INTEGRATING INFORMATION TECHNOLOGY IN THE TEACHING/LEARNING OF ENGLISH PRONUNCIATION IN THE CLASSROOM: DESIGNING AND IMPLEMENTING AN ONLINE COURSE TO TEACH WORD AND SENTENCE STRESS TO TERTIARY LEVEL STUDENTS.

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Integrating Information Technology in the Teaching/Learning of English Pronunciation in the Classroom: Designing and Implementing an Online Course to Teach Word and Sentence Stress to Tertiary Level Students.

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FAIG CONSTAR que aquest treball, titulat "Integrating information technology in the teaching/learning of English pronunciation in the classroom: Designing and implementing an online course to teach word and sentence stress to tertiary level students", que presenta Nadia Kebboua Chaker per a l'obtenció del títol de Doctor, ha estat realitzat sota la meva direcció al Departament d'Estudis Anglesos i Alemanys d'aquesta universitat.

HAGO CONSTAR que el presente trabajo, titulado "Integrating information technology in the teaching/learning of English pronunciation in the classroom: Designing and implementing an online course to teach word and sentence stress to tertiary level students", que presenta Nadia Kebboua Chaker para la obtención del título de Doctor, ha sido realizado bajo mi dirección en el Departamento d'Estudis Anglesos i Alemanys de esta universidad.

I STATE that the present study, entitled "Integrating information technology in the teaching/learning of English pronunciation in the classroom: Designing and implementing an online course to teach word and sentence stress to tertiary level students", presented by Nadia Kebboua Chaker for the award of the degree of Doctor, has been carried out under my supervision at the Department d'Estudis Anglesos i Alemanys of this university.

Dr. Joaquín Romero Gallego
Doctoral Dissertation Advisor

Tarragona, July 5, 2019

I hereby declare that except where specific reference is made to the work of others, the contents of this dissertation are original and have not been submitted in whole or in part for consideration for any other degree or qualification in this, or any other university. This dissertation is my own work and contains nothing which is the outcome of work done in collaboration with others, except as specified in the text and Acknowledgements.

Nadia Kebboua Chaker
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Abstract

This study investigates the potential of using technology in the teaching and learning of pronunciation. It explores students' progress in English pronunciation with regard to word and sentence stress. An original web-based pronunciation course was specifically created for the participants of this study, bearing in mind the typical mistakes Spanish/Catalan L1 speakers make as a result of first language interference. The study was carried out on two groups of 24 first-year university students, in both control and experimental groups — the control group received instruction on English stress by conventional means whereas the experimental group made use of an online tool for learning pronunciation. The study used a pre-test, intervention, and post-test design.

To evaluate the data, three different approaches were adopted. The reading tasks were evaluated by means of acoustic analysis. In addition, the timed picture-description task was assessed by means of native English ratings, who evaluated the recordings in terms of comprehensibility, accentedness, and fluency. With regard to the qualitative questionnaire, participants used a 5-point Likert scale to give their opinions and feedback on the pronunciation course in general.

The acoustic results reveal that, while both the control and experimental groups showed improvement in their pronunciation of word and sentence stress, this improvement was more significant in the experimental group, even though there was a great deal of variability depending on the specific word or phrase. With regard to the results of the judges' ratings, even though there was some improvement in the three areas measured, statistical significance in both groups was only observed for the fluency rating. The results therefore provide evidence of the usefulness of information technologies in the learning of English pronunciation in the classroom.

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Chapter I. Introduction

Pronunciation has often been neglected as an area of teaching English as a second or foreign language (Rubin, 1992; Scovel, 1969), with the majority of teachers justifying the little time devoted to teaching pronunciation due to its difficulty (Macdonald, 2002; Henderson et al., 2012). As a consequence, neglecting to teach this important aspect of language learning leads many learners to communication breakdown, principally with native speakers (Jenkins, 2000). Furthermore, most textbooks and syllabi that deal with pronunciation mainly focus on segmental features and hardly ever deal with suprasegmental features, unless specific manuals are used. According to many researchers, however, the misuse of suprasegmentals may lead to misunderstandings between native and non-native English speakers. For instance, Benrabah (1997) blames communication failure between native and non-native English speakers on the misplacement of stress in words.

Conversely, many advanced English learners are now sensitive to the importance of acquiring, if not native pronunciation, at least a correct and appropriate level of pronunciation that will enable them to communicate effectively in the target language (Cenoz & Lecumberri, 1999; Levis, 2015; Zielinski & Yates, 2014). Most of them have already had frustrating experiences in which they failed to make their meaning understood because of their English pronunciation. Unfortunately, in many cases, teachers place a low priority on pronunciation, even if students are willing to work hard to improve it.

On the other hand, information technology is increasingly being utilised in the classroom by teachers and learners alike (Celce-Murcia, Brinton, Goodwin, & Grinner, 2011; Neri, Cucchiarini, Strik, & Boves, 2002; Pennington, 1999; Shirer, 2005).

Following on from the previous discussion, this study investigates the potential of using technology in the teaching of pronunciation in the classroom by creating online activities to help students improve their pronunciation skills in regard to word and sentence stress.

1.1. Organisation of the dissertation

This dissertation is organised into four chapters: introduction, methodology, results, and discussion and conclusion. The introduction chapter is divided into six sections: Section One provides a brief overview of the position of the English language worldwide; Section Two introduces the field of study and the current situation with regard to teaching pronunciation; Section Three provides a review of previous literature examining some factors that may prevent learners from acquiring effective second language pronunciation; Section Four briefly reviews the history of and approaches to teaching pronunciation; Section Five provides a brief description of stress in English and Spanish/Catalan. In this regard, the first subsection introduces word stress in English, word stress rules, and sentence and contrastive stress. The second subsection highlights the contrast between word and sentence stress in English and Spanish/Catalan and the difficulties that speakers of these languages may have with English word and sentence stress due to transfer from their first language; finally, Section Six outlines the aims of this study by stating the research questions and hypotheses.

A more detailed description of the present study can be found in Chapter Two, which outlines the research methodology. This chapter is divided into eight sections: the research design, the participants, the level test, the pre-speaking test, a thorough description of the treatment, the post-test, the qualitative questionnaire, and the data analysis. The treatment section is divided into four subsections—overview, background,

reception, and production—each of which provides a detailed description of the activities carried out by the participants throughout the training. Chapter Three, which outlines the research results, is divided into three sections: the results obtained from i) the acoustic analysis, ii) the raters' assessments, and ii) the qualitative questionnaire. Chapter Four presents a global view of the study and its implications, discusses some pedagogical implications arising from the research, highlights its limitations, suggests lines for further research, and finally presents conclusions for the whole study.

1.2. English as a Lingua Franca

In a globalised world, in which the development of technological innovation means boosting the interconnectedness between nations and people from different backgrounds, cultures, ethnicities, and languages more than ever before, the role of English has become increasingly prominent. In this regard, English has gained the position of a 'world language' or lingua franca and is nowadays considered to be the language of communication between speakers who do not share the same mother tongue. Dewy (2007, p. 333) defines the English language as follows:

> English is like no other language in its current role internationally, indeed like no other at any moment of history. Although there are, and have previously been, other international languages, the case of English is different in fundamental ways: for the extent of its diffusion geographically; for the enormous cultural diversity of the speakers who use it; and for the infinitely varied domains in which it is found and purposes it serves.

Although English is the third most commonly spoken language in the world by native speakers after Mandarin and Spanish, non-native speakers of English outweigh native speakers by a rate of one to three (Crystal, 2006). In this sense, Crystal (2006) claims that between 330 and 360 million people are native speakers, whereas there are

estimated to be between 470 million to more than one billion non-native speakers. In fact, English is currently the most taught foreign language worldwide (Crystal, 2006). In Spain, as in many other European countries, the situation is no different; in recent decades, English has gained an important role as the most commonly taught foreign language in schools. In fact, English has become a compulsory subject in most Spanish schools for children from the age of six. Furthermore, most Spanish learners believe that being able to communicate successfully in English is of extreme importance because they are aware that speaking at least one foreign language is essential for studying or working abroad, travelling, or simply communicating with people from other countries. However, while communicating successfully and effectively depends, to a certain degree, on the amount of vocabulary one has learned at school and one's accurate use of grammar and syntax, it primarily depends on one's ability to convey a message in an intelligible way. In this respect, while many learners master a great deal of English vocabulary and grammar, they still fail, in certain situations, to communicate effectively, particularly with native speakers. One of the main reasons for communication breakdown between native and non-native English speakers is learners' pronunciation and their inability to understand native speakers' natural speech: 'it is in the area of pronunciation that L2 varieties diverge most from each other linguistically and therefore it is this area that most threatens intelligibility' (Jenkins, 2000, p. 1).

1.3. Pronunciation Teaching Perspectives

Many researchers and practitioners claim that teaching English pronunciation is the most difficult and neglected area of language teaching (Rubin, 1992; Scovel, 1969). For this reason, teachers of English as second or foreign language sometimes find it the most intimidating aspect of teaching (Burgess & Spencer, 2000), with Kelly (1969)

comparing it to the tale of 'Cinderella' in the sense that, just as she was not allowed to take part or show herself in any public ceremony, grammar and syntax are given much more prominence than pronunciation in the majority of syllabi. In a similar way, other researchers have defined it as the orphan of second language research and teaching (Derwing & Munro, 2005). However, since at least the nineteenth century, the study of pronunciation has been an important and organised discipline. With the emergence of the International Phonetic Association (IPA) and the creation of the International Phonetic Alphabet, many researchers consider pronunciation to be a scientific, theoretically supported discipline. Otto Jesperson—who wrote '*How to teach a foreign language*' in 1904—stated that

> the use of phonetics and phonetical transcription in the teaching of modern languages must be considered as one of the most important advances in modern pedagogy, because it ensures both considerable facilitation and an exceedingly large gain in exactness. But these means must be employed immediately from the very beginning (p. 170).

About thirty years later, with the emergence of Audiolingualism in the United States and the Oral Approach and Situational Language Teaching in the United Kingdom between the 1930s and 1960s, more importance was given to pronunciation than to the written form, and a strong emphasis was placed on getting this right from the very beginning of the learning process. In 1957, Earl Stevick (as cited in Derwing, 2010) pointed that one should start teaching/learning pronunciation from the very start. In this sense, accuracy matters, and one should focus on suprasegmental features such as pitch, stress, and rhythm; consistency also matters, and one should spread one's work out over a period of time. For example, four sessions of ten minutes are better than one session

of 60 minutes; finally, one should teach in terms of contrasts and practice with connected speech.

Another approach that emphasised the importance of the accurate production of sounds, stress, and intonation from the very beginning of the learning process was the Silent Way, whose founder was Caleb Gattegno (1976); although he claimed that the method was highly successful with L2 speakers, this approach to teaching pronunciation was difficult to practise in most communities because it required a considerable amount of training on the part of teachers. Just like the Silent Way method, Community Language Learning views pronunciation practice as a very important aspect of language teaching (Richards & Rodgers, 1986). In addition, these two approaches share the belief that success is highly dependent on learners' responsibility for their own learning, which remains one of the most important principles in contemporary teaching.

Nevertheless, with the rise of Communicative Language Teaching, a dilemma has emerged in regard to choosing the correct methodology of teaching pronunciation. On the one hand, it has been generally accepted that 'intelligible pronunciation is an essential component of communicative competence' (Morely, 1991, p. 488), meaning that the explicit teaching of segmental and suprasegmental aspects of language is an essential aspect of language teaching. On the other hand, and unlike previous methods that emphasised the use of drills and dialogues when teaching pronunciation, the principles of Communicative Language Teaching are based on significant interactions; in this sense, learners are encouraged to focus on conveying their message as opposed to paying attention to the language form. In criticising such a focus, Murcia (1996, p. 8) maintains that 'proponents of this approach have not dealt adequately with the role of pronunciation in language teaching, nor have they developed an agreed-upon set of

strategies for teaching pronunciation communicatively'. Since a concrete and concise methodology for teaching pronunciation is lacking, teachers need to choose what they think is the most appropriate methodology for the specific needs of their learners.

In recent years, thanks to publications in the field of teaching English as a second or foreign language, this scenario is changing somewhat, and pronunciation is increasingly attracting researchers' attention and receiving the appropriate respect amongst other aspects of language teaching, e.g. the publication of pronunciation-specific journal issues (see Cardoso & Trofimovich, 2014), encyclopaedia volumes and handbooks (see Reed & Levis, 2015), and the launch of the *Journal of Second Language Pronunciation* in 2015. Furthermore, there has been a significant increase of article publications in applied linguistics (Reed & Levis, 2015). According to Baker and Murphy (2011),

> the past decade has witnessed an explosion in the number of […] classroom textbooks; teacher's manuals; classroom-based research reports; teacher-training books; book chapters; journal articles; CD-ROMs; videos, computer software; and Internet resources, most of which are geared directly toward ESL/EFL teaching (p. 37).

1.4. Factors Affecting Learners' Pronunciation

Learners are the first and foremost factor to take into consideration when designing an effective and efficient course. Wong (1987, p. 17) states that teaching pronunciation 'is not exclusively a linguistic matter' and that many other factors should be taken into account, such as the age at which learners start learning a second language, their amount of exposure to the target language and pronunciation instructions, their personality, attitude, and motivation while learning the second language, and finally the influence of and interference from their first language.

1.4.1. The age factor

There is general agreement amongst researchers that the younger students start learning a second language, the better their attainment is as far as pronunciation is concerned. Consequently, a great deal has been said about age as a preeminent factor in both children and adults that has a direct impact on the effectiveness and ease of learning a second language. However, some researchers take issue with this theory. For example, Scovel (1969, 1988) asserts that once they reach adulthood, learners are unable to attain native-like proficiency in pronunciation; he provides the example of Joseph Conrad's speech, which was partially incomprehensible to the majority of native English speakers. Lenneberg (1967) and Penfield and Roberts (1959) also support Scovel's claims in stating that success in second language acquisition—and principally in phonology—can be attributed to the critical period hypothesis, in which different hemispheres of the brain are understood to reach their growth at about the ages of 15 or 16, and with it the ability for language acquisition comes to an end. This theory implies that learners before the age of puberty are able to acquire a second language easily and effortlessly but that the phonological acquisition of a second language becomes a more difficult goal to achieve after this period, and learners will not generally reach native-like proficiency. Krashen (1973) and Scovel (1969) support this theory by arguing that along with lateralisation—which occurs within the first five years of life (according to Krashen's theory)—an increasing loss of brain 'plasticity' also takes place, making it impossible for a person after puberty to acquire native-like pronunciation in a second language.

However, many other researchers in the field of second language acquisition do not consider the critical period hypothesis to be a crucial factor in learning and pronouncing

a second language effectively and clearly. For example, Flege (1981, p. 445) claims that 'neither physiological maturation nor neurological reorganisation renders an adult incapable of speaking a language without an accent'.

1.4.2. Amount of exposure to the target language

Many researchers would argue that the amount and quality of exposure to the target language play a significant role in the effective acquisition of a second language, particularly with regard to phonological acquisition. Asher (1977), Krashen (1982), and Postovsky (1974), amongst others, state that young children aged between 0 to 2 receive a huge amount of understandable input in their first language before they can utter their first words or phrases. Indeed, no individual can learn a second language without language input of some sort (Gass, 1997). Similarly, Suter (1976) claims that interaction with native speakers is the third most important factor for pronunciation attainment. However, while input plays an important role in second language acquisition, recent research has contradicted Krashen's assertion that only input matters in second language acquisition. For example, Swain & Lapkin (1991) claim that a group of students enrolled in French language programmes in Canada were still producing non-native-like grammar mistakes when interacting in French, even though they had received years of native-level listening lessons. In addition, researchers have pointed out that interaction in the second language is an important factor that must be taken into account. According to Long's (1996) interaction hypothesis, comprehensible input is significantly increased when learners are faced with the necessity of negotiating meaning when communication breakdown happens. In this regard, one of the interlocutors will try to make their message understood by using various communicative strategies, such as making the

input more comprehensible, providing feedback for the other participant(s), and modifying their speech.

