Description Test, the words that presented higher rates of prothetic vowel were 'spider' and 'stairs', followed by 'strong' and 'spoon'. The other seven words were produced without the prothetic vowel. Note that the word 'sprout' was elicited in the test but was not produced by any participant, possibly because this low-frequency word (See Table 10) was not part of the active vocabulary of learners. Alternatively, the image used to elicit this word, as well as 'spot' was not clear enough. Moreover, 'spaceship', 'spring', 'spray', 'stop', 'star', 'street' and 'strawberry' were produced, but no occurence of prothesis was found.

Table 9

Summarizing results per tested words for the Image-Description Test

Words	N for prothesis occurrence	Words	N for prothesis occurrence
Spider	3/7 (42.85%)	Stop	0/6
Spoon	1/5 (20%)	Star	0/7
Spot	0/0	Stairs	3/5 (60%)
Spaceship	0/1	Strong	1/4 (25%)
Spring	0/1	Street	0/6
Spray	0/7	Strawberry	0/6
Sprout	0/0	**Total**	**8/55 (14.54%)**

Table 10

Rank of word frequency in COCA corpus website in the Sentence-Reading Test and the Image-Description Test.

Words	Word frequency in COCA	Words	Word frequency in COCA	Words	Word frequency in COCA
Spoilt	49	Sprung	1813	Spot	30469
Spits	994	Spray	9799	Spaceship	996
Spain	11786	Sprints	783	Spring	45390
Space	92589	Spring	52496	Spray	8602
Spoon	8072	Spread	36838	Sprout	965
Spend	50182	Strong	86826	Stop	86134
Stop	99809	Strangely	3760	Star	49641
Stays	8208	Streets	34925	Stairs	13620
Study	177816	Struck	22803	Strong	75492
Star	57980	Stress	31646	Street	103326
Starring	5181	Strengthen	6411	Strawberry	2737
Still	410362	Spider	3198		
Sprawl	1607	Spoon	7180		

Considering frequency, it is difficult to make generalizations regarding the role played by this variable in the production of /s/-clusters. In order to understand and visualize better the frequency status of the tested words, Table 10 shows the frequency of each word in COCA - for both tests. The

results did not show a huge percentage of correct productions in frequent words, for instance, as in 'stop' in the Sentence-Reading Test or as in 'spider' and 'stairs' in the Image-Description Test. Additionally, the word 'space' has a high degree of frequency in addition to being a cognate in BP, and no participant produced it with a prothetic vowel. Thus, it seems that frequency does not help to clarify the production patterns obtained for the participants of the present study.

On the other hand, it might be that the frequency variable was not properly examined here and it can be the topic of future investigation whether frequency really plays a role in the production of /s/-clusters. In this sense, Bettoni-Techio (2008) states that "the sound will be learned if there is a high frequency of words containing one of the sounds and a great necessity for the distinction to contrast words and utterances, which are important for communication" (p. 17). Considering the fact that highly frequent words led to both high and low frequencies of vowel prothesis, it seems that word frequency is not a good predictor for the production of /s/-clusters by Brazilian learners of English. However, further studies should examine this issue.

4.2 The influence of the preceding phonological context (RQ1) and of type of cluster (RQ2)

This section brings the results for RQ1 and RQ2, for the sake of brevity, given that it is easier to display the results for both type of phonological context and type of cluster in the same tables.

The first research question addressed the role of the preceding phonological context in the rate of prothesis before /s/-clusters produced by future EFL teachers at UNEB. Based on the findings of previous studies (Bettoni-Techio, 2008; Cornelian, 2003; Rauber, 2004), the hypothesis in the present study was that higher rates of prothesis would be found when the /s/-cluster was preceded by a vowel.

A total of seven informants were tested and the results presented in this section will report data from the Sentence-Reading Test only, as this instrument allowed controlling for the preceding phonological environment, different from the Sentence-Reading Test, which generated few tokens of /s/-clusters, most of them preceded by a pause. Each participant produced 24 words beginning with an /s/-cluster, six for each type of cluster: /sp/, /st/, /spr/, and /str/. A total of 168 tokens were analyzed to answer RQ1.

Table 11 shows the results divided per type of cluster and type of preceding context. The present research revealed the same trend found in previous studies, concerning the preceding phonological context, for the participants tended to insert an epenthetic vowel before /s/-clusters, especially when the preceding environment was a vowel (above 85% of occurrence for all clusters), confirming the findings aforementioned (Bettoni-Techio, 2008; Cornelian, 2003, 2010 and Rauber, 2004). The second context that led to high percentages of prothesis was when the /s/-cluster was preceded by a silence, with percentages ranging from 28.6% to 64.2%. Finally, the consonantal context was the easiest one, considering that the prothesis rates varied from 7.1% to 28.5%. In Rebello's (1997) study the consonantal environment was also found to be the easiest context, though the silent context generated the highest prothesis rates.

Table 11

Rates of prothesis per type of cluster and preceding environment for the Sentence-Reading Test

Type of cluster	Total count of prothesis	Vocalic Context	Silence Context	Consonantal Context
/spr/	25 (59.52%)[19]	12 (85.7%)[20]	9 (64.2%)	4 (28.5%)
/str/	22 (52.38%)	13 (92.3%)	7 (50%)	2 (14.2%)
/sp/	20 (47.61%)	13 (92.3%)	6 (42.8%)	1 (7.1%)
/st/	19 (45.23%)	12 (85.7%)	4 (28.5%)	3 (21.4%)
Total	86 (4,76%)	50 (89.3%)	26 (46.4%)	10 (17.8%)

Total N = 168 (6 words (2 for each type of preceding phonological context, times 7 participants)).
N for each type of cluster = 42.

Turning to RQ2, which investigated the effect of type of cluster, Table 11 shows that the most modified cluster was /spr/, followed by /str/, /sp/ and /st/, corroborating Hypothesis 1b, which stated that three-member clusters would lead to more vowel prothesis than two-member clusters. As shown, the participants had more difficulties pronouncing three-member clusters (/spr/ and /str/), followed by two-member clusters (/sp/ and /st/), different from Rebello (1997), but suporting the findings reported by Carlisle (1991, 1992, 1997, 1998, 2006) and Rauber (2004).

Statistical tests were run to verify whether the type of cluster and of preceding environment played a significant role in the rates of prothesis. Table 12 shows the means and standard deviations for each type of cluster and type of phonological context, and non-parametric Kruskal Wallis tests were run for these comparisons (See Appendix G for the detailed results displayed in tables). The overall results for type of cluster came out nonsignificant ($p = .88$). However, the Kruskal Wallis test showed a significant effect for type of phonological context ($p < .001$), and post-hoc Mann-Whitney tests were run for pairwise comparisons to locate significant differences (See Appendix H for the Statistical test results displayed in details).

[19] These percentages were calculated by dividing the number of prothesis by the total number of tokens for each type of cluster (i.e., 42)

[20] These percentages were calculated by dividing the number of prothesis for each context by the total number of tokens produced for each type of cluster (N = 14), that is, 2 words for each context times 7 participants).

Table 12

Means and standard deviations for type of cluster and type of phonological context

	Vowel		Silence		Consonant	
	Mean	Sd	Mean	Sd	Mean	sd
/sp/	6.5	.70	3.0	1.4	0.5	0.7
/st/	6.0	0	2.0	0	1.5	0.7
/spr/	6.0	0	4.5	0.7	2.0	1.4
/str/	5.5	0.7	3.5	0.7	1.5	0.7

The post-hoc tests came out significant for all comparisons ($p < .05$), thus showing that the vocalic context significantly led to higher rates of prothetic vowel (means varying from 6.5 to 5.5). The second context with high rates of vowel prothesis was silence (means varying from 4.5 to 2.0), which displayed mean values lower than the ones found for the vocalic context, but higher than those found for the consonant context. Finally, the context that yielded the lowest rates of prothesis was when the /s/-cluster was preceded by a consonant (means varying from 2.0 to 0.5), and these means were significantly lower than the means for the vocalic and the consonantal environments.

Thus, the results of the present study are similar to those findings of Carlisle (1991, 1992, 1997, 1998, 2006) and Rauber (2004), which also found that the preceding phonological context can influence an EFL speaker's production, yielding higher percentages of prothesis when /s/-clusters are preceded by a vowel, thus corroborating H1.

Furthermore, the present study found a tendency for three-member clusters to lead to higher frequency of prothetic vowels, but these results did not reach statistical significance and H2 could not be corroborated.

4.3 The influence of task type on the production of /s/-clusters (RQ 3)

The third research question examined the influence of task type on the production of /s/-clusters. It was hypothesized that a more formal task would lead participants to insert a vowel to the /s/-clusters more often than a less formal task, considering that different speaking styles would lead to different performance (Bettoni-Techio, 2008; Dickerson, 1974; Major, 1986; Silveira, 2012; Tarone, 1985).

The present research collected data using two types of tests, a Sentence-Reading Test (a more formal one) and an Image-Description Test (a more informal one). As orthographic information is available in the Sentence-Reading Test, learners are expected to transfer patterns of sound-spelling correspondence from their L1 into the L2 (Silveira, 2012) more often when performing this task (a formal task type). Conversely, the Image-Description Test had no orthographic information and provided only images to elicit the production of words initiating with /s/-clusters.

As mentioned above, the transfer of L1 patterns can be higher in a specific task type, since the degree of formality can influence learners' production in different ways (Edge, 1991; Silveira, 2002; Tarone, 1985). As Dickerson (1974) proposed and confirmed, different 'styles' of tasks might affect learners' production, in a sense that a specific task type can determine the language that is going to be used. Dickerson (1974) still proposes that the difference in performance is based on the amount of attention paid to an utterance – that is, more attention is paid when a formal task is administered, so pronunciation is expected to be more accurate.

Major's (1986) findings, supporting Dickerson's (1974) revealed that once a task is more formal, the speaker tends to be more concentrated - compared to a less formal task, focusing on form; consequently, pronunciation tends to be more precise. Conversely, Tarone's (1985) findings showed that some structures seem to be more accurate while learners produce a more formal task, but also other structures can be more inaccurate too. Therefore, Tarone (1985) highlights the fact that performance may vary across tasks, but that task formality alone does not explain performance for different types of structures. It may be the case that, as argued by Silveira (2012), tasks containing orthography information may increase the chances of L1 transfer, especially in the case of adult literate learners.

Taking into account the different tests used in the present study, the results displayed in Table 13 revealed that there was a higher rate of prothetic vowel in the Sentence-Reading Test compared to the Image-Description Test. So, as stated in Hypothesis 3 the Image-Description Test did not cause a higher rate of prothesis possibly because the participants did not have the interference of orthography as a means to produce the words, which often leads learners to transfer patterns of sound-spelling correspondence from their L1 into the L2 (Silveira, 2012). Thus, the test offering orthographic input yielded a higher rate of prothesis than the test with no orthographic input. Indeed, Table 13 shows that the Sentence-Reading Test led to about 50% occurrence of prothesis, against about 14% for the Image-Description Test. P1 was the only participant who presented a low rate of prothesis in both tests, compared to the other participants, and P1 together with P6 and P7 produced no prothetic vowel before some /s/-clusters in the Image-Description Test. (For a more detailed description about these percentages, see Appendix I).

Table 13

Amount and percentage of prothesis in the Sentence-Reading Test and Image-Description Test

Participants	Percentages of vowel for the Sentence-Reading Test	Percentages of vowel for the Image-Description Test
P1	25%	0%
P2	91,6%	42,8%
P3	37,5%	14,2%
P4	45,8%	28,5%
P5	66,6%	14,2%
P6	45,8%	0%
P7	45,8%	0%
Total:	**85/168 (50.59%)**	**8/55 (14.54%)**

Given that the two tests contain different number of tokens, a nonparametric Wilcoxon test was run to check whether the percentage of prothetic vowel was significantly different across tasks. The results show that indeed the percentage of prothetic vowel in the Sentence-Reading Test is significantly higher ($Z = -2.37$, $p = .01$) than in the Image-Description Test. Thus, hypothesis 3 is corroborated, as a significant effect for task type was found.