1.4.3. Personality and attitude

The interaction of factors influencing learners' acquisition of second language phonology is extremely complex. According to Stevick (1976), apart from language aptitudes and educational and cultural experiences, individuals and their personalities are another factor affecting the learning process. According to Guiora (1972), personality is a key factor in acquiring second language phonology: 'speaking a foreign language entails the radical operation of learning and manipulating a new grammar, syntax, and vocabulary and, at the extreme limits of proficiency, modifying one of the basic modes of identification by the self and others, the way we sound' (p. 140).

Along the same lines, Shumann (1986) states that learners' personalities may impact upon their learning effectiveness in the sense that the closer they are to the target language culture, the better they do in acquiring a native-like proficiency with regard to phonology. In other words, when learners want to sound like native speakers and be considered as members of the target language society, they will make significant efforts to achieve this goal. Moreover, it would be more beneficial if learners are extroverted because it would then be easier for them to develop contacts or make friends with native speakers, interactions that would help to get more inputs from the target language.

1.4.4. Language transfer

The influence of the first language on the acquisition of a second language is one of the most important factors to take into consideration when trying to improve learners' pronunciation. In this sense, transfer from the first language is generally recognised as

one of the major factors in second language pronunciation, both at segmental and suprasegmental levels (Ellis, 1994; Major, 1987). In fact, Loup (1984) suggests that phonetic transfer is the most important influence in the acquisition of second language phonology and that speakers who share the same first language will probably commit the same errors when communicating in a second language. For this reason, it is very easy for a native English speaker to recognise Spanish- or Russian-accented English (Rogerson, 2011).

One of the most important theories of phonological acquisition is the contrastive analysis hypothesis (Lado, 1957), which claims that if the target language is similar to the first language, learners will not have many difficulties in acquiring the second language; on the other hand, if the target language is different from the first language, learners will probably have more difficulty in mastering different aspects of the second language. In other words, almost all of the errors committed in the second language can be blamed on interference from the first language. However, some recent theories have argued that the contrastive analysis hypothesis generalises the problem because many errors are committed by learners irrespective of their first language. Furthermore, according to Selinker (1992), interference from the first language can even be understood as beneficial in terms of the production of new sounds, i.e. learners acquire new sounds more easily when compared to those that have a similar counterpart in their first language.

1.5. Review of the History and Methods of Teaching Pronunciation

Murphy and Baker (2015) classified the teaching of pronunciation in the last 150 years into four major stages, the first of which started in the 1850s and lasted for about three decades, with the main method of teaching being ‘imitative-intuitive’. The second stage

started in the 1880s, and lasted for about two decades, during which a major achievement occurred: the formation of the International Phonetic Association (IPA). While the approaches in the first two stages of teaching pronunciation co-existed for much of the twentieth century, the third stage began around the mid-1980s and is still in use today, in which interaction between the student and the teacher is the dominant approach. However, it was not until the fourth stage, beginning in the mid-1990s, that pronunciation teaching attracted specialists and researchers' attention, thus resulting in extensive foundational research and the publication of innovative resources and materials.

1.5.1. The Grammar Translation Method

The Grammar Translation Method was the predominant approach in schools from the seventeenth to the nineteenth centuries, focusing on reading, understanding, and translating literary works from the target language. Classes were conducted in the first language of the students, who were expected to learn grammar rules deductively from translating sentences or texts from the target language into their first language, and teaching methods of this era prioritised the written form over the spoken form. As a result, pronunciation received little attention in L2 classrooms (Kelly, 1969; Howatt & Widdowson, 2004; Richards & Rodgers, 2001) and, for most of the nineteenth century, the teaching of pronunciation was seen as being 'largely irrelevant' (Murcia, Brinton, Goodwing, & Griner, 2010). At the beginning of the nineteenth century, scholars rejected the Grammar Translation Method as a valid method of teaching foreign language because its scope was limited to reading and writing, and therefore listening and spontaneous speaking of the target language were completely lacking.

1.5.2. Approaches to teaching pronunciation (1850s–1880s)

The 'imitative-intuitive' method, as labelled by Celce-Murcia et al. (2010), began in the 1850s as a rejection of and transition away from the classical teaching methods used in the nineteenth century. Its creators, Berlitz (1882) in the United States, Gouin (1880) and Marcel (1853) in France, and Predergast (1864) in England, were specialists in second and foreign language teaching and were promoting speaking abilities, even though they were not principally dealing with pronunciation. For the first time, students were encouraged to use the language of study in the classroom. Although their method of teaching was not very popular in their own era, their scholarship had a direct impact on promoting teaching pronunciation in the following decades. Furthermore, many teaching methods were influenced by their principles, e.g. the Direct Method (see Sauveur, 1874), Situational Language Teaching (see Hornby, 1950; Palmer, 1917), The Natural Approach (Terrell, 1979), and The Total Physical Response (Asher, 1965), cited in (Murphy & Baker, 2015).

1.5.3. The Reform Movement (the 1880s–the early 1900s)

The formation of the International Phonetic Association in Paris during the period of 1886–1889 and later the International Phonetic Alphabet (IPA), based on the work of Sweet (1880–1881), was a huge achievement in the teaching of pronunciation. Setter and Jenkins (2005) claim that the IPA's creators' aim was to develop a system 'capable of representing the full inventory of sounds of all known languages' and that the impact on pronunciation teaching 'is attested by the fact that, over a hundred years later, it is still the universally acknowledged system of phonetic transcription' (p. 2). The International Phonetic Association promoted four important principles: since speaking

abilities are the most important aspect of the language, they should be taught first; research findings into phonetics must be used in the classroom; teachers must have a solid training in phonetics; and learners should be familiar with phonetics in order to develop good speech habits (as cited in Celce-Murcia et al., 2010, p. 3). For the first time, 'analytic-linguistic' principles were introduced in the teaching of pronunciation, which continued for most of the twentieth century. However, instead of replacing earlier methods of teaching pronunciation, the Reform Movement co-existed with other orientations.

1.5.4. The 1920s–1950s

Under the influence of proponents of the Reform Movement's methods, phoneticians at this time were deeply concerned about the phonological system of language. For instance, Bell (1906) and Palmer (1924) provided a thorough description of the major phonological elements of English. Furthermore, by the early 1940s, specialists had provided an exhaustive description of native English speakers' pronunciation, inclusive of segmental and suprasegmental features. For instance, Pike (1945) provided a valuable description of American intonation, which Bolinger (1947) described as 'the best that has ever been written on the subject' (p. 134). Unfortunately, aside from some other specialists (e.g. Clarey & Dixon, 1947; Lado, Fries, & Robinett, 1954; Prator, 1951), teaching pronunciation was not the main priority in language teaching; instead, reading and vocabulary was seen as 'the only realistic objective of learners with only a limited amount of study time' (Howatt & Widdowson, 2004, p. 268). Thus, once again (and for a long period of time) teaching pronunciation was seriously lacking.

1.5.5. 'Intuitive-imitative' versus 'analytic-linguistic' approaches

Although the 'analytic-linguistic' method had been introduced by the Reform Movement decades earlier, most methods of teaching a second language were still influenced by 'intuitive-imitative' methods. For instance, the main approach of the Audiolingual Method, even though it emphasised the use of the target language from the very beginning of the learning process, was the extensive imitation of the teacher. In this sense, native-like pronunciation was given importance in that learners were expected to repeat exactly what and how everything was said. Obviously, the input learners were given was that in the 'language laboratory'. Furthermore, no grammar was explicitly taught. As a result, the effectiveness of this method was questioned in the late 1950s by many linguists, the most famous of which was Noam Chomsky, who severely criticised it by basing his arguments on the limitations of structural linguistics.

In the 1960s, the Cognitive Approach developed as one of the leading methods in foreign language instruction. Its foremost linguist, Noam Chomsky, believed that language relates to primarily rule-governed behaviour rather than habit formation. Unlike previous methods (e.g. the Direct Method and the Audiolingual Method), the main focus of the Cognitive Approach was explicit grammar and vocabulary instruction. As a result, native-like pronunciation teaching was dropped from the syllabi due to it being an unrealistic goal (Scovel, 1969).

Unlike in the Cognitive Approach, the main focus of the Silent Way was pronunciation. The principle of its creator, Caleb Gattegno, for teaching foreign languages was to concentrate on how students learn rather than how they are taught, and therefore imitations and drills, common in previous methods of teaching foreign language, were completely rejected. Furthermore, teaching foreign languages shifted from being a

teacher-based approach to a student-based approach, with an emphasis on cooperation amongst students while the teachers, as the name suggests, were often silent. Nevertheless, the teachers utilised certain techniques to help students with their pronunciation, such as mouthing words and hand gestures.

Community Language Learning (CLL) was an approach developed by Charles A. Curran and his associates for teaching second and foreign languages, which consisted of allowing students to choose the aspects of the language they wished to learn. In addition, the learner acted as a collaborator or client whereas the teacher acted as a counsellor. In a typical class, the client would say a sentence in their native language, which the counsellor had to translate; then, the client would repeat it, imitating the counsellor, as many times as they wished. Once they were satisfied with their production, they used a device to record it. After this, the counsellor would write a transcription of the new sentence or elements, and students had to match this with its translation. This method was somewhat similar to the Direct Method in that the teaching approach of pronunciation was intuitive and imitative, focusing on form rather than meaning.

1.5.6. Communicative styles of pronunciation teaching (mid-1980s–1990s)

Today, methods of teaching second and foreign languages have combined almost all the previous approaches to give rise to a new one: Communicative Language Teaching (CLT). This method, which highlights the interaction between student and teacher, is the dominant approach at present. It was first introduced in the 1980s and is still being used today. The major emphasis of the communicative approach is interaction between the learners and the teacher and amongst the students. For the first time, authentic texts and situations were introduced into the learning process. Students, whose own personal

experiences are considered an important element of learning, are encouraged to focus not only on the form but also on the learning process. Furthermore, classroom language is not only taught inside the 'language lab' but is also sometimes linked to activities outside the classroom. Therefore, as this approach highlights communication, the need for teaching accurate pronunciation has increased considerably in recent decades, and speaking accurately in English has become a goal in itself. No matter how proficient a foreign speaker of English is, if their pronunciation is inaccurate, they may be involved in situations where misunderstanding and communication breakdown are logical consequences (Jenkins, 2000). Furthermore, there has been a considerable growth in specialists and material developers concerned not only with the most important teachable features of pronunciation but also with the best sequence and strategies and the most effective methods of teaching it. For instance, among others, Acton (1984), Celce-Murcia (1983), De Bot (1983), Morley (1987), Naiman (1987), Pica (1991), and Wong (1987) have all contributed to promoting innovative ways to introduce pronunciation teaching in the classroom. During this period, various new-wave pronunciation-centred classroom textbooks were published.

1.5.7. The changing scene (mid-1990s–present)

Even though there was considerable growth in the publication of pronunciation-centred textbooks during the 1980s and 1990s, particularly when compared with other aspects of language teaching, there was still a lack of empirical research to support researchers' methods and strategies. According to Murphy & Baker (2015), it was not until the mid-1990s that there was an increase of empirical research investigating the three macro-level areas of teaching pronunciation: 1) the most important and necessary features of English phonology (e.g. Field, 2005; Hahn, 2004; Kennedy & Trofimovich, 2008;

Munro & Derwing 1995, 1998); 2) the most effective methods of teaching those features (e.g. Derwing, Munro, & Wiebe, 1998; Dlaska & Krekeler, 2013; Jenkins, 2000; Murphy, 2014); 3) teachers knowledge and beliefs and learners' perspectives about pronunciation instruction (e.g. Baker, 2011a, 2011b, 2014; Foote, Holtby, & Derwing, 2011; Saito & Lyster, 2012b).

1.5.8. Computer-Assisted Language Learning

Computer-Assisted Language Learning (CALL) emerged in the early 1980s and is currently being used worldwide in many universities and institutions. Levy (1997, p. 1) defines it as 'the search for and study of applications of the computer in language teaching and learning'. This approach to teaching foreign and second languages, whose major feature is interactive and individualised learning, focuses much more on the learning process than on instruction itself. Opposed to teacher-centred approaches, computer-assisted language learning is a purely student-centred approach, in which teaching materials may or may not be controlled. CALL, which supports students learning on their own, can be used either to support what has already been taught in the classroom or to help learners acquire additional knowledge:

> Learning a foreign language can enrich the education of every pupil social and intellectually and be vocationally relevant. The new technology should form an integral part of a modern language department's overall teaching strategy. By these means, to coin a communicative-sounding acronym, TELL (Technology Enhanced Language Learning) can help produce telling results in language performance both in school and in the wider world. It therefore has a place in every modern language department (Brown, 1991, p. 6).

Using technology in pronunciation teaching presents a promising solution. Computer-assisted pronunciation teaching thus seems to be an advantageous and beneficial method

for supporting what has already been learned in the classroom and assisting learners to acquire new skills and enhance presentation styles by offering visuals, native speakers' voices, and models for students to follow and compare their production.

However, in comparison to other areas of learning foreign and second languages, Computer-Assisted Pronunciation Teaching (CAPT) still 'remains in its infancy in many ways' (Levis, 2006, p. 184). Levis (2006) argues that such a situation is unacceptable, given the huge possibilities that computers can offer inside and outside the classroom, i.e. the endless opportunities for replication and performance of new sounds; illustrated support to improve the articulation of new features; the availability of many models and accents and not only that of teachers, who sometimes feel underprepared to provide an accurate model for students to imitate; and, above all, the opportunity for students to record their performances and later compare them with other learners and native models.

1.6. Word and Sentence Stress

The present study investigates the role of technology in the teaching of word and sentence stress to university students. Given the fact that the participants in the current study were bilingual Spanish and Catalan speakers, a few relevant features of word and sentence stress in English, Spanish, and Catalan will be outlined in the following section.

1.6.1. Suprasegmental features

Along with rhythm and intonation, stress is one of the suprasegmental features of English phonology. Mott (1991, p. 191) defines suprasegmentals as being 'superimposed on the basic sound segments of language'. In other words, the

suprasegmental features give the overall shape of a word and operate over longer stretches of speech than segmental features (the individual phonemes or sound segments). Additionally, Jones (1960, p. 245) defines stress as 'the degree of force with which a sound or syllable is uttered', while Mott (1991, p. 183) points out that 'stress is increased air pressure from the lungs. With heavier stress there is more articulatory effort: air is pumped out more rigorously by using greater muscular energy'. In other words, stress is related to the emphasis certain syllables and words receive. While stressing a syllable or a word, air pressure from the lungs increases, and the heavier the stress, the more articulatory effort is produced.

1.6.2. Stress in English

According to Mott (1990), the world's languages fall into two major categories as far as word-stress is concerned: fixed stress languages, where the stress always falls on the same syllable, and dynamic stress languages, where the stress falls on any of the syllables in a given word. In languages like French, Turkish, Persian, and modern Hebrew, it is always the last syllables that carry the stress, while in languages like Hungarian, Finnish, and Czech, the stress always falls on the first syllable of words. However, English, German, Russian, Spanish, and Catalan belong to the second group because their word stress systems are not always fixed. Even though the rules of stress for Spanish and Catalan are not always fixed, they are much more regulated in comparison to English. In Spanish, apart from some exceptions, a graphic accent is used whenever the stress falls on a syllable that is different from the penultimate one. In Catalan, two graphic accents are used (acute and grave) to mark not only the stressed syllable when it is an exception to the rule but also the vowel quality, i.e. whether it is an open or closed stressed vowel. On the other hand, in English, no accents are used to

mark stress, with the general tendency being that stress is a property of the particular word. Thus, some learners whose first languages have more regulated word stress, as in the case of Spanish and Catalan, may tend to transfer the stress rules of their own languages when pronouncing English words.

1.6.2.1.Word stress

Word stress in English is far from an easy task to deal with in class. First, its rules are not as simple as for many other European languages, which have clear-cut rules for stress. Second, most teachers feel underprepared to teach stress due to the need to learn all of its rules and exceptions. Third, and most notably, unlike grammatical or lexical issues of language, it is rather difficult to build a lesson around suprasegmental features, and they are usually time consuming. Furthermore, even if a few teachers devote time to teaching rules of stress and all their exceptions, only a small number of learners will remember them and actually use them spontaneously when speaking in English. Therefore, raising students' awareness of stress and including it while teaching other aspects of language would be a good method of making them understand the importance of this suprasegmental feature.

1.6.2.2. Word stress rules

Many phoneticians believe it is important to take lexical stress into consideration when designing effective pronunciation programmes as a part of teaching English as second or foreign language (Benrabah, 1977; Harmer, 2007; Kenworthy, 1987). Brown (1997) has remarked on the importance of accurate stress in English, stating that instead of being 'an adjunct to correctly pronounced sequences of consonants and vowels', stress must be perceived as 'the essential framework within which (these) are related' (p. 51).

However, as there are numerous rules for word stress and also many exceptions, teachers find it difficult to decide on the most teachable features of word stress. Accordingly, many phoneticians take this to the extreme and argue that students should assume responsibility for learning the stress of individual words as a part of the acquisition process (Jones, 1962; O'Connor, 1980; Roach, 1991).

On the other hand, some researchers claim that word stress in English is 'not entirely capricious' (Knowles, 1987, p. 117) and that there are some 'patterns' that may help students not only learn word stress but also predict stress placement in words (e.g. Arnold, 1957; Burzio, 1994; Chomsky & Halle, 1968; Fudge, 1984; Halle & Keyser, 1971).

Depending on target learners' levels and age and the teaching/learning context and objectives, teachers may prefer to provide students with some basic word stress rules. As they are somewhat difficult to remember if presented all at once, it would be better to integrate them into the syllabi and introduce them gradually while teaching other aspects of language. The following rules have been adapted from Dalton and Seidlhofer (1994, p. 103).

- In most two-syllable nouns and adjectives, the stress usually falls on the first syllable, for example words like *cinema*, *hospital*, and *table*. However, there are many exceptions to this general rule, for instance *mistake*, *garage*, *asleep*, *machine*, *alone*, *guitar*, *hotel*, and *lagoon* all have the stress on the second syllable.
- Apart from some exceptions, verbs in English share the same pattern of word stress, with the most prominent stress falling on the second syllable, for example *record*,

present, and *suggest*. However, there are many exceptions to this general rule, for example *enter*, *open*, and *profit* have the stress on the first syllable.

- In most compound nouns, the prominent stress usually falls on the first part, for instance words like *hotdog*, *evening dress*, and *mobile phone* have the stress on the first element. Nevertheless, the stress may fall on the second part in many compounds, for example *hot tea*, *singing girl*, and *stone building*.
- In most compound adjectives, both parts are stressed, with stronger or primary stress usually falling on the second component, for example *good-looking*, *self-confident*, *well-dressed*, and *easygoing*.
- Most compound verbs are stressed on the second syllable, for example *overflow*, *understand*, and *overlook*.
- Generally speaking, in words with suffixes, the primary stress falls on the syllable coming just before the suffix. Examples of this general rule are words ending in '-ic', e.g. *static*, *realistic*, and *geographic*, and words ending in '-sion' and '-tion', e.g., *television*, *solution*, and *revolution*.
- In words ending in '-cy', '-ty', '-phy', '-gy', and '-al', the primary stress usually falls on the ante-penultimate syllable (third from the end), e.g. *democracy*, *reliability*, *autography*, *anthropology*, and *economical*.

1.6.2.3. Sentence stress

When uttered in isolation, in every English word that has two syllables or more, one of the syllables will be more prominent than the others. However, when words are put together in an utterance, only some of the words will stand out from the rest and gain more prominence than the others, the reason for which is to direct the attention of the

listener to the most important portion of the utterance. Sentence stress in English has no specific distribution; it all depends on the new information the speaker wants to convey. In general terms, content words or lexical words—such as nouns, adjectives, verbs, and adverbs—are more likely to get the most prominence. On the other hand, grammatical or function words—such as pronouns, articles, prepositions, auxiliaries (in the positive form), and conjunctions—are less likely to carry stress. In other words, for the rhythm of English to sound natural, stressed syllables within a sentence stand out whereas unstressed syllables seem to be 'squeezed' in between the stressed ones. It is this regular timing between stressed and unstressed syllables that produces the 'music' of English. Sentence stress is, in fact, the feature that creates the rhythm of English, and it is the combination of stressed, lightly stressed, and unstressed syllable that provides English with its musicality. Murcia (2010) defines this phenomenon as follows:

> In stressed-timed languages, the family to which English belongs, syllables are grouped into metrical feet, causing it to sound like DUM di-di/ DUM di di / DUM di di / DUM. Each metrical foot contains one strong-stressed syllable along with lightly stressed and unstressed ones. Within the stream of discourse, these strongly stressed syllables tend to occur at regular intervals, causing English to have a regular rhythmic beat (p. 208).

Since the function of stress is to highlight the most important words in a sentence, it is essential to keep this technique in mind when speaking with native speakers. In fact, a feature that may augment native English speakers' feelings of frustration when communicating with non-native speakers is the latter's tendency to over-stress every single word in a sentence. Similarly, when listening to native speakers, non-native speakers fail to understand the whole message because many of the words are not given much importance and are therefore are quickly glided over or reduced. For this reason, students should be aware that it is the stressed words that indicate the meaning in

English sentences. Words that carry information and importance are often uttered with a raised pitch and an increase in duration. In fact, mistakes in stressing the appropriate words may lead to communication failure because speakers (or listeners in this case) rely significantly on the stressed word (or the stressed syllables of the content words) to get the whole information (rather than on the unstressed words).

1.6.2.4. Contrastive stress

Unlike Arabic, Finnish, Polish, Spanish and many other languages that allow word order to highlight the most important information in an utterance, English has a fairly strict word order. In this respect, in spoken English, native English speakers use different techniques to draw the listener's attention to the most important parts of the message, one of which is putting stress on the most significant words, i.e. those that carry the most important information no matter what their grammatical function is. It is true that for learners, mainly those with a low level of English, choosing the right word is a difficult task in itself, so to explain the concept of highlighting the most important words may be quite difficult for them to understand. However, one simple yet effective way to present this important concept to students is to provide them with some examples that have exactly the same words but differ only in regard to those stressed. In other words, it is very important to emphasise that there are no rules for stressing an English sentence—it all depends on the context and the specific message the speaker wants to convey.

1.6.3. Stress placement in Spanish

Just like in many other European languages, Spanish stress is governed by regular patterns, along with many exceptions to these general rules. Even though Spanish is a

dynamic stress language, its word stress rules are quite predictable in that stress usually falls on any of the last three syllables of words. In general, in vowel-final words, it is usually the penult syllable that carries the stress while in consonant-final words, it is usually the last syllable in which the stress falls. However, the exception to this last rule occurs when a word ends in 's'. Hooper and Terrell (1976) conclude that when the final 's' functions as a plural marker or when it indicates second person singular, the stress usually falls on the penult syllable and not on the final one. Words in which the stress falls in the antepenult syllable are considered to be irregular because they contradict the first two general rules. Stress on the pre-antepenult syllable in Spanish, on the other hand, is considered quite rare, only occurring in some verbal forms when they are followed by two clitic pronouns (e.g. guardándoselos). Figure 1 highlights the tendency of stress in Spanish in the most frequent 4,829 polysyllabic words.

Word ending	Final stress	Penult stress	Antepenult stress
Vowel	178	2494	178
Consonant	798	1085	96
Final 's'	20	909	94
Consonant (except s)	778	176	2

Fig. 1 Stress placement in 4,829 polysyllabic Spanish words (Alameda and Cuetos Dictionary, 1995)

The penult stress in vowel-final words and in words ending in 's' is the general pattern, whereas final stress falls regularly in words ending in all consonants but 's'.

1.6.3.1. Nuclear stress

The nuclear stress rule of Chomsky and Halle (1968) (paraphrased as 'giving greatest prominence to the last word') could apply more to Spanish and other Romance languages than to English. Unlike contrastive or nuclear stress in English, which is used

to focus the listener's attention on a specific piece of information within a sentence, contrastive stress in Spanish usually falls on the last word of an utterance. As Spanish allows for the arrangement of word order, it is usually this technique that is used to direct the listener's attention to the new information in an intentional phrase. On the other hand, under neutral focus, all content words in sentences or phrases will be stressed and will normally be accompanied by a pitch excursion (Roca, 1986).

1.6.4. Stress in Catalan

Just like Spanish and English, the position of word stress in Catalan is free and contrastive. In this regard, Catalan uses two different accent positions to mark the stressed syllable when the word does not follow the word stress rules. There are two graphic accents, i.e. acute and grave, that are used to mark both the stressed syllables as well as the vowel quality (i.e. closed or open stressed vowels).

1.6.4.1. Accentuation rules

In Catalan, apart from some exceptions, the general tendency is that if a word ends in a consonant, the stress falls on the last syllable, whereas if it ends in a vowel, it is the second-to-last syllable that is stressed. However, when the stress falls on a different syllable, either the acute or the grave accent will mark the stressed syllables. These are some of the basic rules of Catalan stress. Monosyllabic words are not usually accentuated, except those that have a diacritical accent. Acute words, in which the tonic syllable falls on the last word, are usually accentuated if they end in vowels followed by -s, -en, or -in (e.g. Català [Catalan] and també [also]). Plain words (the penult syllable is the tonic) are usually accentuated if they do not end in any of the previous endings (e.g.

tónic [tonic] and àton [atonic]). Words stressed on the antepenult syllable, on the other hand, are always accentuated.

1.6.5. Syllable-timed versus stressed-timed languages

One of the most striking differences between Spanish/Catalan and English—as far as stress is concerned—is that Spanish and Catalan are considered to be syllable-timed languages, whereas English is considered to be a stress-timed language (Pike, 1945; Abercrombie, 1967). In this sense, for a word in Spanish that has two or more syllables, almost all of them will be given the same prominence: even though there is a stressed syllable, every syllable has its own length. On the other hand, for words in English that have two or more syllables, only one of them, the stressed syllable, will be highlighted in terms of length, pitch, and loudness. For instance, in the word hoTEL, the stressed syllable is said much more prominently than the unstressed syllable.

Regarding sentence stress, every word will receive equal importance in terms of duration and loudness in Spanish and Catalan. In English, on the other hand, only words that carry new information will be stressed, while the others, having less importance in terms of conveying new information, will be rapidly glided over. This is one of the reasons why many Spanish learners face difficulties when listening to native speakers of English, as many words are spoken quickly or are not said at all. For example, the sentences in Figure 2 will be pronounced in approximately the same time even though the number of syllables is different in each (Dalton & Seidlhofer, 1994, p. 107).

●	●	●
birds	**eat**	**worms**
the **birds**	**eat**	**worms**
the **birds**	**eat**	the **worms**
the **birds**	will **eat**	the **worms**
the **birds**	will have **eat**en	the **worms**

Fig. 2 'Birds and worms' rhythm drill

While a native English speaker will pronounce all of the sentences above in almost exactly the same time, many Spanish/Catalan learners will spend much more time pronouncing every single word, including function words, and giving them equal importance in terms of duration. In this regard, non-native speakers, especially those whose first language is considered to be a syllable-timed language, tend to emphasise every syllable within a word, and this is one of the issues that causes frustration for native speakers when listening to non-native speakers.

According to Rogerson and Gilbert (1990, p. 11):

> In English, some syllables are much more prominent than others. This prominence, or stress, is important to make speech clear. There are three main signals of stress:
>
> **1** Pitch change
> **2** Length of syllable
> **3** Vowel quality
> Together, these signals make syllables sound louder.

This definition draws attention to the significance of stress for making speech understood by the listener, who depends on such stressed syllables to understand the whole message. Benrabah (1997, as cited in Murcia, 2010) provides some examples of this, in that the 'misplaced stress on normally (norMALLy) [is] misheard as no money,

[the] misplaced stress on written (wriTTEN) [is] misheard as retain; and [the] misplaced stress on secondary (seCONdary) [is] misheard as country'.

The findings of such studies emphasise the fact that the misplacement of stress may lead to communication failure between native and non-native speakers, particularly if the first language of the non-native speaker is syllable-timed, as in the case of Spanish and Catalan. In most cases, many learners are not even aware of their mistakes concerning stress. As they pronounce English words the same as Spanish ones, they think they are doing so in the correct way.

1.7. Research questions and hypotheses

This dissertation investigates the impact of the use of technology as a tool to improve students' perceptions and production skills of word and sentence stress. Accordingly, if tertiary-level students use Computer-Assisted Pronunciation Teaching, it is hypothesised that they will develop their pronunciation skills through the recordings in relation to awareness, self-evaluation, and self-correction. In addition, if they are exposed to explicit instruction on word and sentence stress, then it is hoped that they will improve their production skills with regard to intelligibility, fluency, and accentedness. In this regard, with short-term classroom instruction, will improvements occur in:

- Research Question 1: The participants' discrimination between stressed and unstressed syllables within words, phrases, and sentences?
- Research Question 2: The participants' production skills in regard to intelligibility, accentedness, and fluency?
- Research Question 3: The participants' perspectives towards the teaching/learning of pronunciation and the use of technology as a tool for its enhancement?

In light of the issues dealt with in the literature review and the aims of this study, a thorough outline of this study's research methods will be provided in the following chapter.

Chapter II. Methodology

2.1. The design

In order to test the hypothesis that using computer-assisted learning (CAL) and new technologies in the classroom while teaching/learning pronunciation will benefit students in improving their pronunciation, an experiment was conducted that included two groups of participants: experimental and control groups. The experiment consisted of five different stages:

- Create original activities to teach word and sentence stress.
- Make the activities available online.
- Choose a representative section of the population to test the experiment.
- Instruct, monitor, and encourage participants to fulfil the tasks.
- Collect the data and analyse it.

Before they commenced the treatment, participants carried out an English level test, and a pre-speaking test. After the training, they answered a qualitative questionnaire and carried out a post-speaking test. Learning Pronunciation Skills was the name given to the training course. It was integrated in their usual course of English. The course was not graded though, as the aim was to train and instruct the participants rather than to test them. After collecting the data, two different approaches were carried out—quantitative and qualitative.

2.2. The participants

Thirty-four first year university students participated in this study. They were enrolled in either a Catalan or Spanish language literature degree at Rovira i Virgili University, in Tarragona, Spain. Almost all the participants were bilingual, Spanish and Catalan speakers. They were aged between 19 and 21 years old. At the beginning of the course there were 34 participants, 4 males and 30 females, but due to external factors, only 24 students completed the study, they were 3 males and 21 females.

2.3. The level test

The level test student took was the official free online one used by Cambridge University Press to test students' level of the language (See Appendix A). As it was expected, the level of the language of both groups was quite heterogeneous and all mixed in. In fact, of the 34 participants, eight had the A2 level, 13 had the B1 level, 10 had the B2 level, and two had the C1 level (according to the Common European Framework of Reference of Languages). The diversity of levels obviously added to the variability of the results.

2.4. The pre-speaking test

The speaking test was original, created especially for this particular group of participants. It was taken in a speech laboratory unit. Students of both groups performed the recordings individually in a soundproof booth. They were given some instructions on how to use a digital recorder. The digital recorder used for this task was a Sony PCM - M10. Participants were required to record ten words, four phrases, nine sentences, read a short text and describe a photo for one minute. There were five tasks in total. (See Appendix B).