In order to check for the relationship between the two tests, a non-parametric Spearman correlation was run. The results show that the participants who produced more vowels in the Sentence-Reading Test tend to produce more vowels in the Image-Description Test too. The correlation was moderate and positive ($rho = .503$, $p = .17$), but non-significant. This is due to the fact that from the seven participants, two who had produced high percentages of prothetic vowel in the Sentence-

Reading Test (P6, P7) did not produce any prothetic vowel in the Image-Description Test. This fact, again, confirms that the Image-Description Test leads to more target-like pronunciation of the /s/-clusters. This result is probably due to the fact that the Image-Description Test provides no orthographic information and leads to less L1 transfer than the Sentence-Reading Test (Silveira, 2012).

Finally, considering the small number of tokens of the Image-Description Test and the fact that the words were pronounced in isolation, it is not possible to discuss how the preceding phonological context could influence the results for different task types.

Having presented the results for RQ1, RQ2, and RQ3, this chapter now turns to a brief description of the acoustic nature of the prothetic vowels produced by the participants.

4.4 Acoustic Information about the Prothetic Vowel

In this section, the objective is to present acoustic information about the prothetic vowel Brazilians insert in front of English /s/-clusters. Although there are studies reporting on the production of /s/-clusters by Brazilians (e.g. Bettoni-Techio, 2008; Cornelian, 2003, 2010; Rauber, 2002; Rebello, 1997), to the best of my knowledge, none of them reports acoustic information about the nature of the prothetic vowel. In this sense, the present study intends to contribute to the field of interphonology by providing phonetic details about the prothetic vowel Brazilians insert before the /s/-clusters.

The results will be presented separately for male and female informants, to allow for comparisons with Rauber's (2006) study on English and BP vowels produced by Brazilian learners of English. Furthermore, as explained by Ladefoged (2001), the reason why we do not mix F1 and F2 of the vowels for male and female is that:

> The men's vowels have lower formant frequencies, resulting in their chart being more compressed, with all the points being moved upward and to the right. This is because men have larger vocal tracts, containing bigger bodies of air. These larger bodies of air vibrate more slowly, so that the formants have lower frequencies (p. 43).

Table 14 shows the means, medians, and standard deviations for the first (F1) and second (F2) formants of the prothetic vowels produced by the four males and three females who provided data for the present study[21]. Furthermore, Table 14 brings similar information for three vowels produced by each participant in Rauber (2006), namely the English high front vowels /i/ and /ɪ/, and the BP high front vowel /i/. The reason for reporting the values for these specific vowels is because we expect them to be similar in terms of F1 and F2 to the prothetic vowel produced by the participants in the present study. Note, however, that Rauber's (2006) study does not investigate /s/-clusters, but it is one of the few studies to bring phonetic information about the high-front vowels in English and BP.

[21] Detailed information about the F1 and F2 values found for each token can be found in Appendix J.

Table 14

F1 and F2 values for the high-front vowels of the present study and Rauber's (2006) study results for F1 and F2 values for the high-front vowels of English /i/ and /ɪ/ and BP /i/.

		Present study results[a]		**Rauber (2006) results**					
		Inserted Vowel		English /i/		English /I/		BP /i/	
		F1	F2	F1	F2	F1	F2	F1	F2
Female	Mean:	374	2276	308	2766	501	2121	298	2710
	Median:	385	2298	306	2753	518	2110	286	2694
	SD:	49	240	35	117	55	95	41	192
Male	Mean:	321	1872	280	2331	412	1884	292	2212
	Median:	321	1944	276	2343	423	1931	293	2199
	SD:	45	292	22	152	43	172	23	130

[a] male =48 tokens; female = 38 tokens

Rauber (2006) has shown the differences in terms of F1 and F2 values for /i/ and /ɪ/ in English, as produced by American monolinguals[22], and also F1 and F2 values for BP /i/, as produced by BP monolinguals[23]. In the present study, I used these values to check whether the vowel added before the /s/-clusters by the participants of the present study is more similar to the English high-front vowels /i/ and /ɪ/, or to the BP /i/. Table 14 displays the values of F1 and F2 in the present study, in comparison to Rauber's (2006). The mean of F1 value for the prothetic vowel produced by female participants in the present study was 374 (median = 385, sd = 49), reaching a closer value to English (mean = 308) and BP /i/ (mean = 298). The same happened to the male participants' results, as the mean and median were 321 (sd = 45), which is close to the F1 value for the English /i/ (mean = 280), and the BP /i/ (mean = 292). Turning to the F2, the value for the prothetic vowel produced by female participants in the present study was 2276 (median = 2298, sd = 240). Regarding the F2 values produced by male participants of the study, the mean was 1872 (median = 1944, sd = 292). These F2 values seem to be closer to the F2 values of the English vowel /ɪ/ (mean for female = 2121; mean for male = 1884).

Given that F1 is related to tongue height and F2 to tongue retraction (Yavas, 2011), we can say that the prothetic vowel produced by the participants presents tongue height similar to English and BP /i/, but is produced with the tongue more retracted, as it would be the case for an English /ɪ/. Thus, the prothetic vowel seems to be of a hybrid nature, which is something expected in the case of interphonology (Tully, 2007).

Thereby, based on these values, we can conclude that Brazilians have a tendency to add a vowel similar to /i/ or /ɪ/ before the /s/-clusters. It would be interesting to compare these results with acoustic information from the high-front vowel in BP words such as '*escola*', or English words such as 'escape' in order to better understand the acoustic nature of the prothetic vowel produced by BP learners of English.

Thus, the fourth research question, which was related to the acoustic nature of the prothetic vowel produced by Brazilians before /s/-clusters was answered and the results suggest that a high-front vowel containing F1 values similar to /i/ and F2 values similar to /ɪ/ was the sound participants inserted before the English /s/-clusters. Since this question aimed at understanding the acoustic nature of the prothetic vowel, it was merely explanatory, and no formal hypothesis was stated. However, the results point out to importance of investigating this issue further. Now, let's turn to a qualitative analysis of the participants' questionnaire answers regarding their view on the Phonetics and Phonology classes they attended.

[22] "All the American English monolinguals were born and/or had lived most of their lives in the city of Sacramento, California" (Rauber, 2006, p. 103)

[23] "BP monolinguals (6 women and 6 men) were from different Brazilian states: Rio Grande do Sul, Santa Catarina and Paraná" (Rauber, 2006, p. 94)

4.5 Participants' opinions about the Phonetics and Phonology classes

Regarding the participants' answers in the questionnaire and the information from the syllabuses of the Phonetics and Phonology course at UNEB (Appendix A), we can see that /s/-clusters were not practiced in class. The courses, possibly following textbook sequence, only provided instruction on clusters with /w/, /r/ and clusters with /l/. This fact may have contributed to the high percentage of prothesis found in the data set of the present study.

Perhaps, if the participant had received some formal instruction on how to produce /s/-clusters, together with massive exposure to the language, extensive practice and immediate feedback, they could have produced these clusters in a more target-like fashion (Bettoni-Techio, 2008; Nobre-Oliveira, 2007).

An important point to be discussed, taking into account the participants' answers is the willingness to learn about pronunciation they all demonstrated to have, once they were being prepared to be English teachers. They judged important for a future teacher to be aware of the phonological properties of the English language and learn them accurately, in order to teach appropriately.

Furthermore, two participants out of seven suggested that the Phonetis and Phonology course should not be taught during three semesters only, but, throughout the whole Letras Program – parallel to the eight semesters, since there is a lot of information to be learned, which could not be possible in three semesters. Thus, these participants suggested a wider amount of hours destined to the Phonetics and Phonology study, practice and training.

4.6 Summary of the chapter

This chapter showed the results for all the research questions of the present study. RQ1 revealed that the preceding phonological environment does affect the production of /s/-clusters by future EFL teachers at UNEB. In fact, the results indicated that the vocalic context was found to be the most difficult context, which leads learners to add a vowel before the /s/-cluster words, confirming previous studies (Bettoni-Techio, 2008; Cornelian, 2003; Rauber, 2004).

RQ2 examined the effect of type of cluster on the production of /s/-clusters, namely, whether three-member clusters would lead to higher frequencies of prothetic vowels than two-member clusters. The results reported in section 4.2 demonstrate no significant effect for type of cluster, although three-member clusters presented higher rates of prothesis, which was also found by Carlisle's (1991, 1992, 1997, 1998, 2006), Rauber's (2004) and Rebello's (1997) studies.

The results for RQ3 demonstrated that task type also influences the production of /s/-clusters, as there was higher rates of vowel addition in the Sentence-Reading Test than in the Image-Description Test, confirming Silveira's (2012) prediction that the presence of orthographic information in a test may lead to higher rates of L1 transfer.

RQ4, which turned the attention to the acoustic nature of the prothetic vowel, showed that the future EFL teachers at UNEB inserted a vowel before the /s/-clusters of the target words with hybrid acoustic features, which makes this vowel have F1 values similar to English and BP high-front vowel /i/, but F2 values similar to the English /ɪ/. These results are preliminary, and further studies should investigate the acoustic nature of the prothetic vowel, as well as its duration, which was not analyzed in the present study.

Finally, the analysis of the questionnaire showed that the participants had not received explicit instruction on /s/-clusters, but that, overall, they were willing to learn more about English pronunciation. The results of the present study were described and discussed in the present chapter. The next chapter aims at presenting the conclusions.

CHAPTER FIVE
CONCLUSION

The present chapter aims at summarizing the results already presented throughout the prior chapter, discussing the pedagogical implications that emerged from the findings and showing the limitations of this research, in order to suggest and contribute to future L2 speech studies, especially those concerned with the investigation of /s/-clusters.

5.1 Restatement of the purpose and overall results

The main purpose of the present study was to investigate the production of word-initial /s/-clusters by Brazilian EFL future teachers in Bahia. Throughout the work, many important issues could be discussed, in order to check whether the participants inserted a prothetic vowel before the /s/-clusters. Thus, taking into account that RQ1 and RQ2 intended to unveil how the preceding phonological context and type of cluster affect the production of word-initial /s/-clusters, the first hypothesis stated that the participants' production would show a higher rate of prothesis after the vocalic environment than a consonantal environment, supporting previous studies (Bettoni-Techio, 2008; Cornelian, 2003, 2010; Rauber, 2004). Additionally, the second hypothesis stated that the three-member cluster would yield more prothesis than the two-member cluster, as Carlisle (1991, 1992, 1997, 1998, 2006), Rauber (2002), and Rebello (1997) claim. The results showed that there was addition of a prothetic vowel before the tokens in many cases, especially when the preceding context was a vowel, followed by silence and consonant, which answered the second research question and confirmed the respective hypothesis.

RQ3 aimed at determining how task-type affects the production of /s/-clusters. Its hypothesis stated that the individuals would present higher rates of prothetic vowel in the Sentence-Reading Test than in the Image-Description Test, since in the latter there is no interference of orthography, which leads learners to transfer patterns of sound-spelling between both languages (L1 and L2) as Bettoni-Techio (2008), Silveira (2012) and Tarone (1985) claim. RQ3 was answered and H3a confirmed too, as the Sentence-Reading Test presented higher rates of prothesis than the Image-Description Test. Furthermore, the study examined the acoustic nature of the prothetic vowel produced by the participants and found that it is of hybrid nature, with acoustic features of the high front vowels /i/ and /ɪ/. Finally, the questionnaire used in the study also showed that the participants are willing to learn more about English phonetics and phonology in order to improve their pronunciation and their performance as language teachers.