2.5. The training

All the materials were original, designed specifically for this group of population, Spanish/Catalan speakers, taking into account the typical mistakes some of these first language speakers make while speaking in English as far as word and sentence stress are concerned. After creating all the materials to be used for this particular group of participants, they were made available online using the Scorm 1.2 compliant package; they were developed to be delivered through LMS files. These files are able to store/deliver students' learning progress and interactions.

As far as the activities are concerned, they were divided in four major units, overview, background, perception and production (Soler & Romero, 2010) In each unit, students were required to accomplish a set of interactive activities. The course was taught in 8 sessions, one hour per week. (All the activities used can be found in Appendix C).

Both the experimental and the control groups were monitored and guided throughout the whole course by the instructor/researcher. The control group received instruction on English stress by conventional means whereas the experimental group made use of the online tool for learning pronunciation. While the control group did the activities in a regular classroom, using pen and paper, the experimental group did the activities online in a computer lab and used external headphones to record themselves.

Throughout the training course, participants of both groups received constant and detailed instructions and guidance. However, the experimental group received extra guidance on how to use the website, the recording tool and the interactive activities. Figure 3 shows a screen shot of the recording tool integrated in the website the experimental group made use of. As illustrated in Figure 3, the waves demonstrate the amplitude of the user voice while recording.

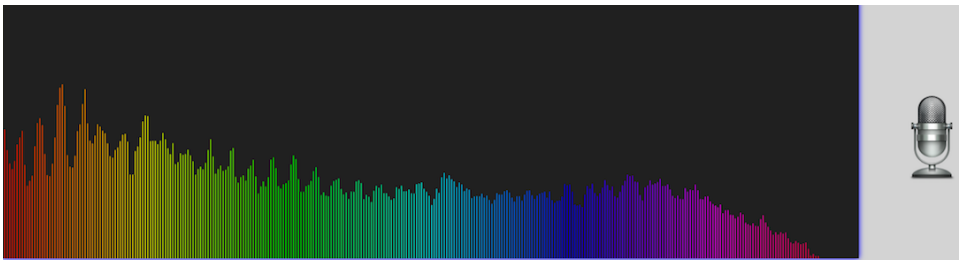


Fig. 3 A screen shot of the integrated recording tool (html 5) showing a wave form

To record themselves, participants had to click on the "microphone icon", which became red instantly. Once they started recording, they could see waves which showed the amplitude of their voices. When they finished recording, they clicked on the "save icon" shown in Figure 4 to save the file in their computers, which they uploaded afterwards on Moodle, in the forum section, so that they could go back to it whenever they needed to.

Throughout the four units, the experimental group recorded a set of words, phrases, sentences and short texts. The control group, on the other hand, listened to a native speaker and repeated the target language.

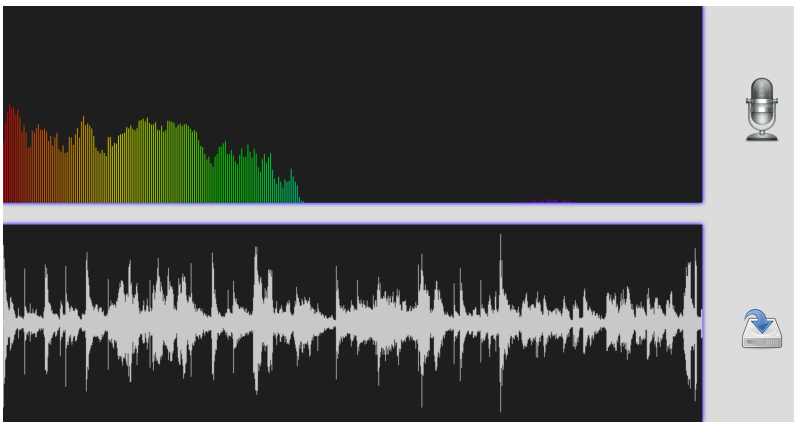


Fig. 4 A screen shot of the html 5 recording tool showing a spectrum form display (the upper panel) and a waveform (the lower panel)

2.5.1. Overview

In this section, the main objective was to draw students' attention to the differences in word and sentence stress between Spanish and English. As the rules of stress in Spanish are quite predictable, it was very important to make them aware that stress in English does not have as well-established rules as in Spanish.

2.5.1.1. Spotting the difference

The objective of the first activity was to make students realise the difference of pronunciation between some words in Spanish and their counterpart in English, even if these words are spelt exactly the same. Some of the stimuli used were: *internet, hotel, chocolate*, etc. After reading the target language, participants who belonged to the control group listened to a typical mistakes section, in which a Spanish speaker, an expert on Spanish, Catalan and English phonetics and familiar with the common mistakes most of the Spanish and Catalan native speakers make, committed intentionally some errors due to the influence of their first language. Afterwards, students listened to a native speaker of English saying the same words. Finally, they were asked to repeat the words they listened to previously. The speaker, an intern for the International Centre of the URV and a Master's degree student, is a native speaker in four languages, English, Spanish, Catalan, and French.

The experimental group also listened to the typical mistakes section, but instead of repeating the words after the native speaker they recorded themselves, listened to the native speaker and wrote down any differences they could recognise between their production and the native speaker's production. Next, they were given some room to write up to three differences.

The participants followed the same procedure with the phrases: first they read them as many times as they needed, repeated/recorded themselves, listened to the typical mistakes section, listened to the native speaker, compared their production, and finally, they wrote down up to three differences they could recognise. The same procedure was repeated with the sentences.

It is relevant to mention here that in order to draw the participants' attention to the stressed syllables of the target language, every time the trainees pressed the "check" icon, they could not only hear the model saying the given words, phrases or sentences, but they also could see the stressed syllables of the target language highlighted and underlined.

Figure 5 shows the first Set of stimuli (words), when the participants clicked on the "check" icon, the the stressed syllables of the stimuli were highlighted and underlined.

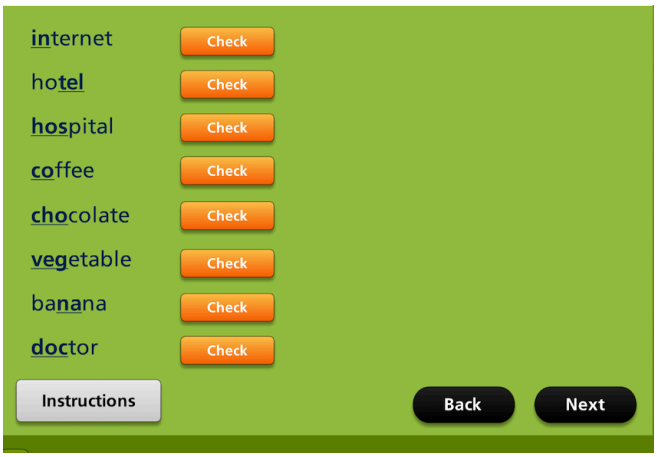


Fig. 5 An example of visual aids showing the stressed syllables of the stimuli

2.5.1.2. Raising awareness activities

This activity was related to activity 1. As shown in Figure 6, participants were required to listen again to the words, phrases, and sentences of both the typical mistakes section

and the model answers. They also had to listen to their own production and reflect on it. Afterwards, as shown in Figure 7, participants had to read three statements about Set 1 (words), Set 2 (phrases) and Set 3 (sentences) and identify their mistakes. In Set 1 (words), they were asked to choose one of the following options: whether they put the stress on the wrong syllables in all the words, in most of the words, or if their pronunciation sounded quite the same as the model. Regarding the phrases, they had to decide if they put the stress on the wrong words, whether their pronunciation sounded different from the native speaker, or if their production sounded nearly the same as the model. Concerning Set 3 (sentences), participants were required to reflect on their production and decide whether they pronounced all the words in a very different way from the model, if most of their words sounded different, or if their production sounded quite the same as the model.

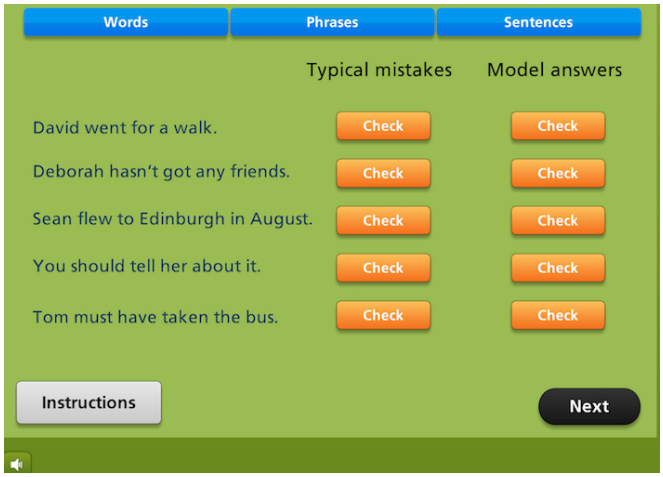


Fig. 6 A Set of words, Phrases and Sentences. When participants click on each Set, two sections appear: The Typical Mistakes Section and the Model Answer

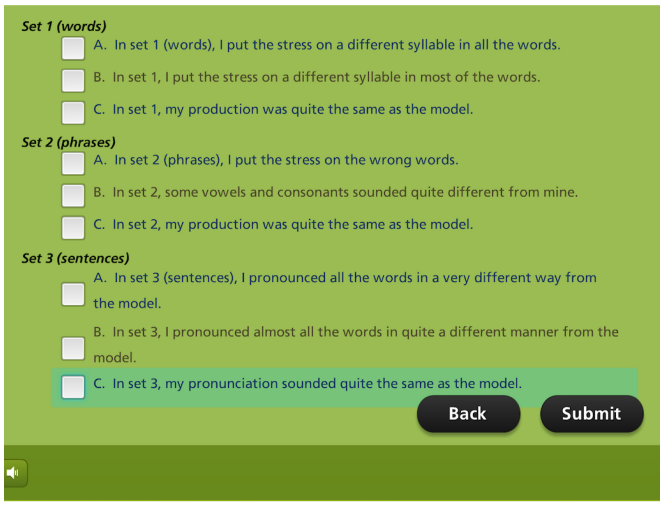


Fig. 7 An example of a Checklist Activity: Participants click on one option in each Set of words

2.5.1.3. Sharing experiences

The last activity of the overview section consisted of raising students' awareness about the difference in stress between their native language, Spanish/Catalan, and English, about the direct impact misplacement of stress has on the perception of words, and about their possible failure to perceive native speakers' natural speech. After the participants gave examples of the options shown in Figure 8, as a class discussion, they were given some room to share their previous experiences, if any, in which misplacement of stress caused communication breakdown mainly with native speakers of English.

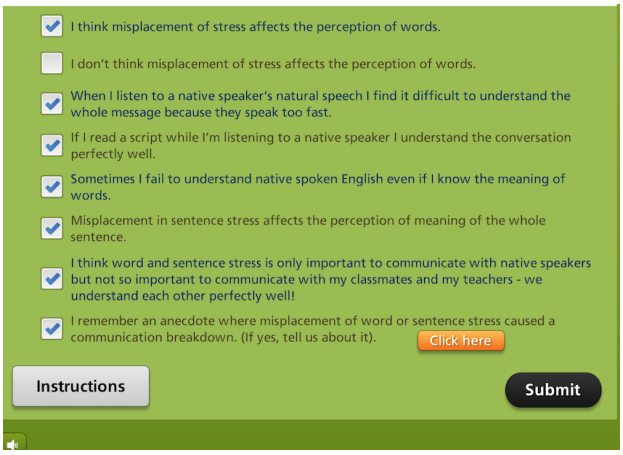


Fig. 8 A checklist activity: Students reflect on their pronunciation and share their experiences

2.5.2. Background

This section was the longest one of the whole training course, its objective being to make students reflect on the differences in the rules of stress between Spanish and English, Spanish being a syllable timed language and English being a stressed timed language. Most of the participants had the tendency to apply the well established rules of stress of Spanish while saying words in English, mainly the words which come from the same origin, Latin, and have their counterpart in Spanish. They were provided with some patterns which most of the words of the same category share as far as stress is concerned. It was hoped that students realise that stress in English is not as random and difficult to predict as it may seem.

2.5.2.1. Warm up

In the first activity of this section, as shown in Figure 9, participants had to identify the number of syllables of a set of words and choose the correct answer from a drop down list.

Fig. 9 An example of multiple options choice activity

After selecting the answers, students listened to the native speaker saying the target language. The objective of this activity was to make them aware that in words which have two or more syllables, one of these syllable will be said more prominently than the others in terms of pitch, duration and vowel quality.

2.5.2.2. Stress rules

In this section students were given some basic patterns of word stress in English. It was divided in 6 subsections: Stress rules of Nouns, Adjectives, Verbs, Nouns versus Verbs, Compound Words, and Words with Suffixes. In each Set, students had to read some words, repeated/or recorded themselves, listened to the model answer and reflected on their production. Every time the native speaker said these words, the stressed syllables were highlighted and underlined—this was done as a visual aid to direct the participants' attention to the pattern of stress in these words. Figure 10 shows a set of nouns. Almost all the words have the stress on the first syllable—as a general rule.

Fig. 10 An example of English stress rules (Nouns). When the words are clicked, the stressed syllables are highlighted and underlined.

Furthermore, participants were provided with many exceptions to these rules so that they did not take them for granted. It was very important to make students realise that all the rules or patterns were not absolute and that they had to be aware of the

exceptions so that they did not over-apply the rules to all the words they came across. Instead, they were advised to "underline" mentally the stressed syllable of every new word they learn in English.

Another important issue dealt with in this section was the fact that many verbs and nouns are homographs—they only differ in the placement of stress. Apart from some exceptions, the stress falls on the first syllable of most nouns, whereas it falls on the second syllable of most verbs. Figure 11 shows the task students had to do. They were asked to identify the stressed syllables of these words and underline/click on them. After finishing the task, students listened to the native speaker saying these words and repeated/recorded them.

Fig. 11 A set of homographs: Identifying and clicking on the stressed syllables of nouns versus verbs.

2.5.2.3. Sentence stress

The main objective of this section was to increase students' awareness of the similarity between word and sentence stress. In words with two or more syllables, one syllable will be said more prominently than the others in terms of length, pitch and loudness. Similarly, in every sentence in English and depending on many factors, some particular words will be highlighted more than the others because they carry the most information.

2.5.2.4. Content words versus function words

The first activity students had to do in this section was to read carefully a set of sentences and underline/click on the content words: the words carrying the most information. Figure 12 shows the task.

Fig. 12 Sentence stress pattern: Content words versus function words

After finishing the task, students listened to the native speaker saying these sentences. The objective of this activity was to make them aware that the "underlined/clicked" words are actually the words which carry the most information. They were advised that in order to make their speech understood, mainly when interacting with native speakers, this is one of the techniques they should use in order to direct their interlocutors' attention to the most important words.

2.5.2.5. Stress pattern

In this activity, as shown in Figures 13, 14, and 15 respectively, students had to do three tasks. First, they listened to four sentences and filled in the blanks. Afterwards, they had to underline/tick in places where the word is stressed. Finally, they had to match each sentence with its stress pattern.

Fig. 13 An example of dictation activity: Listen and fill in the blanks

The objective of these activities was to raise their awareness about the fact that even though sentences in English are very different as far stress is concerned, they usually share the same pattern: content words are said more prominently than function words.

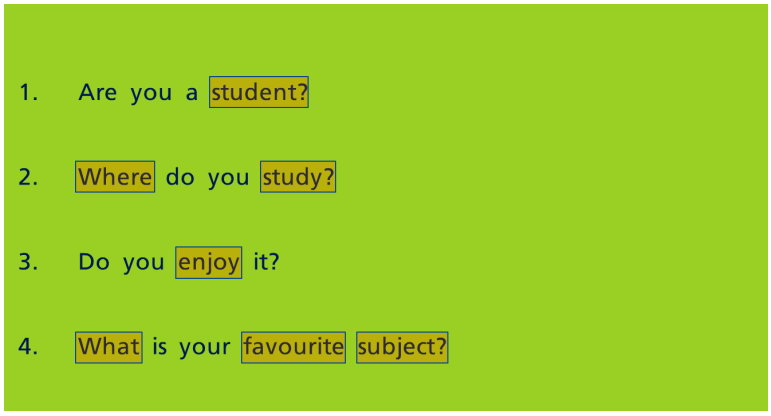


Fig. 14 An example of sentence stress recognition activity

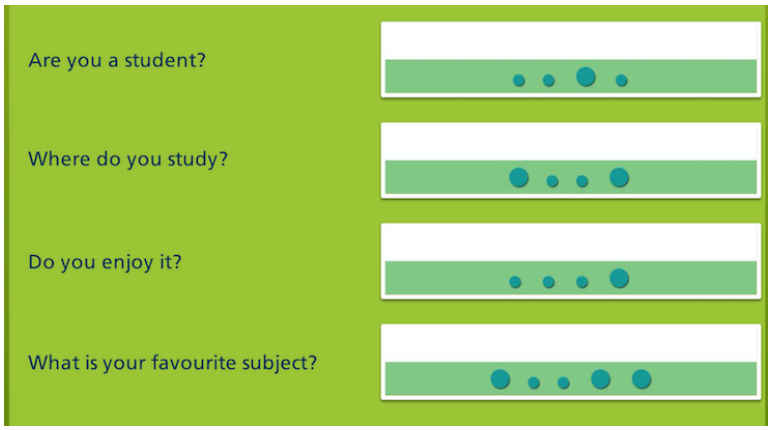


Fig. 15 Matching activity: Stress Pattern

All these activities were done in order to bring students' attention to the difference between Spanish, a syllable-timed language, and English, a stress-timed language. After completing the tasks, it was hoped that students would realise that, unlike their language, in which all syllables of all the words are said in nearly the same amount of time and energy, some words within English sentences are much more discriminated: depending on the context and generally speaking, content words are much more prominent than function words in terms of pitch, loudness, quality and length of the vowels.

2.5.2.6. Schwa versus vowels and diphthongs

Bearing in mind that the English vowel system is quite different from the Spanish/Catalan vowel systems, the aim of this activity was to provide participants with a brief training in order to make them reflect on this issue. In Spanish there are five pure vowels and six falling and eight rising diphthongs, the vowels are always written, read and pronounced in exactly the same way. Figure 16 shows the distribution of the five vowels in the chart: /i u e o a/. Each of these vowels occur in both stressed and unstressed syllables, (Martínez Celdrán, Fernández Planas & Carrera Sabaté, 2003).

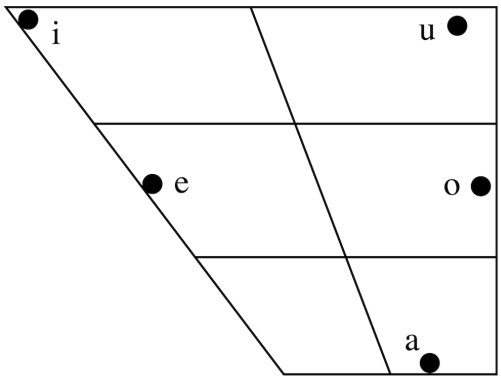


Fig. 16 Spanish vowel chart, from Ladefoged & Johnson (2010, p. 227)

Concerning the diphthongs, there are six falling: /ai̯ au̯ ei eu oi ou/; and eight rising: /ja je jo ju wa we we wo/ (Martínez Celdrán, Fernández Planas & Carrera Sabaté 2003).

In Catalan, there are eight pure vowels, seven stressed peripheral phonemes /a ɛ e i ɔ o u/ and a reduced vowel in unstressed position [ə] (Recasens, 1993). Figure 17 shows the distribution of the eight vowels of Standard Eastern Catalan (the region where this study took place): /a ɛ e i ɔ o u/ (Carbonell & Listerri 1999). In addition, the Catalan vowel inventory has a variety of rising and falling diphthongs basically including all combinations of the vowels described (Recasens, 1991).

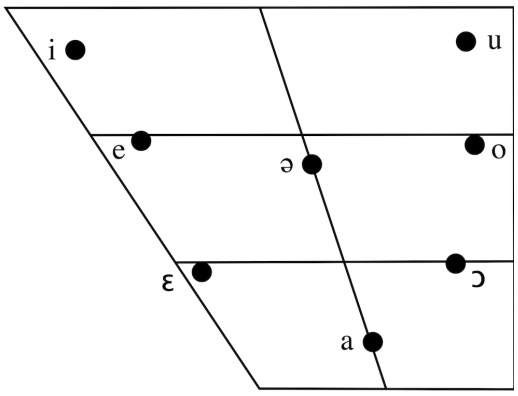


Fig. 17 Vowels of Standard Eastern Catalan, from Carbonell & Listerri (1999, p. 62)

On the other hand, English has the same vowels, in the written form, but they can be pronounced in twelve manners, up to twenty if we count diphthongs. Figure 18 shows the distribution of the monophthongal vowels of Standard Southern British English

(SSBE). In BBC English there are five long vowels: /iː ɜː ɑː ɔː uː/; seven short vowels: /ɪ e æ ʌ ɒ ʊ ə/; and eight diphthongs: /ɪə eə ʊə eɪ aɪ ɔɪ əʊ aʊ/.

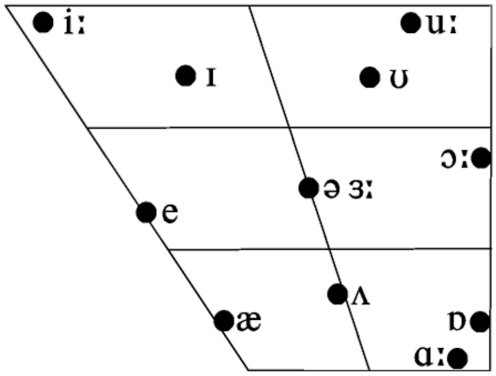


Fig. 18 Standard Southern British English (SSBE) vowel chart, from Gimson (2008)

It is not surprising then that the differences between the Spanish/Catalan and the English vowel system can be problematic for learners. In this activity, students were provided with some minimal pairs in English and another word in their language, quite similar to these words in terms of spelling, in order to shed light on the importance of vowel quality in English and to distinguish between very similar words which differ only in vowels. In all the words given, there was a contrast between schwa, the unstressed central vowel, represented by the symbol /ə/ in the International Phonetic Alphabet, and some other vowels and diphthongs.

As shown in Figure 19, students had to read these words and record themselves saying them. The aim behind this activity was to remind them that schwa can only occur in unstressed syllables.

Fig. 19 Schwa versus vowels and diphthongs

2.5.2.7. Connected speech

In the first activity of this section, students were required to read a set of sentences and record them, and then listen to a native speaker saying them. The objective of this activity was to introduce students to elision—omission of some sounds. It was important to make participants aware that the speed of colloquial natural speech can reach 350 syllables per minute (Rogerson 2011, p. 162). Consequently, certain alterations/modifications of sounds are inevitable in order to facilitate the articulation of connected speech.

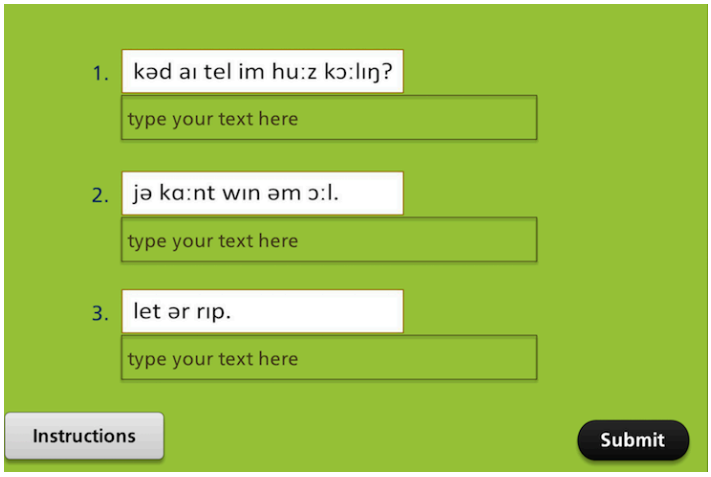


Fig. 20 Phonetic transcription: An example of elision

As shown in Figure 20, and even if students were not familiar with phonetic transcriptions, they were assessed and encouraged to read three sentences and write them in a normal script. Again, the objective of this activity was to make students aware of elision—in natural speech, many sounds that students expect to hear are not actually pronounced.

In the following activity, students had to read a set of sentences again, record them and listen to the native speaker saying them. All these sentences contained auxiliary verbs. In some sentences, they could be contracted, but in many others, they couldn't. The aim behind this activity was to give them another example of elision and emphasise that contracting auxiliaries is the most obvious case of elision in English, at least it can be seen in the written form. In all the other cases, though, the contraction of words occurs in the spoken form but not in the written form. After finishing the task, students reflected on the importance of putting the stress on the right syllables, highlighting the right words within a sentence in order to convey the correct meaning.

All the activities suggested above were done to foster the idea that native speakers highlight some words and reduce many others—words which carry the most information are emphasised, and words which do not are usually reduced. Similarly, while listening to other speakers, native speakers depend much more on the highlighted words. The misunderstanding occurs when non-native speakers highlight the wrong words, or when they over stress every syllable of each word. In this case, native speakers fail to perceive the right message, which may lead to communication failure.

2.5.3. Perception

In this section, students did a set of interactive activities, the aim of which was to make them reflect on some of the reasons why they sometimes fail to understand native

speakers' speech even though they are familiar with the language used. To achieve it, students did four different activities.

2.5.3.1. Identifying the number of syllables

Figure 21 shows an example of a drag and drop activity. Participants had to identify the number of syllables of a set of words and drag and drop them in the right column—the words were either monosyllabic, disyllabic, trisyllabic, or tetra-syllabic.

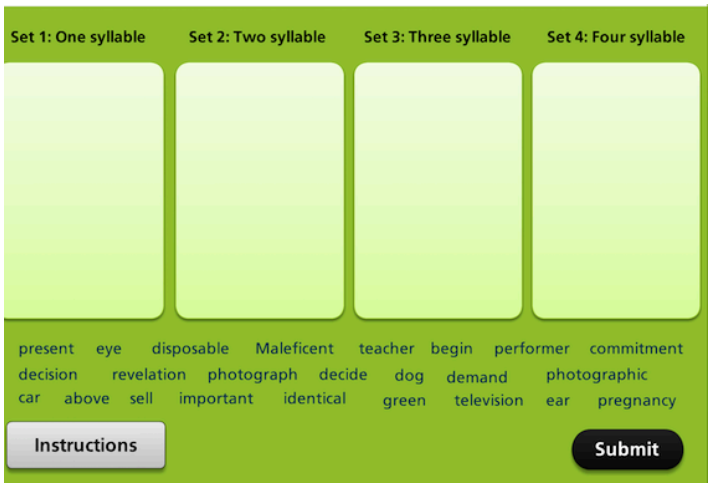


Fig. 21 An example of a drag and drop activity: Identify the number of syllables

After finishing the task of identifying the number of syllables of all the words, as shown in Figure 22, students were asked to underline/click on the stressed syllable of these words. The objective of this activity was to make them recognise that in every word having two or more syllables, one of these will be said louder, higher in pitch, and longer than the others.

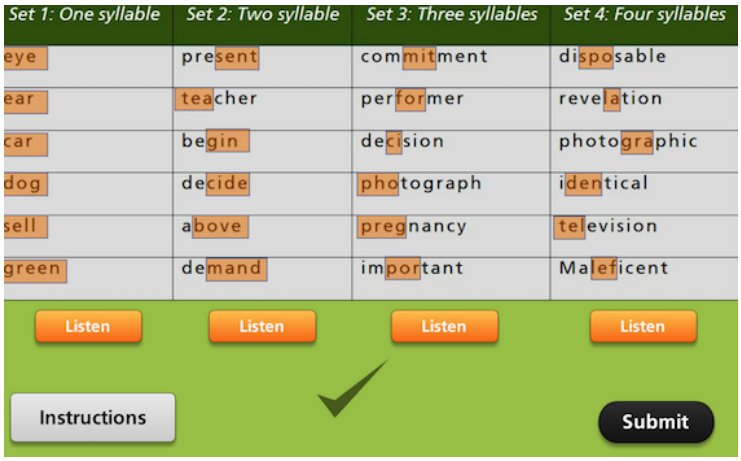


Fig. 22 Word stress recognition activity

Once students had finished underlying/clicking on the syllables, they pressed the "listen" icon to listen to the native speaker saying these words. Afterwards, they were given some room to write words from their language, either monosyllabic, disyllabic, trisyllabic, or tetra-syllabic words. The aim of this activity was to remind them of the huge difference between the well regulated rules of stress of their language and the few patterns or tendencies of English stress.

2.5.3.2. Exceptions to the rules learned

Figure 23 shows the activity students had to do in order to shed light on the many exceptions to the rules of stress in English. As they had learnt in the previous section, background, that the stress falls on the second syllable of most of the verbs, and it falls on the first syllable of most of the nouns and adjectives, in this activity they realised that there are many exceptions to this general pattern. Again, they were advised that the best way to predict stress in English is to mentally underline the stressed syllables of every new word they learn.

In the first part of this activity they had to read some verbs, listen to the model saying them and identify the verb which did not follow the pattern.

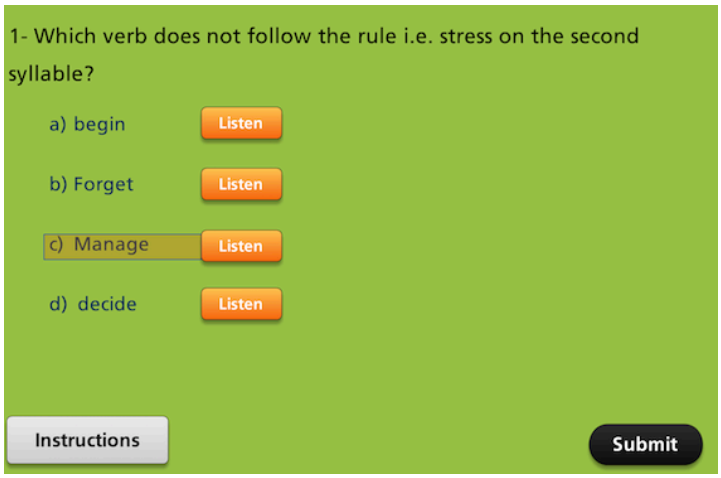


Fig. 23 An example of oddity task activity—Exceptions of word stress rules

In the next activity, participants had to read a set of nouns and listen to the model saying them. As shown in Figure 24, the task consisted in having students identify the function of words they heard: verbs or nouns.

Fig. 24 An example of identifying grammatical category activity: Noun/verb recognition

2.5.3.3. Cloze activities

The last activities in the perception section were slightly demanding, since it was expected that students at this stage would be more confident about word and sentence stress. They were given a part of the lyrics of a song in which all the content words were

removed. The song chosen was "With a Little Help from my Friends" by the Beatles, written by John Lennon and Paul McCartney from the album Sgt. Pepper's Lonely Hearts Club Band, issued worldwide in June 1967. As shown in Figure 25, first, they had to decide if the words were nouns, verbs, adjectives, etc. Then, they listened to the song and this time they had to fill in the blanks with the missing words.