5.2 Pedagogical Implications

All of the findings of the present research confirmed a tendency Brazilians have to add a vowel before the /s/-clusters, in order to structure syllables with /s/-clusters (Cornelian, 2003, 2010; Rauber, 2002, 2004). In other words, the results for each research question and hypothesis showed how the degree of mispronunciation can be high when it comes to the production of /s/-clusters in English words.

Taking this characteristic into consideration, RQ1 and its hypotheses (H1a and Hypothesis 1b) demonstrated that phonological context could affect production. Once vocalic context was found to be the most problematic environment, instruction and practice in the L2 classroom might be a strategy to improve a learner's production, since the more accurately a sound is perceived, the more likely it will be produced in a target-like fashion (Delatorre, 2007; Flege, 1995). If learners do not have the accurate perceptual "targets", which guide the sensorimotor learning of L2 sounds, many learners' errors can come from the lack of this perceptual basis (Flege, 1995).

Regarding type of cluster, the results showed that participants had slightly more difficulty in producing three-member clusters than two-member ones. The MDH proposed by Eckman (1977; 2009) claims learners have some difficulties when it comes to produce some structures that are very

different from their L1, and which are more marked, that is, less frequent in the world's languages which is the case of three-member /s/-clusters. As Carlisle (1991, 1992, 1997, 1998, 2006), Rauber (2002, 2004), Rebello (1997) and now the present study showed, Brazilians tend to modify three-member clusters very often; even more than two-member clusters. Thus, some instruction could be given in classroom, possibly beginning with the easiest clusters (two-member ones) and moving on to the three-member ones.

Additionally, it is possible to see that task type plays a special role in a learner's production, since the results for RQ3 and its hypothesis revealed that the Sentence-Reading Test caused a higher rate of prothesis than the Image-Description Test. As suggested by Bettoni-Techio, (2008), Silveira (2012), and Tarone (1985), when completing an Image-Description Test, test-takers do not have the interference of the orthography which is likely to lead them to transfer L1 sound-spelling patterns into the L2. Considering the results, as Rauber et al. (2005) and Watkins (2010) pointed out, activities stressing perception and production should be designed and employed, in order to raise learner's awareness of the English-Brazilian Portuguese phonological differences. Furthermore, pronunciation activities should go beyond the reading of isolated words and sentences, and include more informal tasks that to not provide learners with written information, as this could diminish the chances of having learners rely on L1 sound-spelling correspondence information while producing L2 speech.

5.3 Limitations of the study and suggestions for further research

There are limitations in this study, which were not covered by the researcher. I shall now highlight some of them, in order to inspire future pieces of research in the field.

First of all, it is important to have a larger amount of individuals, so that the trends identified in the present study can be confirmed and better understood. Thus, when investigating /s/-clusters, further research could work with more participants, which will contribute to the studies conducted so far and will allow us to have other important variables to be taken into account, such as dialect.

Furthermore, as type of cluster was another important topic to analyze and discuss, further research could address focus on a broader spectrum of clusters, since this study worked with only four types of clusters. Moreover, as two types of task were used, another suggestion for further research is in relation to the variety of tasks; that is, different types of tasks can be designed and administered – not only related to reading of sentences and/or description of images, but with a wider range of speech styles, such as Text-Reading tasks.

Still regarding the tests used – specifically the Image-Description Test, the researcher decided to use thirteen tokens only, as already described and explained in Chapter 3. Thus, it would be helpful if other studies could use more images, control better the role of word frequency/familiarity, and make sure the images really elicit the target words.

Furthermore, as the study shows that the prothetic vowel produced by the BP participants has a hybrid nature, future studies should investigate in detail the acoustic characteristics of the prothetic vowel as a means to understand how L2 phonology develops throughout time, and across different proficiency levels. For example, it would be interesting to find out whether the prothetic vowel that the BP learners produce for words such as 'sky' are similar to the reduced vowel they are expected to produce in words such as 'escape'. Should these vowels present different acoustic features, we could speculate that BP learners somehow perceive the difference between the /i/ and /ɪ/ syllabic patterns, but still acquiring the former one. This type of information is important to enable educators to prepare materials and activities to provide massive training in classrooms (Bettoni-Techio, 2008; Rauber et al., 2005; Rauber et al., 2010).

REFERENCES

Allan, D. (2004). *Oxford Placement test 1*. Oxford: Oxford University Press.

Albini, A. B., & Kluge, D. C. (2010). O Desafio da Pronúncia na Formação de Professores de Inglês. *Anais do IX Encontro do CELSUL, p.1-9*. Universidade do Sul de Santa Catarina.

Baptista, B., & DaSilva Filho, J. (1997). The influence of markedness and syllable contact on the production of English final consonants by EFL learners. In: J. Leather & A. James (eds.), *New Sounds 97: Proceedings of the Third International Symposium on the Acquisition of Second Language Speech* (pp. 26-34). Klagenfurt: University of Klagenfurt.

Beddor, P. S., Harnsberger, J. D., & Lindeman, S. (2002). Language-specific patterns of vowel-to-vowel coarticulation: Acoustic Structures and their perceptual correlates. *Journal of Phonetics*, 30 (pp. 591-627).

Bettoni-Techio, M. (2005). Production of final alveolar stops in Brazilian Portuguese/English interphonology. Dissertação de mestrado não publicada. Universidade Federal de Santa Catarina.

Bettoni-Techio, M. (2008). Perceptual Training and Word-initial /s/-clusters in Brazilian Portuguese/English Interphonology. Dissertação de doutorado não publicada. Universidade Federal de Santa Catarina.

Bettoni, M., & Koerich, R. D. (2008) Preceding phonological context effects on palatalization in Brazilian Portuguese/English interphonology. *Ilha do Desterro (UFSC), v. 55*, (pp. 1-2).

Bettoni, M., & Koerich, R. D (2009). Perceptual Training in the production of /s/-clusters in Brazilian Portuguese/English interphonology. In: M. A. Watkins; A. S. Rauber; B. O. Baptista. (Org.). *Recent Research in Second Language Phonetics/Phonology: Perception and Production. (pp. 154-173).* London: Cambridge Scholars Publishing.

Bettoni, M., & Kluge, D. C. (2014). Encontros consonantais do inglês iniciados por /s/ - efeitos de um treinamento perceptual. In Brawerman-Albini, A. & Gomes, M. L. C. (Orgs.) In: *O jeitinho brasileiro de falar inglês. Pesquisas sobre a pronúncia do inglês por falantes brasileiros* (pp. 105-125). Campinas, SP: Pontes Editores.

Biber, D.; Nekrasova, T., & Horn, B. (2011). *The Effectiveness of Feedback for L1-English and L2-Writing Development: A Meta-Analysis*. Northern Arizona University.

Bion, R. A. H, Escudero, P., Rauber, A.S., & Baptista, B. (2006). Category formation and the role of spectral quality in the perception and production of English front vowels. *Proceedings of Inter speech (p. 1363-1366)*. Pittsburgh, Estados Unidos.

Birdsong, D. (2006) Age and Second Language Acquisition and Processing: A Selective Overview. In *Language Learning*, v 56 (pp. 9-49).

Boersma, P., & Weenink, D. (2012). *PRAAT: doing phonetics by computer* (Version 5.3.32) (Computer program), retrieved 01 November 2012, from http://www.praat.org.

Bongaerts, T. (2005). Introduction: Ultimate attainment and the critical period hypothesis for second language acquisition. IRAL, v 43 (pp. 259-267).

Bonilha, G. F. G., & Vinhas, L. I. (2005). Aquisição de onsets complexos: militância da hierarquia de restrições da língua materna. *Revista Virtual de Estudos da Linguagem – ReVEL*. Ano 3, n. 5. [www.revelhp.cjb.net].

Broselow, E. (1992). Transfer and universals in second language epenthesis. In *Language Transfer in Language Learning*, ed. S. Gass and L. Selinker. Philadelphia: Benjamins.

Cardoso, W. (2008). The Development of sC Onset Clusters in Interlanguage: Markedness vs. Frequency Effects. Concordia University and the Centre for the Study of Learning and Performance. *Proceedings of the 9th Generative Approaches to Second Language Acquisition Conference (GASLA 2007), ed. Roumyana Slabakova et al., 15-29*. Somerville, MA: Cascadilla Proceedings Project.

Carlisle, R. S. (1991). The influence of environment on vowel epenthesis in Spanish/English interphonology. *Applied Linguistics, 12*(1), (pp. 76-95).

Carlisle, R. S. (1992). Environment and markedness as interacting constraints on vowel epenthesis. In J. Leather & A. James (Eds.), *New Sounds 92: Proceedings of the 1992 Amsterdam Symposium on the Acquisition of Second-language Speech* (pp. 64-75). Amsterdam: University of Amsterdam.

Carlisle, R. S. (1994). Markedness and Environment as Internal Constraints on the Variability of Interlanguage Phonology. In M. Yavas (Ed.), *First and second language phonology* (pp. 223-249). San Diego: Singular.

Carlisle, R. S. (1997). The modification of onsets in a markedness relationship: Testing the interlaguage structural conformity hypothesis. *Language learning, 47* (2), (pp. 327-361).

Carlisle, R. S. (1998). The acquisition of onsets in a markedness relationship: a longitudinal study. *Studies in Second Language Acquisition*, 20 (pp. 245-260).

Carlisle, R. S. (2006). Production of English /s/-clusters by speakers of Brazilian Portuguese and Argentinean Spanish. In: Baptista, B.O.; Watkins, W. (ed.). *English with a Latin beat*. Amsterdam: John Benjamins Publishing (pp. 155-167).

Carroll, S., Swain, M. (1993). Explicit and implicit negative feedback: An empirical study of the learning of linguistic generalizations. In *Studies in Second Language Acquisition, 15, 357-386.*

Cornelian, D. (2003). Brazilian Learners' Production of Initial /s/ Clusters: Phonological Structure and Environment. Tese de mestrado não publicada. Universidade Federal de Santa Catarina.

Cornelian, D. (2010). Variables affecting Brazilian learners' production of initial /s/ clusters. In: Watkins, M. A.; Silveira, R.; Koerich, R. D. (Orgs.), (2010). *The Acquisition of Second Language Speech: Studies in Honor of Professor Barbara O. Baptista*, (pp. 267-279). Florianópolis: Insular.

Cristófaro-Silva, T. (2002). On Branching Onsets in Brazilian Portuguese. Revista de Estudos da Linguagem, Belo Horizonte.

Davies, M. (2015, December). *The Wikipedia Corpus: 4.6 million articles, 1.9 billion words*. Adapted from Wikipedia. Available online at http://corpus.byu.edu/wiki/.

Derwing, T. M., & Munro, M. J. (2005). Second language accent and pronunciation teaching: a research-based approach. *TESOL Quarterly*. *39*(3), pp. 379-397.

Derwing, T. M., & Munro, M. J. (2009). Putting accent in its place: Rethinking obstacles to communication. *Language teaching*. *42*:4, 476-490. Cambridge University Press.

Delatorre, F. (2007). EFL teacher's education and the importance devoted to pronunciation in Brazil. In.: Abrahão, M. H. V.; GIL, G.; Rauber, A. S. (Orgs.) 56 *Anais do I Congresso Latino-*

Americano sobre Formação de Professores de Línguas. Universidade Federal de Santa Catarina.

Dickerson, L. (1974). Internal and External Patterning of Phonological Variability in the Speech of Japanese Learners of English. 1975. Tese (Doutorado). University of Illinois, Urbana.

Doughty, Catherine & Long, Michael (Eds), (2008). The Handbook of Second Language Acquisition, chapter I, (pp. 3-16). Blackwell Publishing.

Eckman, F. R. (1977). Markedness and the contrastive analysis hypothesis. *Language Learning* 27: 315-30.

Eckman, F. R. (1985). Some theoretical pedagogical implications of the markedness differential hypothesis. In *Studies in Second Language Acquisition 13: 23-41*.

Eckman, F. R. (1986). Markedness: An overview. In *Proceedings of the Twelfth Annual Linguistics Symposium of the University of Wisconsin-Milwaukee*.

Eckman, F. R. & Iverson, G. (1994). Pronunciation difficulties in ESL: coda consonants in English interlanguage. In: M. Yavas (ed.), *First and Second Language Phonology* (pp. 251-65). San Diego, CA: Singular Publishing.

Eckman, F., Elreyes, A., Iverson, G. (2003). Some principles of second language phonology. Second Language Research 19 (3): 169-208.

Eckman, F. R. (2009). Typological Markedness and Second Language Phonology. University of Wisconsin-Milwaukee. Cambridge University Press.

Edge, B. A. (1991). The Production of Word-final Obstruents in English by L1 Speakers of Japanese and Cantonese. *Studies in Second Language Acquisition*, 13, 377-393.

Ellis, R. (1994). The study of second language acquisition. Oxford: Oxford University Press.

Enochson, K. (2014). L2 Production of English Onset sC and CC clusters. *Proceedings of the International Symposium on the Acquisition of Second Language Speech Concordia Working Papers in Applied Linguistics*, 5.

Fernandes, P. R. C. (1997). A epêntese na interfonologia português/inglês. Dissertação de Mestrado: Universidade Católica de Pelotas Escola de Educação Curso de Mestrado em Letras: RS.

Flege, J. E. (1989). Chinese subjects' perception of the word-final English /t/-/d/ contrast: performance before and after training. *The Journal of the Acoustical Society of America*, 86, (5), p. 1684-1697.

Flege, J. E. (1995). Second Language Speech Learning Theory, Findings, and Problems. *In Winifred Strange (editor); Speech Perception and Linguistic Experience: Issues in Cross-Language Research.* Timonium, MD: York Press.

Gass, S. & Selinker, L. (2001). Second Language Acquisition: An Introductory Course. Second Edition. Lawrence Erlbaum Associates. Kimberly L. Geeslin, Indiana University.

Graddol, D. (2006). *English Next*. UK: British Council.

Granena, G., Long, M. H. (2013) Age of onset, length of residence, language aptitude, and ultimate L2 attainment in three linguistic domains. In *Second Language Research*. *Journals Permission* (pp. 1-33). Sage Publications.

Hallé, P.; Segui, J.; Frauenfelder, U. H.; Meunier, C. (1998). The processing of illegal consonant clusters: A case of perceptual assimilation? *Journal of Experimental Psychology: human Perception and Performance*, 24 (2), p. 592-608.

Hooper, J. B. (1976). *An introduction to natural generative phonology*. New York: Academic Press.

Jabbari, A. A. (2012). The Adaptation of English Initial Clusters by Persian Learners. *The Journal of Teaching Language Skills (JTLS) 3(4)*

Koerich, R. D. (2006). Perception and Production of vowel paragoge by Brazilian EFL students. In Baptista, B. O.; Watkins, M. A. (Eds.), *English with a Latin Beat: Studies in Portuguese/Spanish – English Interphonology (p. 91-104)*. Amsterdam: John Benjamins.

Krashen, S. D. (1982). Principles and practice in Second Language Acquisition. Pergamon Press Inc. University of Southern California.

Krashen, S. D. (1985). The input hypothesis: Issues and implications. California: Laredo. Publishing Co Inc.

Ladefoged, P. & Maddieson, I. (1996). The sounds of the world´s languages. Cambridge: Blackwell, 1996:215-245.

Ladefoged, P. (2001a). *A Course in Phonetics* (4th edn.). Boston, MA: Heinle & Heinle.

Ladefoged, P. (2001b). *Vowels and Consonants*. Oxford: Blackwell.

Ladefoged, P. (2011). A Course in Phonetics. Wadsworth. Boston, USA.

Larson-Hall, J., & Herrington, R. (2010). Improving data analysis in second language acquisition by utilizing modern developments in applied statistics. *Applied Linguistics*, 31(3): 368–390.

Lenneberg, E. H. (1967). Biological foundations of language. New York: Wiley.

Lindau, M. (1985). The story of /r/, in Victoria Fromkin (org), V. *Phonetic Linguistics: Essays in Honor of Peter Ladefoged* (edited by Victoria Fromkin). New York: Academic Press, 1985, pp.157-168.

Long, M. (2007). Problems in SLA. Lawrence Erlbaum Associates. Mahwah, New Jersey. London.

Maia, E.M. (1985). No reino da fala: a linguagem e seus sons. São Paulo: Ática.

Major, R. (1986). Paragoge and Degree of Foreign Accent in Brazilian English. *Second Language Research*, 2(1), 53-72.

Major, R. C. (1994). Chronological and Stylistic Aspects of Second Language Acquisition of Consonant Clusters. *Language Learning 4k4, December (pp. 655-680).*

Mitchell, R., F, Myles (1998). Second Language Learning Theories. London: Arnold.

Moyer, A. (2004). Age, Accent and Experience in Second Language Acquisition: An Integrated Approach to Critical Period Inquiry. In *Second Language Acquisition 7*. Multilingual Matters LTD.

Munro, M. J. (2008). Foreign accent and speech intelligibility. In Hansen Edwards, J. G. & Zampini, M. L. (Eds.). *Phonology and Second Language Acquisition* (pp. 193-218). Amsterdam: John Benjamins.

Nikolov, M; Djigunovic, J. M. (2006). Recent Research on age, Second Language acquisition, and early Foreign Language Learning. *Annual Review of Applied Linguistics, v. 46 (pp. 234-260)*.

Nobre-Oliveira, D. (2007). The effect of perceptual training on the learning of English vowels by Brazilian Portuguese speakers. Unpublished doctoral dissertation. Florianópolis: Universidade Federal de Santa Catarina.

Ortega, L. (2009). Understanding Second Language Acquisition. *Understanding Language Series*. Hodder Education. London. UK.

Oxford, R. L. (2003). Language Learning Styles and Strategies: An overview. *Learning Styles & Strategies*. Oxford, Gala.

Parrino, A. (1998). The politics of pronunciation and the adult learner. Adult ESL: Politics, Pedagogy and Participation in Classroom and Community Programs (pp. 171-184).

Penfield, W. & Roberts, L. (1959). Speech and Brain Mechanisms. Princeton, NJ: Princeton University Press.

Rauber, A. S. (2002). *The Production of English Initial /s/ Clusters by Portuguese and Spanish EFL Speakers*. Unpublished master thesis. Florianópolis: Universidade Federal de Santa Catarina.

Rauber, A. S. (2004). The production of English initial /s/ clusters by Portuguese and Spanish EFL speakers. In *Rev. Est. Ling., Belo Horizonte, v. 12, n. 2, p. 459-473*.

Rauber, A. S., Escudero, P., Bion, R. A. H., & Baptista, B. O. (2005). The interrelation between the perception and production of English vowels by native speakers of Brazilian Portuguese. Paper presented at the *EUROSPEECH-INTERSPEECH 2005 9th European Conference on Speech Communication and Technology*, Lisbon.

Rauber, A. S. (2006). Production of English initial /s/-clusters by speakers of Brazilian Portuguese and Argentine Spanish. In B. O. Baptista & M. A. Watkins. *English with a Latin Beat: Studies in Portuguese/Spanish – English Interphonology (p. 155-167)*. Amsterdam: John Benjamins.

Rauber, A. S.; Watkins, M. A.; Silveira, R.; Koerich, R. D. (Orgs.), (2010). *The Acquisition of Second Language Speech: Studies in Honor of Professor Barbara O. Baptista.* Florianópolis: Insular.

Rebello, J. T. (1997a). The Acquisition of English Initial /s/ clusters by Brazilian EFL learners. In J. Leather, & A. James (Eds.), *New Sounds 97: Proceedings of the Third International Symposium on the Acquisition of Second-Language Speech* (pp. 336-342). Klagenfurt, Austria: University of Austria.

Rebello, J. T. (1997b). The Acquisition of English Initial /s/ clusters by Brazilian EFL learners. Unpublished master's thesis. Florianópolis: Universidade Federal de Santa Catarina.

Rebello, J. T. & Baptista, B. O. (2006) The influence of voicing on the production initial /s/-clusters by Brazilian learners. In B. O. Baptista & M. A. Watkins. *English with a Latin Beat: Studies in Portuguese/Spanish – English Interphonology (p. 139-154)*. Amsterdam: John Benjamins.

Russel, J. and Spada, N. (2006). The effectiveness of corrective feedback for the acquisition of L2 grammar. In. *Synthesizing Research on Language Learning and Teaching*. John Benjamins. Chap. 4 (pp. 133–164).

Sebastián-Galles, N. (2005). Cross-Language Speech Perception. In: PISONI, D. B.; REMEZ, R. E. (Ed.). *Handbook of Speech Perception*. Blackwell Publishers, p. 546-566.

Silveira, R. (2002). Pronunciation instruction classroom practice and empirical research. Universidade Federal de Santa Catarina, Florianópolis.

Silveira, R. (2002). Perception and production of English initial /s/ clusters by Brazilian learners. *Rev. bras. linguist. apl.* [online], vol.2, n.1, (pp. 1-21). ISSN 1984-6398.

Silveira, R. (2004). *The influence of pronunciation instruction on the perception and production of English word-final consonants*. Unpublished doctoral dissertation. Universidade Federal de Santa Catarina, Florianópolis, Brazil.

Silveira, R. (2012). PL2 Production of English Word-Final Consonants: The Role of Orthography and Learner Profile Variables. Universidade Federal de Santa Catarina, Florianópolis.

Singleton, D. M.; Ryan, L. (2004). Language acquisition: the age factor. *Multilingual Matters*.

Singleton, D. M. (2005). The Critical Period hypothesis: A coat of many colours. *International Review of Applied Linguistics, v. 43, (pp. 269-286)*.

Schmidt, R. (1990). The Role of Consciousness in Second Language Learning. *Applied Linguistics*, n. 11, (pp. 129-158).

Shibuya, Y. & Erickson, D. (2010). Consonant cluster production in Japanese learners of English. *Proceedings of Interspeech*. Japan.

Swain, M. (1995). Three functions of output in second language acquisition. Cook, B. Seidlhofer (Eds.), *Principle & practice in applied linguistics: Studies in honor of H. G. Widdowson*, (pp. 125-144). Oxford: Oxford University Press.

Swain, M. (2005). The output hypothesis: theory and research. In. E. Hinkel (Ed.), *Handbook of Research in second Language Teaching and Learning*. Mahwah: Lawrence Eblhaum, (pp. 471-483).

Tarone, E. (1985). Variability in Interlanguage Use: A Study of Style-Shifting in Morphology and Syntax. Language Learning 35, (pp. 373-403).

Tully, B. (2007). Acoustic and phonological learning: Two different dynamics? *Mathematics and Social Sciences*, 180(4), (pp. 127-139).

VanPatten, B. & Williams, J. (Eds), (2007). Theories in Second Language Acquisition. An introduction. Lawrence Erlbaum Associated. Mahwah, New Jersey.

White, L. (1989). Linguistic Theory, Universal Grammar, and Second Language Acquisition. John Benjamins Publishing Company.

Yavas, M. (2011). Applied English Phonology. 2nd Ed. Wiley-Blackwell. New Jersey: EUA.

Young-Scholten, M. & Archibald, J. (2000). Second Language Syllable Structure. Archibald , J. (ed.) *Second Language Acquisition and Linguistic Theory*. Oxford: Blackwell, p. 64-97.