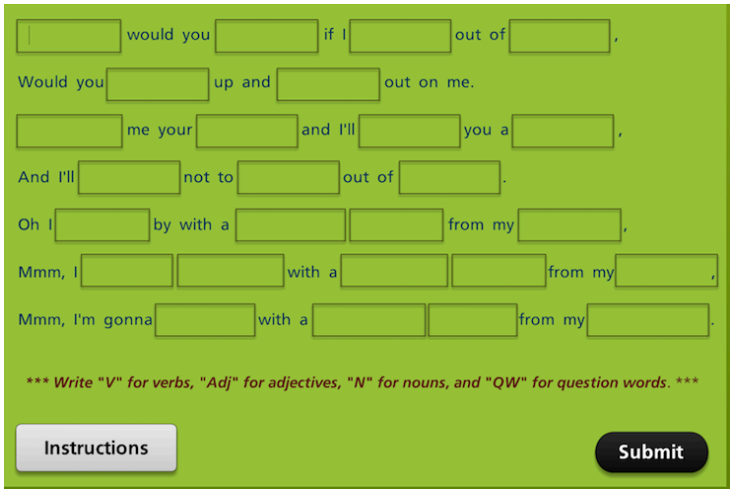


Fig. 25 A part of "With a Little Help from my Friends": the content words were removed

2.5.3.4. Introducing natural colloquial speech

In the last activity of this section, a cloze activity, participants were provided with a conversation taken from a film, "Fast and Furious", an American action film released in 2013, directed by Justin Lin and and written by Chris Morgan. This time, and as shown in Figure 26, students had to predict which function words were removed and fill in the blanks with words which fit in the meaning.

The aim behind both activities was to make students reflect on the importance of highlighting the most important words, the content words, to make the meaning understood. Sometimes even if function words are reduced or removed, the message can still be understood.

Fig. 26 An example of a Cloze activity: part of a conversation from the film "Fast and Furious" in which all the function words were removed.

After finishing the tasks, students realised that when content words were removed from the song lyrics, it became nonsense. However, when function words were removed from the conversation, obviously the sentences were grammatically incorrect, but still the meaning was predictable. It was hoped that students would understand that native English speakers highlight the content words when they speak, i.e., the most important words which carry the most information. Similarly, when they are listening, they depend much more on the highlighted words (the stressed words, or content words) to get the message. Of course, if they hear a word which does not match their mental repertoire, because its highlighted syllable is wrong, or if they hear a sentence in which the highlighted words are not the ones which carry the most information, they will probably miss the meaning of the message, which may lead to communication breakdown.

2.5.4. Production

In the last part of the training, production, students were provided with a set of activities to make them reflect on the reason why sometimes native speakers do not understand non-native speech even if the right words and grammar have been used.

2.5.4.1. Oddity-task activities

In the first activity they were required to read a set of words which had the same function and choose the odd one out, the word which did not follow the same pattern as far as stress was concerned. They were required to do this activity in order to accentuate one more time that, even though there are many rules of stress in English, they do not have to take them for granted, as there are many exceptions. It was another opportunity to revise all the rules and their exceptions learned so far. Again, they were asked to record themselves and compare their production to the native speaker.

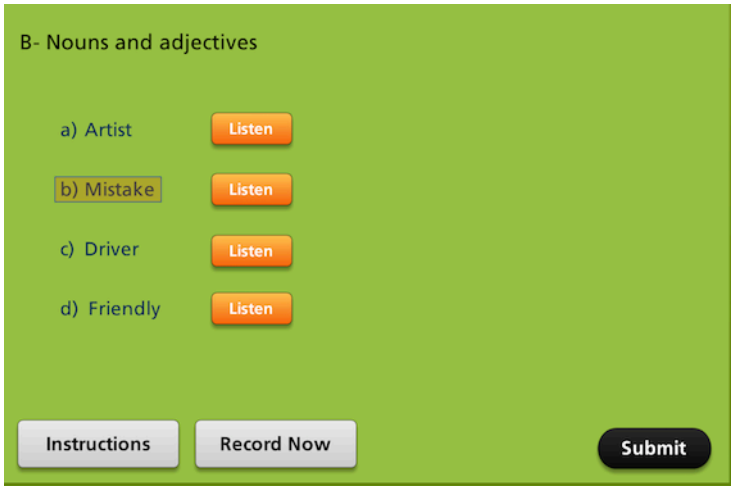


Fig. 27 Identify exceptions to word stress: (nouns and adjectives)

2.5.4.2. Shift in sentence stress

In this activity students were introduced for the first time to shift in sentence stress—a tendency to put the stress on some syllables, even if they are not usually stressed in order to emphasise a particular piece of information within a sentence. This activity was probably one of the most demanding activities. Students had to read eight sentences which were spelt exactly the same but each time a different word was highlighted. First, they had to listen to the native speaker saying them and then they had to choose in which sentence the speaker wanted to convey a specific message. Figure 28 shows the shift in words, the highlighted words are the stressed ones.

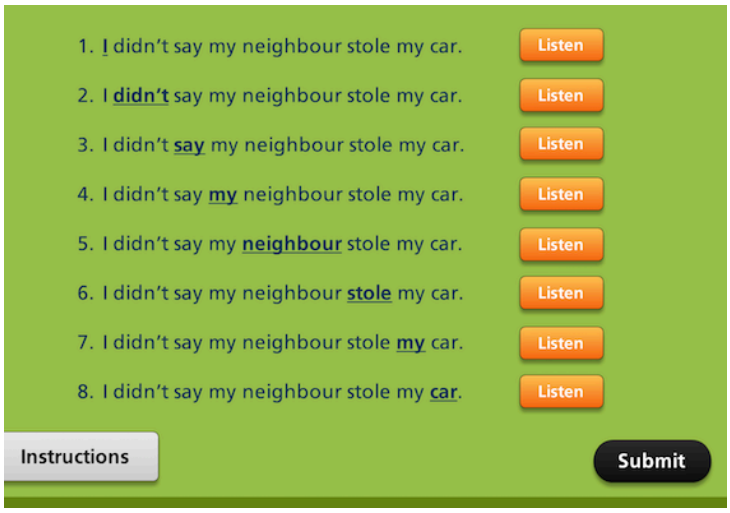


Fig. 28 An illustration of shift in sentence stress

As shown in Figure 29, after finishing the task, students were given the solutions and the possible meaning of the sentences. The objective of this activity was to make them aware that shift in sentence stress is crucial to convey the meaning and that stressing the wrong words alters the meaning of the whole sentence, which may cause communication breakdown.

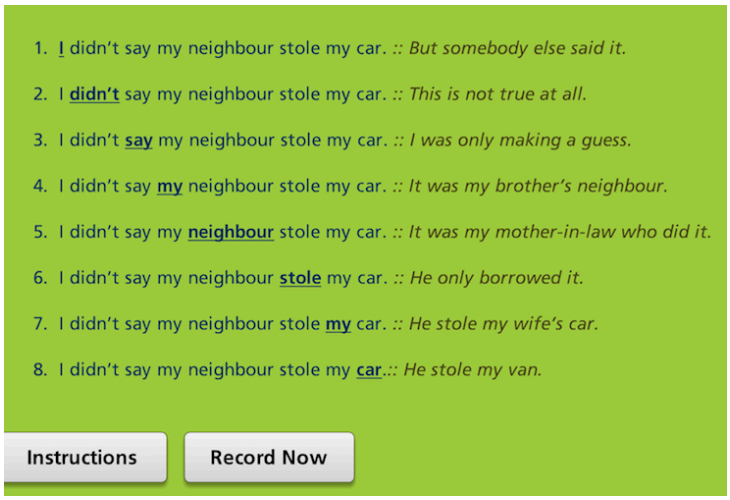


Fig. 29 Different meaning depending on the stressed word

2.5.4.3. Stress pattern

Figure 30 shows a matching activity participants had to do. They first read sentences and then they identified the possible stressed words according to their function. Finally, they matched them to their stress pattern. Again, the objective of this activity was to make them aware of the hierarchy between the words in English: the content words are usually stressed, whereas the function words are unstressed.

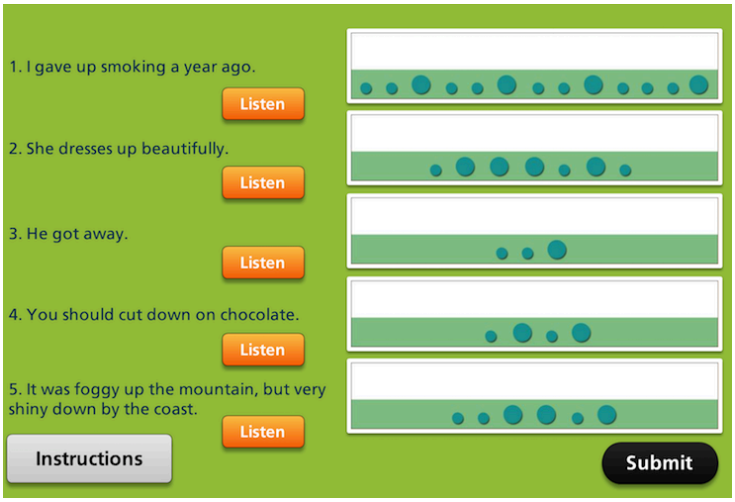


Fig. 30 An example of a matching activity: stress pattern

2.5.4.4. Word stress recognition in connected speech

In the last activity of this pronunciation training course, participants had to listen to a speech by Steve jobs. The speech was the Stanford Commencement Speech on June 12th, 2005. As illustrated in Figure 31, after listening to the speech, participants had to write the missing words, identify the stressed syllables, underline/click on them and finally record themselves. This last activity was meant to make them familiar with the technique of emphasising and highlighting the most important words while talking in a natural context.

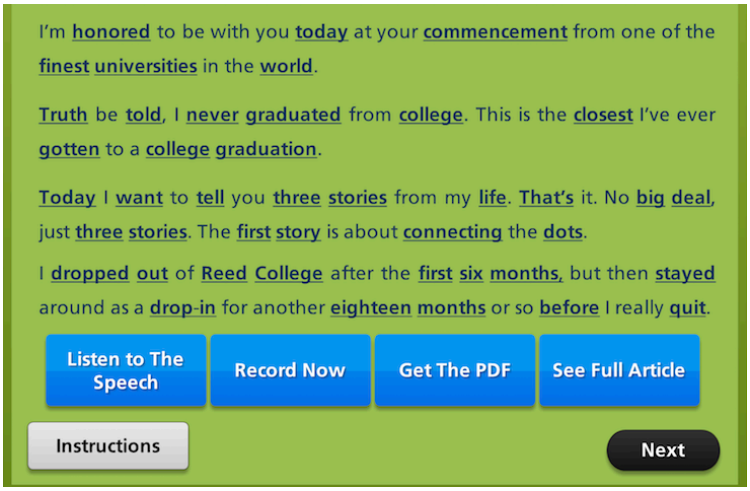


Fig. 31 A part of the Commencement Stanford Speech by Steve Jobs: the content words are highlighted and underlined

2.6. Post-test

The post-test was also carried out in the speech unit laboratory. Once again, students did the recordings individually in a sound-proof booth and used the same digital recorder mentioned in the pre-test section. In order to test their improvement and avoid unnecessary variables, students were made to redo the reading and record the same words, phrases, sentences, short text and describe the same photo they had described in the pre-test.

It is relevant to mention here that the difficulty imposed on each of the tasks mentioned above was not the same. Reading words in isolation was less demanding than reading words in contexts—phrases, sentences, short text—which in turn were less demanding than the timed picture-description task, in which participants had to generate their own narration of a photo. On the other hand, in order to test whether potential improvement applied to items which did not appear in the training, the items used as stimuli for the reading tasks were divided into familiar (in the case of the words) and novel (in the case of the phrases, sentences and the short text).

2.7. Qualitative questionnaire

After finishing the treatment, the trainees answered a qualitative questionnaire. All the questions were created specifically for this particular group of subjects. The first task consisted of providing some basic information about themselves: name, age, sex, degree they were studying and the year they were in. In the second task the participants used a 5-point Likert scale to rate the usefulness of English for their future, their pronunciation before the training, their feedback about the recordings/listening to the model speaker and repeating afterwards, the importance of accurate pronunciation mainly while communicating with native speakers, the importance of using technology in the classroom, and finally their perspectives about the course in general.

The following task consisted of providing open answers related to the previous task—their previous training on pronunciation, whether they had ever failed in conveying or perceiving a message in English because of their pronunciation…etc,. They were also asked to list four major improvements they could recognise after finishing the training, their perspectives about using the website, the recording tool, and the usefulness of the recordings as a way to make them aware of their mistakes. Finally, they were asked to

give their opinion/feedback about the course in general and whether they were satisfied with it. (The questionnaire they used can be found in Appendix D).

2.8. Data analysis

After students had done the pre-test, the training, the post-test, and the questionnaire, all the recordings were edited using the Audacity software. Due to time and space limitations, a decision was made to analyse only a part of the pre-test, the post-test and the questionnaire. The next section describes the different approaches adopted to analyse the data.

2.8.1. Acoustic analysis of the data

A part of the recordings was evaluated using acoustic analysis with the Praat speech analysis software (Boersma & Weenink, 2017). Even though in the actual test participants had read and recorded ten words, four phrases, ten sentences, and a short text, only the words and phrases were analysed. The analysis was carried out for each participant and then per group at each testing phase (pre-test and post-test). Each syllable in the words and phrases was identified in the acoustic signal and a reading of the intensity peak was obtained. These values were then processed in order to obtain the difference in amplitude between the stressed and the unstressed syllables. Amplitude, rather than pitch values, were used because amplitude is a more relevant aspect of Spanish stress than pitch, so it was thought that it would reflect Spanish/Catalan speakers attempts at pronouncing English stress more precisely than pitch. All the values were transferred by default to an intensity log document, which was then copied to an Excel file in which more detailed information was added: the initials of the name of the participant, the number of the activity, the word measured, and the time of the

intensity peak of the syllable. In Figure 32 the word *doctor* is shown. The red bars show the peak of the two syllables that the word has. The difference of amplitude between the stressed syllables and the unstressed syllable is clearly visible.

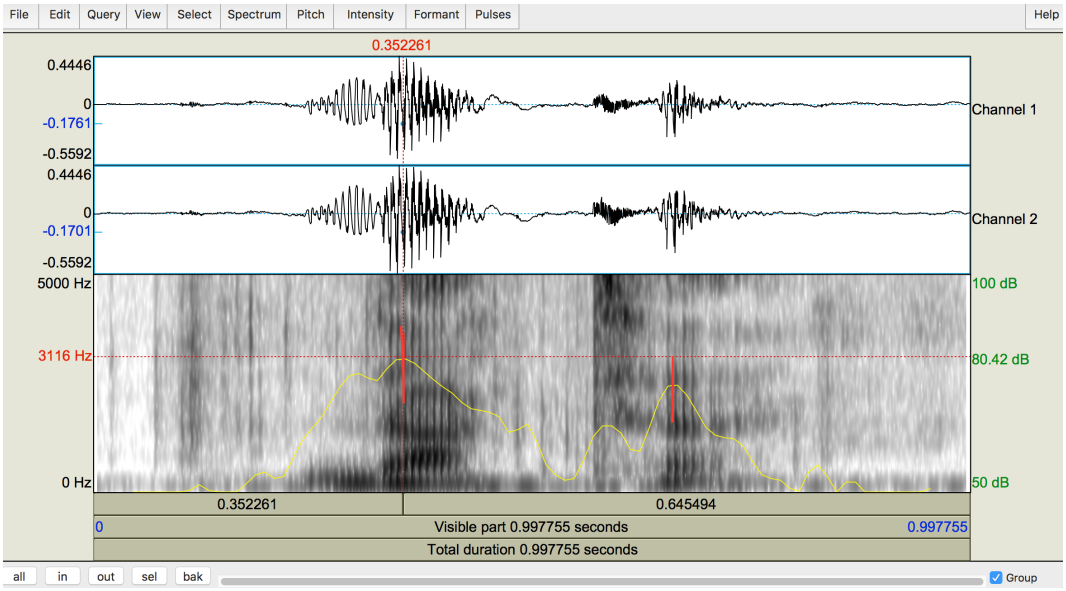


Fig. 32 An example showing a waveform display (upper panel) and a spectrogram with intensity curve (lower panel).