Zimmer, M. C. (2004). A Transferência do Conhecimento Fonético-fonológico do Português Brasileiro (L1) para o Inglês (L2) na Recodificação Leitora: Uma Abordagem Conexionista. Unpublished dissertation. Florianópolis: Universidade Federal de Santa Catarina.

Zuengler, J. (1985) Phonological aspects of input in NS–NNS interactions. In S. Gass and C. Madden (eds) *Input in Second Language Acquisition* (pp. 197–213). Cambridge, MA: Newbury House.

Zuengler, J. (1988) Identity markers and L2 pronunciation. *Studies in Second Language Acquisition* 10, 33–49.

APPENDICES

Appendix A – Phonetics and Phonology syllabuses at UNEB

UNIVERSIDADE DO ESTADO DA BAHIA
Sagres Diário
PLANO DE CURSO
segunda-feira, 4 de maio de 2015

Docente: JULIANE REGINA TREVISOL

DCH - CAMPUS IV Sem.: 20131
Campus: CAMPUS IV

Curso: 412 - LICENCIATURA EM LETRAS, LÍNGUA INGLESA E LITERATURAS

Código	Componente Curricular	Créditos	Horas
LE0064	ESTUDOS FONÉTICOS E FONOLÓGICOS I	0	30

PRÉ-REQUISITOS		
Curso	**Currículo**	**Componente Curricular**
PRÉ-REQUISITO PARA		
Curso	**Currículo**	**Componente Curricular**

Ementa do Componente Curricular

Estuda aspectos fonéticos e fonológicos da LE em nível introdutório. Aborda conceitos básicos da fonética e da fonologia. Analisa os sistemas vocálico e consonantal e os padrões entonacionais da LE.

Recursos

Objetivo

- Conhecer os problemas de pronúncia mais comuns dos aprendizes brasileiros de inglês;
- Conhecer os conceitos de fonética e fonologia, o funcionamento do trato vocal e questões de articulação dos sons da língua inglesa; - Conhecer o sistema sonoro do inglês, especificamente as vogais;
- Aperfeiçoar a pronúncia da língua inglesa através de atividades práticas de percepção e produção oral; - Despertar no discente o interesse pela área através da conscientização da matéria para seu cotidiano.

Conteúdo Programático

Unit 1:
•Basic definition: English phonetics and phonology
•Common pronunciation mistakes of Brazilian EFL learners

•Pronouncing the
vowels of
American English
•[i] as in me, tea,
and bee and [I] as
in it and pi n
Unit 2:
•[æ] as in hat, fat and happy
•[a] as in hot, arm and father
•[u] as in you, too
and [?] as in cook
and put Unit 3:
•[ʌ] as in up, but and come
•[ɔ] as
in all,
caugt,
and
boss
•[ə]
as in
a,
upon
and
soda

UNIVERSIDADE DO ESTADO DA BAHIA
Sagres Diário

PLANO DE CURSO
segunda-feira, 4 de maio de 2015

Metodologia

•Aulas práticas e expositivas com foco no treinamento de pronúncia em língua inglesa;
•Uso do laboratório de línguas e recursos interativos (áudio, internet) para o desenvolvimento das aulas;
•Atividades de percepção e produção de sons em sala, com participação ativa dos discentes;
•Atividades extra-classe.
- Faz necessária a leitura prévia à aula do material didático, além de prática fora de sala de aula das atividades realizadas (e atividades extra) para um melhor aproveitamento do curso.
- Importante: As aulas são ministradas em língua inglesa.

Avaliação

Serão três atividades avaliativas durante o semestre (valor: 10 pontos cada). As atividades avaliativas serão de ordem prática: atividades de percepção e produção da língua inglesa. Adicionalmente, outras atividades poderão serão solicitadas (resumos, seminários em grupo, dentre outros) com fins avaliativos, dependendo do andamento dos encontros e das necessidades do grupo. A média semestral será igual à média aritmética simples de três avaliações parciais.

Referência Básica

AVERY, P. & EHRLICH, S. Teaching American English pronunciation. New York: Oxford University Press, 1992.
CELCE-MURCIA M., BRINTON, D. & GOODWIN, J. Teaching pronunciation: A reference for teachers of English to speakers of other languages. New York: Cambridge University Press, 1996.
CHOMSKY, N. e HALLE, M. The sound pattern of English. Harper & Row, New York, 1968.
GILBERT, Judy B. Clear speech from the start. Cambridge: Cambridge University Press, 2001.
GRANT, L. Well said (book and tape). Boston: Heinle & Heinle, 2000.
HANCOCK, M. Pronunciation games. New York: Cambridge University Press, 1998.
HENRICHSEN, L. E., GREEN, B. A., NISHITANI, A. & BAGLEY, C. L. Pronunciation matters: Communicative, story-based activities for mastering the sounds of North American English. Ann Arbor, MI: University of Michigan Press, 1998.
KELLY, Gerald. How to teach pronunciation. Essex: Longman, 2000.
LAROY, C. Pronunciation. New York: Oxford University Press, 1996.
MORLEY, J. (ed.). Pronunciation pedagogy and theory: New views, new directions. Alexandria, VA: TESOL, 1994.
NILSEN, D. & NILSEN, A. Pronunciation contrasts in English. New York: Pearson ESL, 1987.
ROACH, P. & HARTMAN, J. (eds.). English pronouncing dictionary. 15ª. ed. New York: Cambridge University Press, 1998.

Referência Complementar

CELCE-MURCIA, M., BRINTON, D. M., GOODWIN, J. M. Teaching pronunciation: a course book and reference guide. 2nd ed. Cambridge:
Cambridge University Press, 2011.
DALE, P., POMS, L. English pronunciation made simple. New York: Longman, Pearson Education, 2005.
GIEGERICH, H. English phonology: an introduction. Cambridge: Cambridge University Press, 1992.
HANCOCK, M. English pronunciation in use: self-study and classroom use. Cambridge: Cambridge University Press, 2003.
LADEFOGED, P. A course in phonetics. 4th ed. Fort Worth: Harcourt College, 2001.
ROACH, P. English phonetics and phonology: a practical course. 2nd ed. Cambridge: Cambridge University Press, 1991.

UNIVERSIDADE DO ESTADO DA BAHIA
Sagres Diário

PLANO DE CURSO
segunda-feira, 4 de maio de 2015

Docente: ARNON ALVES ROCHA

DCH - CAMPUS IV Sem.: 20132
Campus: CAMPUS IV

Curso: 412 - LICENCIATURA EM LETRAS, LÍNGUA INGLESA E LITERATURAS

Código	Componente Curricular	Créditos	Horas
LE0120	ESTUDOS FONÉTICOS E FONOLÓGICOS II	0	30

PRÉ-REQUISITOS		
Curso	**Currículo**	**Componente Curricular**

PRÉ-REQUISITO PARA		
Curso	**Currículo**	**Componente Curricular**

Ementa do Componente Curricular

Estuda aspectos fonéticos e fonológicos da LE em nível pré-intermediário.

Recursos

Objetivo

1 – Praticar a Pronúncia através da compreensão e produção oral.
2 – identificar os fonemas da língua inglesa: consoantes, vogais e ditongos.
3 – Diferenciar os sons da língua inglesa: consoante, vogais e ditongos.
4 - Reconhecer e utilizar os símbolos fonéticos adequados, tanto na escrita quanto na fala.
5 – Transcrever foneticamente as palavras
6 – Identificar os fonemas em exercícios de compreensão da linguagem oral.

UNIVERSIDADE DO ESTADO DA BAHIA
Sagres Diário
PLANO DE CURSO
segunda-feira, 4 de maio de 2015

Conteúdo Programático

1 ª unidade
- 23.08.13 - Vowels review.
-The contrast of /i:/ and /I/.
- vowels /ey/ and /e/The contrast /ae/ and /e/The vowels /a/ and /e The contrast /ae/ and /a/. - Vowels followed by /r/ The vowel /o/
- The contrast /ow/ and /o/
- The sound of /wu/
- Some pieces of reading with the vowels sounds more emphatically.

- 30.08.13 - Consonants sounds. Voiced and voiceless consonants theories.
- 06.09.13 – Past tense endings.
- 13.09.13 - The consonants /p/, /b/, /f/, /v/, and /w/.
- 20.09.13 – Evaluation (individual written exam).

2 ª unidade
- 27.09.13 - Clusters with /w/
- 04.10.13 - The consonants /s/, /z/, / /
- 11.10.13 - Sibilant endings: plurals, possessives, present, and contractions - 18.10.13 - The consonant /r/. Cluster with /r/ - 25.10.13 – Evaluation (individual written exam).

3 ª unidade
- 01.11.13 - The contrast of /r/ with /l/ and /w/
- 08.11.13 - Beginning /l/
- 22.11.13 - Cluster with /l/. The contrast /l/ and /r/ - 29.11.13 - Final /l/ The consonant /h/.
- 06.12.13 – Evaluation (individual and written exam).

Metodologia

• Aulas práticas e expositivas com foco no treinamento de pronúncia em língua inglesa;
•Uso do laboratório de línguas e recursos interativos (áudio, internet) para o desenvolvimento das aulas;
•Atividades de percepção e produção de sons em sala, com participação ativa dos discentes;
•Atividades extra-classe.
? Faz necessária a leitura prévia à aula do material didático, além de prática fora de sala de aula das atividades realizadas (e atividades extra) para um melhor aproveitamento do curso.
? Importante: As aulas são ministradas em língua inglesa.

Avaliação

1 – Participação das práticas fonológicas no decorrer das aulas
2 – Atividades individuais e em grupo
3 – Prova escrita individual em cada unidade

Referência Básica

AVERY, P. & EHRLICH, S. Teaching American English pronunciation. New York: Oxford University Press, 1992.
CELCE-MURCIA, M., BRINTON, D. & GOODWIN, J. Teaching pronunciation: A reference for teachers of English to speakers of other languages.
New York: Cambridge University Press, 1996.
GILBERT, Judy B. Clear speech from the start. Cambridge: Cambridge University Press, 2001.
GRANT, L. Well said (book and tape). Boston: Heinle & Heinle, 2000.
HANCOCK, M. Pronunciation games. New York: Cambridge University Press, 1998.
HENRICHSEN, L. E., GREEN, B. A., NISHITANI, A. & BAGLEY, C. L. Pronunciation matters: Communicative, story-based activities for mastering the sounds of North American English. Ann Arbor, MI: University of Michigan Press, 1998.
KELLY, Gerald. How to teach pronunciation. Essex: Longman, 2000.
LAROY, C. Pronunciation. New York: Oxford University Press, 1996.
MORLEY, J. (ED.). Pronunciation pedagogy and theory: New views, new directions. Alexandria, VA: TESOL, 1994.
NILSEN, D. & NILSEN, A. Pronunciation contrasts in English. New York: Pearson ESL, 1987.
ROACH, P. & HARTMAN, J. (eds.). English pronouncing dictionary. 15ª. ed. New York: Cambridge University Press, 1998.

Referência Complementar

UNIVERSIDADE DO ESTADO DA BAHIA
Sagres Diário
PLANO DE CURSO
segunda-feira, 4 de maio de 2015

Docente: JULIANE REGINA TREVISOL

DCH - CAMPUS IV Sem.: 20141
Campus: CAMPUS IV

Curso: 412 - LICENCIATURA EM LETRAS, LÍNGUA INGLESA E LITERATURAS

Código	Componente Curricular	Créditos	Horas
LE0121	ESTUDOS FONÉTICOS E FONOLÓGICOS III	0	30

PRÉ-REQUISITOS		
Curso	**Currículo**	**Componente Curricular**

PRÉ-REQUISITO PARA		
Curso	**Currículo**	**Componente Curricular**

Ementa do Componente Curricular

Estuda aspectos fonéticos e fonológicos da LE em nível intermediário. Aprimora a capacidade de compreender e produzir os padrões rítmicos e entonacionais da LE.