The scores obtained were calculated by subtracting the value of the unstressed syllables from the stressed syllables. Thus, the scores were calculated and compared for each participant, in the pre- versus post-test, and per each group, in the control versus the experimental group. All scores were submitted to statistical analyses and will be reported in Chapter 3, part I.

Table 1 shows an example of the process done in order to obtain the difference of amplitude between the stressed and the unstressed syllables of the words analysed. Both words illustrated in Table 1 are bisyllabic words, thus, only one analysis was required. In the word *doctor*, the stressed syllable is the first one, thus, the difference of amplitude was obtained by subtracting the second syllable from the first one. In the

second word, *hotel*, as the stressed syllable is the second one, the second syllable was subtracted from the first syllable. In words with more than two syllables, more than one analysis were needed.

Table 1. An example of the process done to calculate the difference in amplitude between the stressed and the unstressed syllables

Subject	Test	Exercise	Word	Time	DB	Difference in amplitude
						syll1-syll2
CB	post-test	1	doctor	0.31	80.57	**5.67**
CB	post-test	1	doctor	0.54	74.9	
						syll2-syll1
CB	post-test	1	hotel	0.093	72.24	**5.98**
CB	post-test	1	hotel	0.363	78.22	

As far as the phrases are concerned, the procedure was slightly different in that the difference of amplitude was calculated between the stressed and the unstressed syllables within words. Table 2 shows the procedure done with the phrase c*atholic receptionist*.

Table 2. An example of the process done to calculate the difference in amplitude between the stressed and the unstressed syllables within words

subject	test	exercise	word	time	DB	Difference in amplitude between the stressed and unstressed syllables					
						syll5-syll1	syll5-syll2	syll5-syll3	syll5-syll4	syll5-syll6	syll5-syll7
CB	Posttest	2	Catholic	0.184	75.52	2.21	1.79	2.9	3.1	10.68	9.24
CB	Posttest	2	Catholic	0.367	75.94						
CB	Posttest	2	Catholic	0.472	74.83						
CB	Posttest	2	receptionist	0.62	74.63						
CB	Posttest	2	reception ist	0.834	77.73						
CB	Posttest	2	receptionist	1.074	67.05						
CB	Posttest	2	receptionist	1.148	68.49						

As this phrase was out of context, it was assumed that the most important word, the word which carries the most information was *receptionist,* the stressed syllable of which is the fifth one, *"cep"*. Thus, all the other syllables of this phrase were subtracted from it.

2.8.2. Analyses of production data by means of raters' judgements

As far as the production data are concerned, participants of both groups were required to generate their own description of a photo for one minute. According to Munro (2008), " From the standpoint of communication, there is no useful way to assess accentedness […] except through listener responses of some sort" (p. 200). Subsequently, the data was analysed by means of native English raters' judgments. Ten native English raters listened to 54 recordings and used polar anchors on a 6 point Likert scale to evaluate the participants' production task by means of comprehensibility, accentedness and fluency. All the recordings were uploaded into a Google Form and were sent via e-mail so that the judges could access the recordings as well as the evaluation form. Figure 33 shows the assessment form the judges used to rate the participants' production.

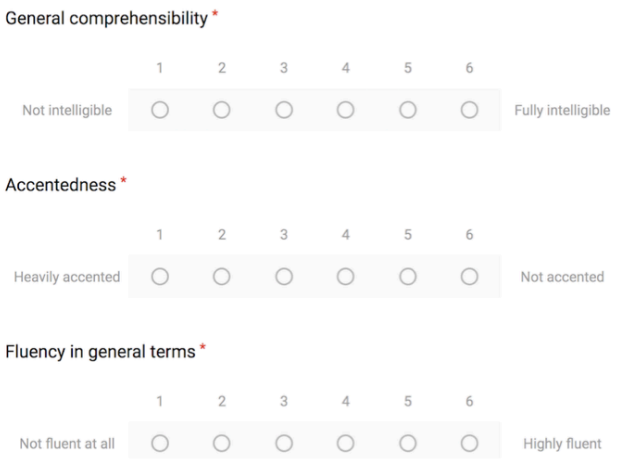


Fig. 33 The assessment form the judges used to rate the participants fluency.

The judges were given detailed instructions on how to use the evaluation form. Even though some of the raters had previous experience with Spanish and Catalan speakers, mainly the ones who were living in Catalonia, Spain, they were asked to evaluate students recordings as a native speaker would do without being familiar with the Spanish accent or the typical mistakes due to the interference of first language.

2.8.2.1. Raters

All the raters were native English teachers. Some of them were living in Spain at the time of the experiment, but the majority were living abroad. Table 3 shows the profession and the nationality of the ten English raters.

Table 3. Production data raters

Judges	Profession	Nationality
Rater 1	Teacher and translater	British
Rater 2	Teacher	British
Rater 3	EFL teacher	Irish
Rater 4	ESL teacher	Irish
Rater 5	Teacher	British
Rate 6	Teacher	South African + British
Rater 7	English teacher	Irish
Rater 8	Pronunciation Trainer and Teacher	American
Rater 9	Teacher	Irish
Rater 10	Narrator	British

2.8.3. Analysis of qualitative data (post training questionnaire)

Immediately after the training, participants of both groups completed a questionnaire in which they reported their previous experiences with the teaching/learning of pronunciation, their opinion about the use of technology in the classroom and the

usefulness of the training in general. The results obtained are presented and discussed in the next section. (The questionnaire can be found in Appendix D).

Chapter III. Results

The present chapter is divided in three main parts. Part I describes the results of the acoustic analysis of the data obtained from the Praat speech software measurements in the pre- and a post-tests; it also reports on the results obtained from a series of t-tests conducted in order to test the differences between the group mean scores. For all the tests, the level of statistical significance was set at $p < .05$.

Part II shows the results of the task in which ten raters evaluated the participants' own description of a photo in the pre- and post-tests. In order to determine the level of agreement between the 10 raters for this production task, a reliability analysis using an Intra-Class Correlation Coefficient (ICC) was used. According to Cronbach (1955) "a reliability coefficient demonstrates whether the test designer was correct in expecting a certain collection of items to yield interpretable statements about individual differences" (p.297). Statistical analyses were performed using IBM SPSS Statistics ver. 21 to compute inter-rater reliability for this coding task. The ICC computed was based on a mean-rating ($k = 10$), consistency, 2-way random effects model with 95% confidence intervals. Based on the 95% confident interval of the ICC estimate, values less than 0.5, between 0.5 and 0.75, between 0.75 and 0.9, and greater than 0.90 are indicative of poor, moderate, good, and excellent reliability, respectively. Part II also reports the results obtained from a series of t-tests. The t-tests were performed by importing the modified Excel file into SPSS and performing the analyses within the SPSS platform.

Part III shows the results obtained from the qualitative questionnaire. A discussion will follow each set of results and a separate chapter, Chapter IV, will present the global discussion of the findings of this study.

3.1. Acoustic measurements

The main research hypothesis of this dissertation deals with the effects of the use of computer assisted pronunciation training in the classroom. That is to say, the effects obtained from the use of the integrated recording tool in the online pronunciation course. Accordingly, results of both groups, the control, which did the activities in a conventional way, and the experimental, which actually used the integrated recording tool in the website, will be shown. In the next section, a thorough description of the results of the data analysis will be presented.

3.1.1. Acoustic and statistical analysis of words

Table 4 shows the group changes in the pronunciation of the words analysed as far as word stress is concerned. The numbers in the first column refer to the position of the unstressed syllables which were subtracted from the stressed syllables. The numbers in the fourth column, the gain scores, were calculated by subtracting the pre-test values from the post-test values. If we compare the mean scores of the values both groups obtained in the pre and post conditions, we observe that the level of discrimination between the stressed and unstressed syllables was more pronounced in the experimental group than it was in the control group. In the word *doctor,* for instance, the experimental group obtained 2.92 gain scores, whereas the control group obtained -0.85. The same applies to the word *vegetable*, mainly in the first and third analyses; even though both groups improved, the improvement was more obvious in the experimental group. Thus, in the first analysis, the gain score of the control group was 2.94, while in the experimental group it was 7.2. In the third analysis, the gain score of the control

group was 1.53, whereas in the experimental group it was 8.57, the gain score the experimental group obtained was almost three times higher than the control group.

Table 4. Pre-test, post-test and gain scores for the words recorded and analysed with the speech software Praat

	Control group			Experimental group		
Words analysed	Pre	Post	Gain scores	Pre	Post	Gain scores
doctor (1-2)	2.31	1.46	-0.85	2.12	5.04	2.92
hotel (2-1)	-0.13	0.27	0.4	-2.15	-2.1	0.05
coffee (1-2)	3.91	7.11	3.2	4.44	6.3	1.86
internet (1-2)	0.71	2.36	1.65	0.21	0.68	0.47
internet (1-3)	0.62	3.61	2.99	-0.17	3.31	3.48
banana (2-1)	-1.42	-1.29	0.13	1.61	-0.37	-1.98
banana (2-3)	2.41	3.21	0.8	-0.12	2.17	2.29
cupboard (1-2)	-1.46	-0.08	1.38	-0.02	1.28	1.3
hospital (1-2)	4.09	5.45	1.36	4.87	5.33	0.46
hospital (1-3)	0.83	2.4	1.57	1.61	4.35	2.74
magazine (3-1)	-2.42	-0.57	1.85	-0.2	-2.98	-2.78
magazine (3-2)	-2.09	1.08	3.17	2.39	-1.09	-3.48
vegetable (1-2)	2.54	5.48	2.94	0.35	7.55	7.2
vegetable (1-3)	2.09	5.22	3.13	-0.42	6.46	6.88
vegetable (1-4)	1.57	3.1	1.53	-0.3	8.27	8.57
chocolate (1-2)	2.98	6.97	3.99	3.78	9.44	5.66
chocolate (1-3)	5.64	12.48	6.84	9.78	11.98	2.2

Table 5 shows the results obtained from the t-tests performed: two paired samples to compare the pre and post scores within the same group and two independent samples to compare scores across the two groups. The shaded cells show the statistically significant results. As observed in Table 5, there were more significant results in the experimental group, 4 cases, than they were in the control group, 3 cases. In the next section, a through description of the mean values as well as graphs will be shown for each word analysed, followed by the results obtained from the t-tests.

Table 5. Means, Standard Deviation and t-test results (p.values) for the words measured using Praat

	Control group				Experimental group				t-tests ($p < .05$)			
	Pre-test		Post-test		Pre-test		Post-test		Paired samples		Independent samples	
Words analysed	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Control	Exp	Pre	Post
Doctor 1-2	2.31	4.88	1.46	4.67	2.12	1.79	5.04	6.66	0.62	0.12	0.90	0.13
Hotel 2-1	-0.13	4.63	0.27	5.37	-2.15	4.36	-2.10	3.72	0.65	0.97	0.28	0.47
Coffee 1-2	3.91	4.32	7.11	5.65	4.44	3.67	6.3	6.76	0.06	0.26	0.75	0.75
Internet 1-2	0.71	4.25	2.36	4.97	0.21	3.5	0.68	2.28	0.31	0.64	0.75	0.29
Internet 1-3	0.62	3.62	3.61	8.11	-0.17	5.25	3.31	7.17	0.26	0.15	0.67	0.92
Banana 2-1	-1.42	2.5	-1.29	2.04	1.61	2.42	-0.37	3.58	0.87	0.14	0.006	0.47
Banana 2-3	2.41	2.08	3.21	4.62	-0.12	3.06	2.17	5.24	0.57	0.11	0.02	0.61
Cupboard 1-2	-1.46	5.34	-0.08	6.74	-0.02	4.24	1.28	5.76	0.53	0.43	0.47	0.59
Hospital 1-2	4.09	5.85	5.45	5.13	4.87	4.33	5.33	4.87	0.48	0.79	0.71	0.95
Hospital 1-3	0.83	3.88	2.4	7.39	1.61	6.53	4.35	6.66	0.39	0.21	0.72	0.50
Magazine3-1	-2.42	3.55	-0.57	3.85	-0.2	4.75	-2.98	5.52	0.14	0.18	0.20	0.22
Magazine3-2	-2.09	4.52	1.08	4.12	2.39	5.45	-1.09	3.54	0.01	0.56	0.03	0.17
Vegetables 1-2	2.54	4.77	5.48	4.7	351	5.8	7.55	5.83	0.01	0.005	0.32	0.35
Vegetables 1-3	2.09	4.97	5.22	7.24	-0.42	5.36	6.45	5.22	0.13	0.02	0.24	0.63
Vegetables 1-4	1.57	5.47	3.1	5.57	-0.3	5.73	8.27	8.31	0.39	0.01	0.42	0.07
Chocolate 1-2	2.98	8.03	6.97	5.73	3.78	4.49	9.44	6.69	0.15	0.04	0.76	0.34
Chocolate 1-3	5.64	7.99	12.48	7.82	9.78	7.61	11.98	3.65	0.001	0.25	0.20	0.84

- *Doctor (1-2)*

The first word analysed was *doctor*, a bisyllabic word, in which the stress falls on the first syllable. The difference between the amplitude of both syllables was calculated by subtracting the second syllable from the first one. As shown in Figure 34, the improvement is clearly pronounced in the experimental group, which obtained $M = 2.12$ in the pre-test and $M = 5.04$ in the post-test, gain scores: 2.92. The mean scores of the

control group were *M* = 2.31 in the pre-test and *M* = 1.46 in the post-test, gain scores -0.85.

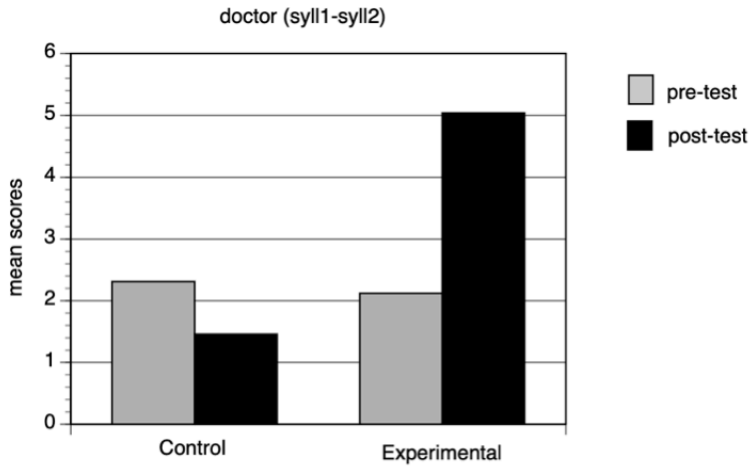


Fig. 34 Mean scores of the values obtained in the pre-test and post-test for the word *doctor*

Statistic results indicate no significant difference in the t-test for the control group in the pre-test (*M* = 2.31, *SD* = 4.88) vs. the post-test, (*M*=1.46, *SD*= 4.67), *t*(11) = .50, *p* = .62. Neither were they significantly different in the scores for the experimental group in the pre-test (*M* = 2.12, *SD* = 1.79) vs. the post-test (*M* = 5.04, *SD* = 6.66), *t*(11) = -1.64, *p* = .12. Regarding the independent samples, there was not a significant difference in the t-test for the control group versus the experimental group in either the pre-test (*M* = 2.31, *SD* = 4.88) and (*M* = 2.12, *SD* = 1.79), *t*(22) = .12, *p* = .90, or in the post-test (*M* = 1.46, *SD* = 4.67) and (*M* = 5.04, *SD* = 6.66), *t*(22) = -1.56, *p* = .13.

- *Hotel (2-1)*

The second word analysed was *hotel*, the stressed syllable of which is the second one. To get the difference of amplitude between the stressed and the unstressed syllables, the first syllable was subtracted from the second one. Figure 35 shows the mean scores of both the control and the experimental group. There was a slight improvement favouring

the control group, which obtained *M* = -0.13 in the pre-test and *M* = 0.27 in the post-test, gain scores 0.4. The experimental group, on the other hand, obtained *M* = -2.15 in the pre-test and *M* = -2.10 in the post-test, gain scores 0.05.