Recursos

Objetivo

•Apresentar, discutir e analisar de modo teórico-pr ático os padrões entonacionais da língua (Word stress, sentence stress, rhythm, intonation); •Possibilitar aumento da autonomia do aprendiz para monitoramento e análise da própria fala na LE.

Conteúdo Programático

•Introducing Stress, Rhythm and Intonation
•Stress within the Word
•Stress within the Sentence
•Rhythm
•Intonation
•Observation of one's own pronunciation: an experiment

Metodologia

•Aulas expositivas e dialogadas com participação ativa dos discentes, com utilização de material impresso, projetor, quadro, laboratório de línguas (uso de softwares, quando necessário, para estudo da fala);
•Indicação de textos para leitura prévia à aula podendo ser solicitada a elaboração de resumos, resenhas, esquemas, fichamentos, etc;
•Atividades avaliativas de percepção e produção de sons, dentre outras, em grupos e individuais; •Projeto de coleta e análise de produção oral ao final do módulo considerando-se os aspectos estudados.

Avaliação

A média semestral será igual à média aritmética simples de três avaliações parciais. Cada avaliação parcial poderá ser composta de Verificação de Aprendizagem (prova escrita e entrega de resumos, artigos, atividades escritas (em sala e extra-classe) e/ou apresentação de seminário.

Referência Básica

AVERY, P. & EHRLICH, S. Teaching American English pronunciation. New York: Oxford University Press, 1992.
CELCE-MURCIA, M., BRINTON, D. & GOODWIN, J. Teaching pronunciation. A reference for teachers of English to speakers of other languages.
New York: Cambridge University Press, 1996.
GILBERT, J. B. Clear speech: pronunciation and listening comprehension in North American English. Cambridge: Cambridge University Press, 1993. GRANT, L. Well said (book and tape). Boston: Heinle & Heinle, 2000.
HANCOCK, M. Pronunciation games. New York: Cambridge University Press, 1998.
HENRICHSEN, L. E., GREEN, B. A., NISHITANI, A. & BAGLEY, C. L. Pronunciation matters: Communicative, story-based activities for mastering the sounds of North American English. Ann Arbor, MI: University of Michigan Press, 1998.
KELLY, Gerald. How to teach pronunciation. Essex: Longman, 2000.
LAROY, C. Pronunciation. New York: Oxford University Press, 1996.
MATOS, F. Gomes de & CINTRA, Geraldo. Predicting the interference of Portuguese Stress Patterns in the Teaching of English to Brazilians.
Estudos Linguísticos 1/1: 28-33, 1966.
MORLEY, J. (ed.). Pronunciation pedagogy and theory: New views, new directions. Alexandria, VA: TESOL, 1994.
NILSEN, D. & NILSEN, A. Pronunciation contrasts in English. New York: Pearson ESL, 1987.
ROACH, P. & HARTMAN, J. (eds.). English pronunciation dictionary. 15ª. ed. New York: Cambridge University Press, 1998.

Referência Complementar

DALE, P., POMS, L. English pronunciation made simple. New York: Longman, Pearson Education, 2005.
HANCOCK, M. English pronunciation in use: self-study and classroom use. Cambridge: Cambridge University Press, 2003.
LADEFOGED, P. A course in phonetics. 4th ed. Fort Worth: Harcourt College, 2001.
ROACH, P. English phonetics and phonology: a practical course. 2nd ed. Cambridge: Cambridge University Press, 1991.

Appendix B – Consent Form

Universidade Federal de Santa Catarina
Centro de Comunicação e Expressão
Programa de Pós-Graduação em Inglês e Literatura correspondente
Pesquisador: Marcos Antônio de Oliveira Santos

TERMO DE CONSENTIMENTO LIVRE E ESCLARECIDO

Você está convidado a participar do projeto de pesquisa *"Produção de /s/ clusters em posição inicial por brasileiros, futuros professores de inglês como LE na Bahia: o papel da proficiência, tarefas específicas e instrução"* que busca estudar características específicas da pronúncia da Língua Inglesa. Este estudo visa contribuir ao ensino de Língua Inglesa, uma vez que os dados coletados podem servir para a elaboração e melhoria de materiais didáticos, adequando-os às necessidades dos alunos brasileiros aprendizes do idioma e, também, contribuindo para o ensino nas áreas de Fonética e Fonologia de modo geral.

Se aceitar participar da pesquisa, você (1) responderá a um questionário, (2) lerá algumas sentenças que serão gravadas (3) será gravado enquanto descreve algumas imagens e (4) responderá a um teste de proficiência. Todos esses dados integrarão o corpus da pesquisa. Esta pesquisa será concluída em fevereiro de 2016 e o estudo tornar-se-á público.

Os riscos ou desconfortos associados à sua participação são mínimos, limitando-se ao possível nervosismo ao efetuar as gravações. Para minimizar essa situação, você poderá optar por fazer pequenas pausas durante o procedimento de coleta. As informações fornecidas e o material coletado serão absolutamente confidenciais e não haverá identificação nominal dos participantes, nem divulgação de quaisquer informações que podem revelar sua identidade. O participante pode, a qualquer momento, deixar de participar da pesquisa, informando o pesquisador de sua decisão, a fim de que ele não utilize mais os dados do desistente. Além do mais, asseguramos que esta pesquisa está submetida aos critérios da Resolução 466/2012 de acordo com o CNS (Conselho Nacional de Saúde) e suas complementares.

A participação nesta pesquisa não acarreta, de forma alguma, em prejuízos ou em privilégios. Se porventura existirem, por mínimas que sejam, qualquer tipo de despesas tidas pelos participantes da pesquisa e dela decorrentes, conforme item IV 3 (g) da Resolução 466/2012 haverá garantia de ressarcimento dos gastos pelo pesquisador responsável, bem como indenização diante de eventuais danos oriundos também da pesquisa. Em caso de quaisquer dúvidas referentes ao seu desenvolvimento, o pesquisador está à disposição para esclarecimentos através dos contatos dispostos abaixo.

Se você estiver de acordo em participar desta pesquisa, assine no espaço abaixo.

Eu, _____, Carteira de Identidade (ou passaporte) número _____, concordo em participar deste estudo e autorizo o pesquisador a utilizar os dados por mim fornecidos.

_____
Assinatura do Participante

_____
Assinatura do Pesquisador

Florianópolis, ____ / ____/ _____
Contato: Marcos Antônio de Oliveira Santos: marcosanttos10@gmail.com ((48) 8470-0945)

Prédio Reitoria II, R: Desembargador Vitor Lima, nº 222, sala 401, Trindade, Florianópolis/SCCEP 88.040-400
e-mail: cep.propesq@contato.ufsc.br
Telefone: + 55 48 3721-6094

Appendix C – Questionnaire

UNIVERSIDADE FEDERAL DE SANTA CATARINA
CENTRO DE COMUNICAÇÃO E EXPRESSÃO
PROGRAMA DE PÓS-GRADUAÇÃO EM LETRAS INGLÊS E LITERATURA
CORRESPONDENTE
DISCENTE: MARCOS ANTONIO DE OLIVEIRA SANTOS (UFSC)
ORIENTADORA: ROSANE SILVEIRA (UFSC/CNPq)

QUESTIONÁRIO SOBRE PARTICIPANTES DE PESQUISA DE CAMPO

Por favor, responda às perguntas abaixo. Este questionário visa somente obter informações que serão utilizadas para direcionar a análise dos dados da pesquisa conduzida pelo aluno acima citado. Em nenhuma hipótese os nomes dos participantes serão divulgados, pois se trata de uma pesquisa quantitativa. Solicito informar nome e telefone somente para, no caso de necessitar alguma informação adicional, poder entrar em contato com você posteriormente.

Nome: _____ e-mail_____
Data_____/_____/2015
1. Idade _____ 2. Sexo: ( ) masculino ( ) feminino

3. Já morou em país de Língua Inglesa? ( ) não ( ) sim

Qual?_____

3.1. Se sim, por quanto tempo? _____
3.2. Quantos anos você tinha? _____

3.3. Qual o motivo de sua viagem?

( ) turismo/passeio;
( ) estudo;
( ) trabalho;
( ) outro: _____

3.4. Neste país, você costumava passar mais tempo com:

( ) falantes nativos de Inglês;
( ) falantes de outras línguas (estrangeiros);
( ) Brasileiros;
( ) em outra comunidade não-brasileira: _____

4. Quantos anos você tinha quando teve seu primeiro contato com o Inglês?

( ) menos de 7;
( ) entre 7 e 10;
( ) entre 10 e 15;
( ) entre 15 e 20;
( ) outra idade: _____

4.1. Você continuou estudando Inglês deste período em diante?

( ) não ( ) sim

4.2. Há quanto tempo estuda Inglês regularmente, ou seja, sem interrupção?

( ) menos de 6 meses;
( ) entre 6 meses e 1 ano;
( ) entre 1 ano e 1 ano e meio ;
( ) entre 1 ano e meio e 2 anos;
( ) entre 2 e 3 anos;
( ) entre 3 e 4 anos;
( ) entre 4 e 5 anos;
( ) entre 5 e 6 anos;
( )
outro:_____

4.2.1. Considerando seu contato com o Inglês, quantos anos de experiência você acredita ter?
_____

4.3. Além das aulas (da UNEB), quanto tempo você aproximadamente gasta estudando Inglês (sozinho, em casa) por semana?

( ) Eu não estudo;
( ) menos de 1 hora;
( ) entre 1 e 2 horas;
( ) entre 2 e 3 horas;
( ) outro:_____

5. Você já fez algum teste de Proficiência?

( ) não ( ) sim
( )Cambridge ( )Trinity
( ) TOEFL ( ) IELTS
( ) Outro_____
Qual foi sua pontuação?_____

6. Você tem o hábito de ouvir música em Inglês? ( ) não ( ) sim

6.1. Você tenta cantar junto com a música? ( ) não ( ) sim

6.2. Quanto tempo você gasta nesta atividade, diariamente?

( ) menos de 1 hora;
( ) mais de 1 hora;
( ) mais de _____ horas;
( ) outro:
_____

7. Você fala outra língua fluentemente, além do Português e do Inglês?

( ) não ( ) sim; Qual?
_____

8. Em casa com sua família, você fala alguma outra língua estrangeira?

( ) não ( ) sim; Qual?

_____

9. De onde você é/vem?

( ) Jacobina ( ) outro

Cidade/estado_____

10. Numere os itens em **negrito** de acordo com o nível de importância que você dá a estes aspectos (você pode repetir o número se necessário):

1- Essencial 2- Importante 3- Indiferente 4- Irrelevante

Comunicação em língua estrangeira: _____ **Gramática: _____**
Pronúncia: _____ Vocabulário: _____

11. Você apresenta algum problema ou dificuldade auditiva?

( ) não; ( ) sim. Se sim, descreva:

_____

12. E algum problema ou dificuldade relacionada à fala?

( ) não; ( ) sim. Se sim, descreva:

_____

13. Se você sente dificuldade em produzir palavras com /s/ clusters em posição inicial, como por exemplo: *spring*, *spider* and *star*, qual seria a razão, segundo sua opinião?

( ) Tenho dificuldade em articular estas palavras;
( ) Eu não faço questão de produzi-las corretamente, não me importo;
( ) É irrelevante;
( ) Outro motivo:

_____

14. Você alguma vez já recebeu instrução formal sobre a pronúncia de palavras (do Inglês) que começam com s e seguem-se com uma sequência de outras consoantes, como por exemplo, *spring* ou *spider*?

( ) não ( ) sim

15. Se não recebeu, gostaria de ter aprendido mais sobre a pronúncia dessas palavras?

( ) não ( ) sim

16. Descreva, com as suas palavras, o que você entende por *clusters*.

_____

_____

17. Você julga importante saber e ter domínio sobre a pronúncia de palavras que se iniciam com s e seguem-se com outras consoantes, como no exemplo da questão 14 deste questionário? Marque a opção e justifique sua resposta.

( ) não ( ) sim

_____
_____

18. Diante dos seus conhecimentos sobre essas diferenças de pronúncia (caso já esteja ciente), você considera suficiente 3 (três) semestres para o estudo dos sons da língua, bem como discussão do porquê de certas estruturas não seguirem a mesma regra para o português? Justifique sua resposta.

_____
_____
_____
_____

Appendix D – Oxford Proficiency Test (OPT)

Oxford University Press and
University of Cambridge Local Examinations Syndicate

Name: ……

Date: ……

Quick Placement Test

Version 2

This test is divided into two parts:

Part One (Questions 1 – 40) – All students.

Part Two (Questions 41 – 60) – Do not start this part unless told to do so by your test supervisor.

Time: 30 minutes

Part 1

Questions 1 – 5

- Where can you see these notices?
- For questions **1** to **5**, mark **one** letter **A**, **B** or **C** on your Answer Sheet.

1

You can look, but don't touch the pictures.

A in an office
B in a cinema
C in a museum

2

Please give the right money to the driver.

A in a bank
B on a bus
C in a cinema

3

NO
PARKING
PLEASE

A in a street
B on a book
C on a table

4

CROSS BRIDGE FOR TRAINS TO EDINBURGH

A in a bank
B in a garage
C in a station

5

KEEP IN A COLD PLACE

A on clothes
B on furniture
C on food

Questions 6 – 10

- In this section you must choose the word which best fits each space in the text below.
- For questions **6** to **10**, mark **one** letter **A**, **B** or **C** on your Answer Sheet.

THE STARS

There are millions of stars in the sky. If you look **(6)** ..... the sky on a clear night, it is possible to see about 3000 stars. They look small, but they are really **(7)** ..... big hot balls of burning gas. Some of them are huge, but others are much smaller, like our planet Earth. The biggest stars are very bright, but they only live for a short time. Every day new stars **(8)** ..... born and old stars die. All the stars are very far away. The light from the nearest star takes more **(9)** ..... four years to reach Earth. Hundreds of years ago, people **(10)** ..... stars, like the North star, to know which direction to travel in. Today you can still see that star.

A at **B** up **C** on

A very **B** too **C** much

A	is	**B**	be	**C**	are
A	that	**B**	of	**C**	than
A	use	**B**	used	**C**	using

Questions 11 – 20

In this section you must choose the word which best fits each space in the texts.
For questions **11** to **20**, mark **one** letter **A**, **B**, **C** or **D** on your Answer Sheet.

Good smiles ahead for young teeth

Older Britons are the worst in Europe when it comes to keeping their teeth. But British youngsters **(11)** ..... more to smile about because **(12)** ..... teeth are among the best. Almost 80% of Britons over 65 have lost all or some **(13)** ..... their teeth according to a World Health Organisation survey. Eating too **(14)** ..... sugar is part of the problem. Among **(15)** ..... , 12-year olds have on average only three missing, decayed or filled teeth.

A getting **B** got **C** have **D** having

A their **B** his **C** them **D** theirs

A from **B** of **C** among **D** between

A much **B** lot **C** many **D** deal

A person **B** people **C** children **D** family

Christopher Columbus and the New World

On August 3, 1492, Christopher Columbus set sail from Spain to find a new route to India, China and Japan. At this time most people thought you would fall off the edge of the world if you sailed too far. Yet sailors such as Columbus had seen how a ship appeared to get lower and lower on the horizon as it sailed away. For Columbus this **(16)** ..... that the world was round. He **(17)** ..... to his men about the distance travelled each day. He did not want them to think that he did not **(18)** ..... exactly where they were going. **(19)** ..... , on October 12, 1492, Columbus and his men landed on a small island he named San Salvador. Columbus believed he was in Asia, **(20)** ..... he was actually in the Caribbean.

A made **B** pointed **C** was **D** proved

A lied **B** told **C** cheated **D** asked

A find **B** know **C** think **D** expect

A Next **B** Secondly **C** Finally **D** Once

A as **B** but **C** because **D** if

Questions 21 – 40

In this section you must choose the word or phrase which best completes each sentence. For questions **21** to **40**, mark **one** letter **A**, **B**, **C** or **D** on your Answer Sheet.

21 The children won't go to sleep ..... we leave a light on outside their bedroom.

A except **B** otherwise **C** unless **D** but

22 I'll give you my spare keys in case you ..... home before me.

A would get **B** got **C** will get **D** get

23 My holiday in Paris gave me a great ..... to improve my French accent.

A occasion **B** chance **C** hope **D** possibility

24 The singer ended the concert ..... her most popular song.

A by **B** with **C** in **D** as

25 Because it had not rained for several months, there was a ..... of water.

A shortage **B** drop **C** scarce **D** waste

26 I've always ..... you as my best friend.

A regarded **B** thought **C** meant **D** supposed

27 She came to live here ..... a month ago.

A quite **B** beyond **C** already **D** almost

28 Don't make such a .....! The dentist is only going to look at your teeth.

A fuss **B** trouble **C** worry **D** reaction

29 He spent a long time looking for a tie which ..... with his new shirt.

A fixed **B** made **C** went **D** wore

30 Fortunately, ... from a bump on the head, she suffered no serious injuries from her fall.

A other **B** except **C** besides **D** apart

31 She had changed so much that ..... anyone recognised her.

A almost **B** hardly **C** not **D** nearly

32 ..... teaching English, she also writes children's books.

A Moreover **B** As well as **C** In addition **D** Apart

33 It was clear that the young couple were ..... of taking charge of the restaurant.

A responsible **B** reliable **C** capable **D** able

34 The book ..... of ten chapters, each one covering a different topic.

A comprises **B** includes **C** consists **D** contains

35 Mary was disappointed with her new shirt as the colour ..... very quickly.

A bleached **B** died **C** vanished **D** faded

36 National leaders from all over the world are expected to attend the ..... meeting.

A peak **B** summit **C** top **D** apex

37 Jane remained calm when she won the lottery and ..... about her business as if nothing had happened.

A came **B** brought **C** went **D** moved

38 I suggest we ..... outside the stadium tomorrow at 8.30.

A meeting **B** meet **C** met **D** will meet

39 My remarks were ..... as a joke, but she was offended by them.

A pretended **B** thought **C** meant **D** supposed

40 You ought to take up swimming for the ..... of your health.

A concern **B** relief **C** sake **D** cause

Part 2

Do not start this part unless told to do so by your test supervisor.

Questions 41 – 50

In this section you must choose the word or phrase which best fits each space in the texts.

For questions **41** to **50**, mark **one** letter **A**, **B**, **C** or **D** on your Answer Sheet.

CLOCKS

The clock was the first complex mechanical machinery to enter the home, **(41)** …….. it was too expensive for the **(42)** …….. person until the 19th century, when **(43)** …….. production techniques lowered the price. Watches were also developed, but they **(44)** …….. luxury items until 1868 when the first cheap pocket watch was designed in Switzerland. Watches later became **(45)** …….. available and Switzerland became the world's leading watch manufacturing centre for the next 100 years.

A despite **B** although **C** otherwise **D** average

A average **B** medium **C** general **D** common

A vast **B** large **C** wide **D** mass

A lasted **B** endured **C** kept **D** remained

A mostly **B** chiefly **C** greatly **D** widely

Dublin City Walks

What better way of getting to know a new city than by walking around it?
Whether you choose the Medieval Walk, which will **(46)** …….. you to the Dublin of 1000 years ago, find out about the more **(47)** …….. history of the city on the Eighteenth Century Walk, or meet the ghosts of Dublin's many writers on the Literary Walk, we know you will enjoy the experience.

Dublin City Walks **(48)** …….. twice daily. Meet your guide at 10.30 a.m. or 2.30 p.m. at the Tourist Information Office. No advance **(49)** …….. is necessary. Special **(50)** …….. are available for families, children and parties of more than ten people.

46 **A** introduce **B** present **C** move **D** show

47 **A** near **B** late **C** recent **D** close

48 **A** take place **B** occur **C** work **D** function

49 **A** paying **B** reserving **C** warning **D** booking

50 **A** funds **B** costs **C** fees **D** rates

Questions 51 – 60

In this section you must choose the word or phrase which best completes each sentence. For questions **51** to **60**, mark **one** letter **A**, **B**, **C** or **D** on your Answer Sheet.

51 If you're not too tired we could have a ..... of tennis after lunch.

A match **B** play **C** game **D** party

52 Don't you get tired ..... watching TV every night?

A with **B** by **C** of **D** at

53 Go on, finish the dessert. It needs ..... up because it won't stay fresh until tomorrow.

A eat **B** eating **C** to eat **D** eaten

54 We're not used to ..... invited to very formal occasions.

A be **B** have **C** being **D** having

55 I'd rather we ..... meet this evening, because I'm very tired.

A wouldn't **B** shouldn't **C** hadn't **D** didn't

56 She obviously didn't want to discuss the matter so I didn't ..... the point.

A maintain **B** chase **C** follow **D** pursue

57 Anyone ..... after the start of the play is not allowed in until the interval.

A arrives **B** has arrived **C** arriving **D** arrived

58 This new magazine is ..... with interesting stories and useful information.

A full **B** packed **C** thick **D** compiled

59 The restaurant was far too noisy to be ..... to relaxed conversation.

A conducive **B** suitable **C** practical **D** fruitful

60 In this branch of medicine, it is vital to ..... open to new ideas.

A stand **B** continue **C** hold **D** remain

Alte level	**Paper and pen test score**		**Council of Europe Level**
	Part 1 score out of 40	Part 1 score out of 60	
0 beginner	0-15	0-17	A1
1 elementary	16-23	18-29	A2
2 lower intermediate	24-30	30-39	B1
3 upper intermediate	31-40	40-47	B2
4 advanced		48-54	C1
5 very advanced		54-60	C2

Appendix E - Sentence-Reading Test

1- Leia, em voz alta, as seguintes sentenças:

a) You spoilt everything.

b) Robert spits on the floor.

c) Spain is a nice place to visit.

d) This room has a different space for you to relax.

e) Spoon is an object.

f) You spend a lot of time doing this.

g) You stop and look at me every time I sing that song.

h) Janet stays here. You go!

i) Study hard! You cannot fail in the test today.

j) Mary and Robert star in a new drama, next month.

k) Starring at me is not the best thing to do now.

l) You still love me.

m) You sprawl out on the bed all the time.

n) I knocked on the door and it sprung open.

o) Spray cans are cheap this time of the year.

p) Now Mat sprints in order to win this competition.

q) Spring is the season of the year I love most.

r) Those guys and you spread the news.

s) Life makes you strong to handle difficult situations.

t) Pat strangely walked away when she saw him.

u) Streets in Brazil are too big in some cities.

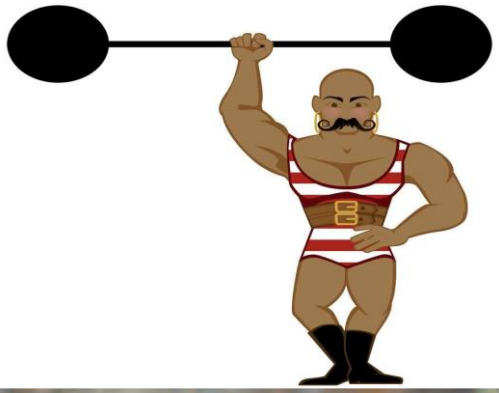
v) Pete struck his enemy last night.

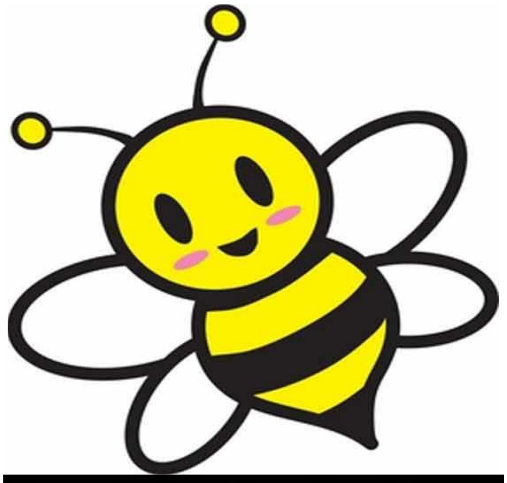
w) Stress is not good for you to have a healthy life.

x) You strengthen me when I am weak.

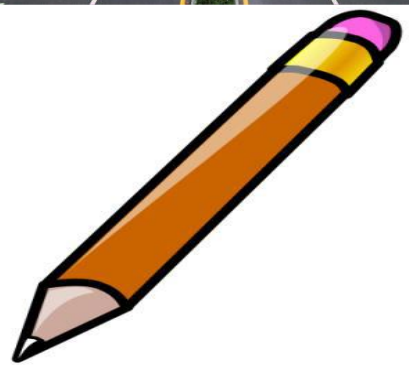
Appendix F - Image-Description Test

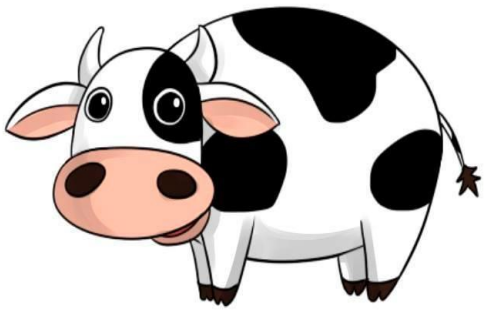
The researcher will show you some images. Say something about each image. You can describe the image or say what the image makes you think of.

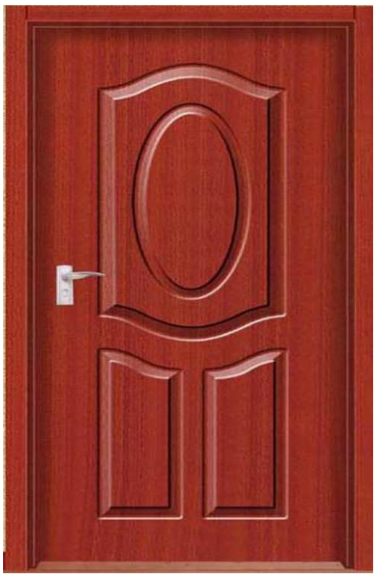


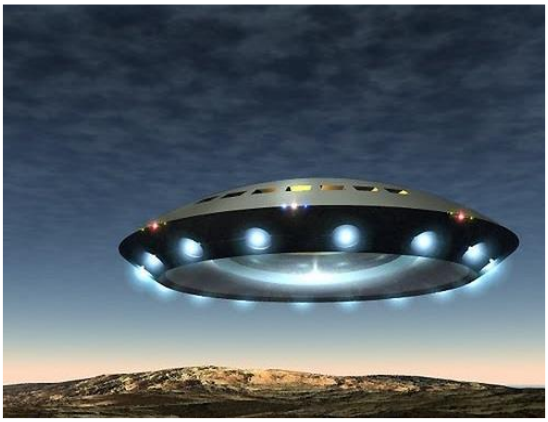


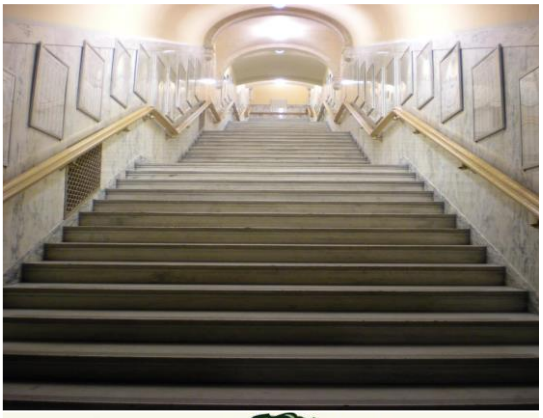

ALL NATURAL
MAM
No-Stick
Cooking Spray

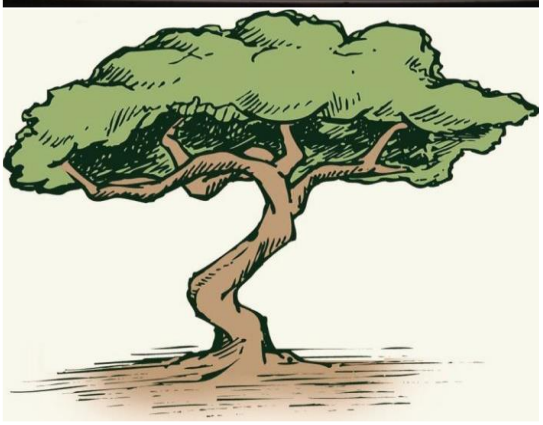












Appendix G - Detailed results for the non-parametric Kruskal Wallis tests

Overall comparison for type of cluster

Test Statistics[a,b]

	Epenthesis
Chi-Square	,659
df	3
Asymp. Sig.	,883

a. Kruskal Wallis Test

b. Grouping Variable: Type_cluster

Overall comparison for type of context

Test Statistics[a,b]

	Epenthesis
Chi-Square	19,023
df	2
Asymp. Sig.	,000

a. Kruskal Wallis Test

b. Grouping Variable: Type_context

Appendix H - Detailed results for the post-hoc Mann-Whitney tests

Mann-Whitney shows significant difference when vowel and silence contexts are compared (vowel means are higher)

Test Statistics[a]

	Epenthesis
Mann-Whitney U	,500
Wilcoxon W	36,500
Z	-3,421
Asymp. Sig. (2-tailed)	,001
Exact Sig. [2*(1-tailed Sig.)]	,000[b]

a. Grouping Variable: Type_context

b. Not corrected for ties.

Mann-Whitney shows significant difference when vowel and consonant contexts are compared (vowel means are higher)

Test Statistics[a]

	Epenthesis
Mann-Whitney U	,000
Wilcoxon W	36,000
Z	-3,480
Asymp. Sig. (2-tailed)	,001
Exact Sig. [2*(1-tailed Sig.)]	,000[b]

a. Grouping Variable: Type_context

b. Not corrected for ties.

Mann-Whitney shows significant difference when silence and consonant contexts are compared (vowel means are higher)

Test Statistics[a]

	Epenthesis
Mann-Whitney U	6,500
Wilcoxon W	42,500
Z	-2,750
Asymp. Sig. (2-tailed)	,006
Exact Sig. [2*(1-tailed Sig.)]	,005[b]

a. Grouping Variable: Type_context

b. Not corrected for ties.

Appendix I - Detailed description of the percentages of occurrence of prothesis in Sentence-Reading test and in the Image-Description Test

	Sentence Reading Test	**Image Description Test**
Participants	N=24)[24]	Number of words actually produced[25]
P1	6/24 (25%)	0/7
P2	22/24 (91,6%)	3/7 (42,8%)
P3	9/24 (37,5%)	1/8 (14,2%)
P4	11/24 (45,8%)	2/9 (28,5%)
P5	16/24 (66,6%)	1/9 (14,2%)
P6	11/24 (45,8%)	0/8
P7	11/24 (45,8%)	0/7

[24] The percentages for Test 1 (Sentence-Reading Test) were calculated by dividing the total number of prothesis – produced by each participant - by the total number of tokens for each type of cluster (24).
[25] Initially the total number of words produced by each participant should have been 13. However, each participant produced a different number of words for the Image-Description Test, as can be seen in the Table.

Appendix J - Detailed information about the F1 and F2 values found for each token

Sentence-Reading Test

P1	307,9173806	1258,1769620
P1	297,3876966	1151,9881816
P1	299,4821034	1164,5510568
P1	325,4294333	1226,4866431
P1	272,0748895	1712,5343352
P1	297,2740795	1854,5270265
P2	331,2742081	2130,7275379
P2	414,3730753	1839,0718356
P2	310,6633220	2104,7916626
P2	346,7127221	2245,0746390
P2	393,8831768	1162,2085491
P2	406,0508882	1721,4514538
P2	413,9527293	1916,9640295
P2	330,6367212	2025,8635610
P2	320,9764963	2138,7990647
P2	390,1884340	2084,9178229
P2	329,7274571	2157,6606585
P2	347,0204759	2030,2710518
P2	320,2428663	2048,9927594
P2	320,0469028	1989,0647812
P2	341,7803934	2001,9697120
P2	328,4906676	1891,3549901
P2	322,3056151	2037,5929905
P2	310,2139414	2227,8859570
P2	344,2497887	2040,3864787
P2	362,4717131	2015,6695084
P2	332,3317090	2105,7415029
P2	321,5823599	2043,4149495
P3	311,1054081	1681,4276194
P3	278,9074203	1937,2437056
P3	304,8929069	1710,8677070
P3	331,2485037	1696,0728244
P3	311,5682070	1590,5929914
P3	250,1893395	1877,0946467
P3	282,1935188	1822,8613935
P3	286,7343199	1951,2153105
P3	352,9390436	1640,5102068
P4	352,9362270	1745,8861269
P4	314,5767706	2114,1002947
P4	370,5790188	1579,8375882
P4	371,5786969	1726,5104766

P4	334,9414702	1847,5096192
P4	242,6483186	2174,4630494
P4	290,7182326	2037,8737747
P4	243,3025629	2090,3042807
P4	198,2890518	2104,1104892
P4	319,6749872	1927,2634036
P4	231,6324797	2275,7000607
P5	431,0322248	1848,2922964
P5	417,6431847	2480,3062356
P5	383,3739647	2229,1951772
P5	468,3220457	1864,8394536
P5	320,5578543	1782,5505110
P5	371,3250969	2375,2716542
P5	305,4099987	2441,6292132
P5	437,3179407	2061,0961341
P5	454,2429296	1809,9798102
P5	331,6180510	2279,8273934
P5	408,1252403	2773,5347566
P5	350,3470321	2429,5392828
P5	392,9431286	2051,8821202
P5	387,9715413	2619,3868104
P5	438,1277347	2467,2776499
P5	302,4720009	2316,2594031
P6	311,5352256	2322,7774766
P6	315,0776332	2259,5658028
P6	448,7779454	2293,6397415
P6	396,5153551	2135,8344390
P6	306,4496855	2059,6944674
P6	402,8259321	2283,2416785
P6	361,5884662	2193,5594543
P6	311,9320452	2484,6096253
P6	391,2937142	2269,8511976
P6	416,6628645	2168,4382127
P6	406,1491246	2303,5890290
P7	299,3377665	2641,1678400
P7	316,5117124	2376,7094847
P7	402,9743531	2322,7886072
P7	365,2124099	2083,9074022
P7	427,7867180	2041,8431025
P7	390,8450640	2484,2490600
P7	323,9630374	2407,8055407
P7	399,1668023	2349,5643576
P7	364,0414321	2003,7133243
P7	329,0923169	2556,9532787
P7	332,5545183	2649,0975609

Image-Description Test

P2	232,4377057	2002,2038379
P2	301,6594220	2070,6325089
P2	294,4153197	2027,0953316
P3	274,2585437	2089,1734090
P4	313,9328127	1938,6700863
P5	304,5113174	1985,8023965