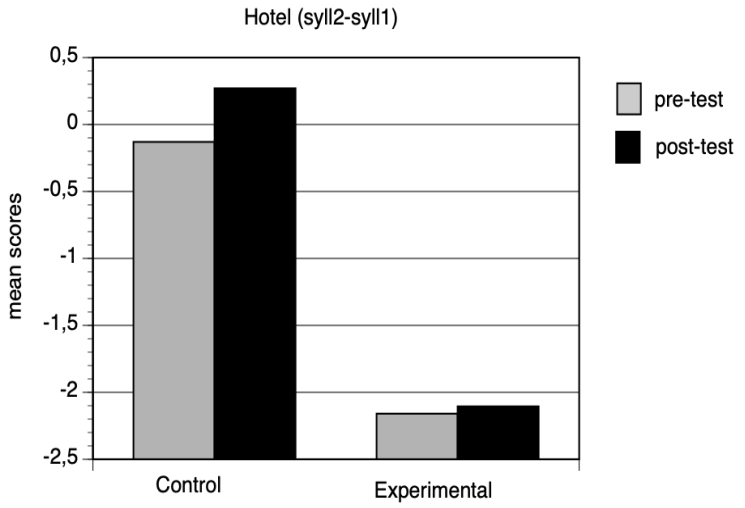


Fig. 35 Mean scores of the values obtained in pre-test and post-test of the word *hotel*

There was not a significant difference in the t-test for the control group in the pre-test (*M* = -.13, *SD* = 4.63) vs. the post-test (*M* = .27, *SD* = 5.37), *t*(11) = .45, *p* = .65. There was not a significant difference in the t-test for the experimental group in the pre-test (*M* = -2.15, *SD* = 4.36) vs. the post-test (*M* = -2.10, *SD* = 3.72), *t*(11) = -.03, *p* = .97, either. As far as the independent samples are concerned, there was not a significant difference in the t-test for the control group in the pre-test (*M* = -.13, *SD* = 4.63) vs. the experimental group (*M* = -2.10, *SD* = 4.36), *t*(22) = 1.10, *p* = .28. There was not a significant difference in the t-test for the control group in the post-test (*M* = 0.27, *SD* = 5.37vs. the experimental group *M* = -2.10, *SD* = 3.72, *t*(22) = .73, *p* = .47, either.

- *Coffee (1-2)*

The third word analysed was *coffee.* This word is bisyllabic, the stressed syllable of which is the first one. To get the difference of amplitude between the stressed and

unstressed syllables, the mean values of the second syllable was subtracted from the first syllable. As figure 36 shows, both groups improved, favouring the control group, which obtained *M* = 3.91 in the pre-test, and *M* = 7.11 in the post-test, gain scores 3.2. The experimental group, on the other hand, obtained *M* = 4.44 in the pre-test and *M* = 6.3 in the post-test, gain scores 1.86.

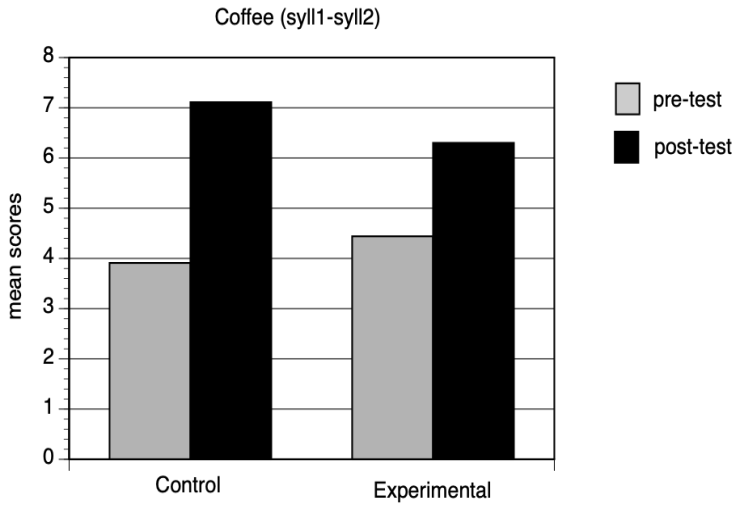


Fig. 36 Mean scores of the values obtained in pre-test and post-test of the word *coffee*

There was not a significant difference in the scores for the control group in the pre-test (*M* = 3.91, S*D* = 4.32) and in the post-test (*M* = 7.11, *SD* = 5.65), *t*(11) = -2.03, *p* = .06. Concerning the experimental group, their scores were not significant either in the pre- versus post-test (*M* = 4.44, *SD* = 3.67) and (*M* = 6.30, *SD* = 6.76), *t*(11) = -1.17, *p* = .26. Regarding the independent samples, there was not a significant difference in the scores for the control group versus the experimental group in the pre-test (*M* = 3.91, *SD* = 4.32) and (*M* = 4.44, *SD* = 3.76), *t*(22) -.32, *p* = .75. There was not a significant difference in the scores for the control group in the post-test (*M* = 7.11, *SD* = 5.65) and the experimental group (M = 6.30, SD = 6.76), *t*(22) .31, *p* = .75, either.

- *Internet (1-2)*

The fourth word analysed was *internet*. In this word, the stress falls on the first syllable. Unlike bisyllabic words which require only one analysis, the word *internet*, being trisyllabic word, required two analyses. In the first analysis, the second syllable was subtracted from the first syllable and in the second analysis the third syllable was subtracted from the first one. Figure 37 shows the results of the first analysis and Figure 38 shows the results of the second analysis. In the first analysis both groups improved, favouring the control group, which obtained $M = 0.71$ in the pre-test and $M = 2.36$ in the post-test with 1.65 gain scores; the experimental group, on the other hand, obtained $M = 0.21$ in the pre-test and $M = 0.68$ in the post-test, gain scores 0.47.

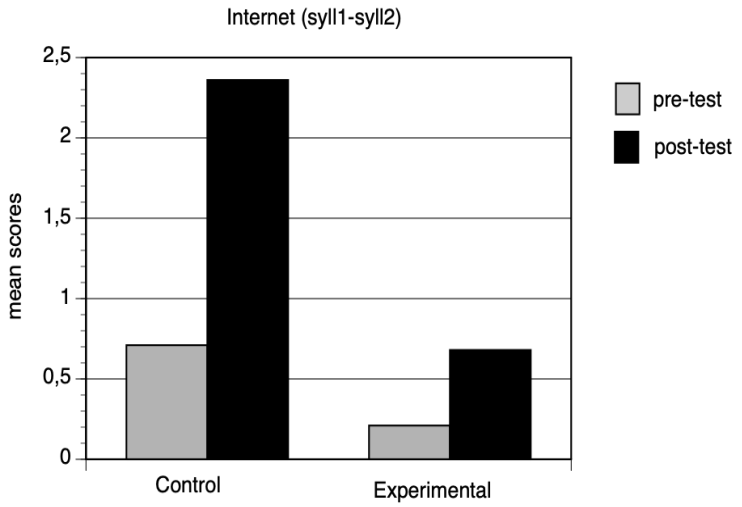


Fig. 37 Mean scores of the values obtained in pre-test and post test of the word *internet (first analysis)*

There was not a significant difference in the t-test for the control group in the pre-test ($M = 0.71$, $SD = 4.25$) vs. the post-test ($M = 2.36$, $SD = 4.97$), $t(11)$ -1.04, p =.31. There was not a significant difference in the t-test for the experimental group in the pre-test ($M = 0.21$, $SD = 3.50$) vs. the post-test ($M = 0.68$, $SD = 2.28$, $t(11)$ -.47, $p = .64$, either. Concerning the independent samples, there was not a significant difference in the t-test

for the control group in the pre-test (*M* = 0.71, *SD* = 4.25) vs. the experimental group (*M* = 0.21, *SD* = 3.50), *t*(22) .31, *p* = .75. There was not a significant difference in the t-test for the control group in the post-test (*M* = 2.36, *SD* = 4.97) vs. the experimental group (*M* = 0.68, *SD* = 2.28), *t*(22) 1.06, *p* = .29, either.

- *Internet (1-3)*

In the second analysis of the word *internet*, which consisted of subtracting the third syllable from the first syllable, both groups improved. The control group obtained M = 0.62 in the pre-test and M = 3.61 in the post-test, with 2.99 gain scores; the experimental group obtained M = -0.17 in the pre-test, and M = 3.31 in the post-test, gain scores 3.48. In this case, the improvement was more pronounced in the experimental group.

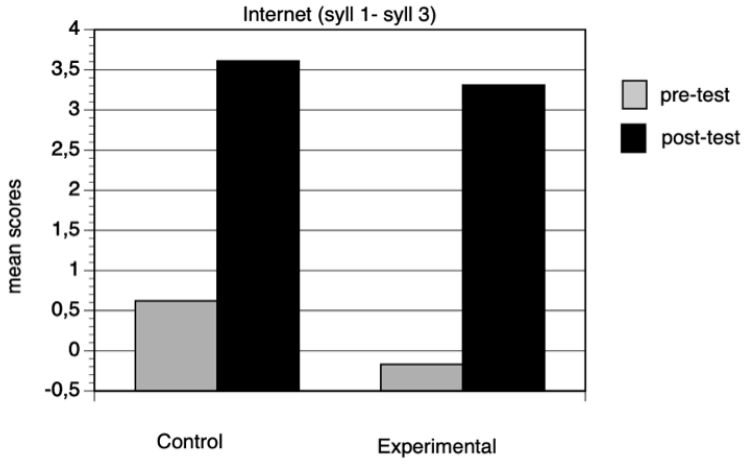


Fig. 38 Mean scores of the values obtained in pre-test and post-test of the word *internet (second analysis)*

There was not a significant difference in the t-test for the control group in the pre-test (*M* = 0.62, *SD* = 3.62) vs. the post-test (*M* = 3.61, *SD* = 8.11), *t*(11) -1.17, *p* = .26. There was not a significant difference in the t-test for the experimental group in the pre-test (*M* = -0.17, *SD* = 5.25) vs. the post-test (*M* = 3.31, *SD* = 7.17), *t*(11) -1.54, *p* = .15, either.

Concerning the independent samples, there was not a significant difference in the t-test for the control group in the pre-test (M = 0.62, SD = 3.62) vs. the experimental group in the pre-test (M = -0.17, SD = 5.25), t(22) .426, p = .67. There was not a significant difference in the t-test for the control group post-test (M = 3.61, SD = 8.11) vs. the experimental group post-test (M = 3.31, SD = 7.17), t (22) 0.98, p = .923, either.

- *Banana (2-1)*

The fifth word analysed was *banana.* As this word is trisyllabic, two analysis were required. In the first analysis, the second syllable was subtracted from the first syllable and in the second analysis, the third syllable was subtracted from the first one. Figure 39 shows the first analysis in which the control group obtained M = -1.42 in the pre-test and M = -1.29 in the post-test, with 0.13 gain scores; the experimental group, on the other hand, obtained M = 1.61 in the pre-test, M = -0.37 in the post-test, -1.98 gain scores. In this case, even if both groups obtained negative results, the control group did better than the experimental group.

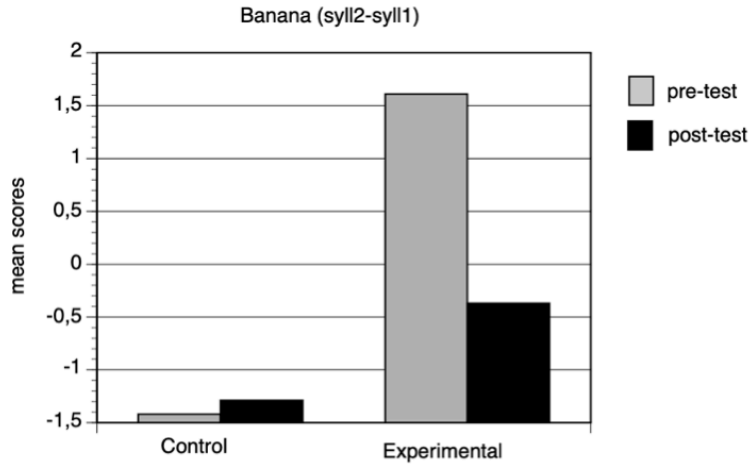


Fig. 39 Mean scores of the values obtained in pre-test and post-test of the word *banana (first analysis)*

There was not a significant difference in the t-test for the control group in the pre-test (M = -1.42, SD = 2.5) vs. the post-test (M = -1.29, SD = 2.04), t(11) -.165, p = .87. There was not a significant difference in the t-test for the experimental group in the pre-test (M = 1.61, SD = 2.42) vs. the post-test (M = -0.37, SD = 3.58), t(11) 1.55 p = .14, either. Concerning the independent samples, there was a significant difference in the t-test for the control group in the pre-test (M = -1.42, SD = 2.5) vs. the experimental group (M = 1.61, SD = 2.42), t(22) -3.02, $p < .05$. There was not a significant difference in the t-test for the control group in the post-test (M = -1.29, SD = 2.04) vs. the experimental group (M = -0.37, SD = 3,58), t(22) -.72, p = .47, either.

- *Banana (2-3)*

Figure 40 shows the results obtained in the second analysis of the word *banana*. In this case, the improvement was more pronounced in the experimental group, which obtained M = -0.12 in the pre-test and M = 2.17 in the post-test, with 2.29 gain scores; the control group obtained M = 2.41 in the pre-test, M = 3.21 in the post-test with 0.8 gain scores.

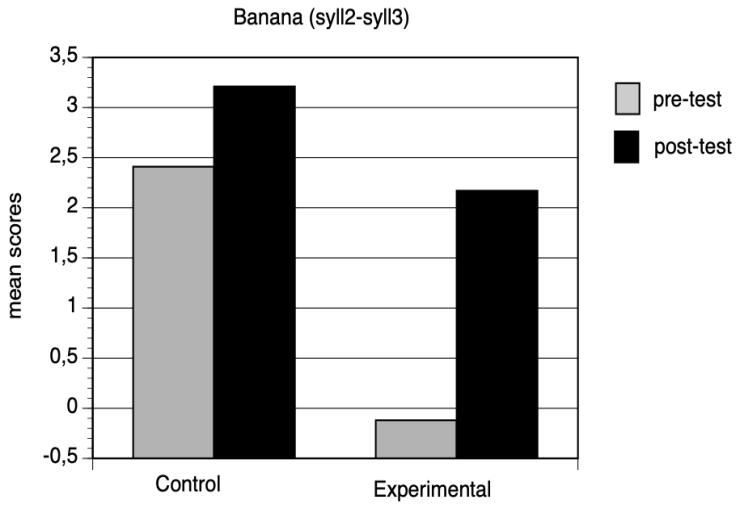


Fig. 40 Mean scores of the values obtained in the pre-test and post-test of the word *banana (second analysis)*

There was not a significant difference in the t-test for the control group in the pre-test (M = 2.41, SD = 2.08) vs. the post-test (M = 3.21, SD = 4.62), t(11) -.57, p = .57. There was not a significant difference in the t-test for the experimental group in the pre-test (M = -0.12, SD = 3.06) vs. the post-test (M = 2.17, SD = 5.24), t(11) -1.70 p = .11, either. Concerning the independent samples, there was a significant difference in the t-test for the control group in the pre-test (M = 2.41, SD = 2.08) vs. the experimental group in the pre-test (M = -0.12, SD = 3.06), t(22) 2.37, p < .05. There was not a significant difference in the t-test for the control group in the post-test (M = 3.21, SD = 4.62) vs. the experimental group (M = 2.17, SD = 5.24), t(22) .51 p = .61.

- *Cupboard (1-2)*

The sixth word analysed was *cupboard*. In this word, as the stressed syllable is the first one, the second syllable was subtracted from the first syllable. Both groups show some improvement. The experimental group obtained M = -0.02 in the pre-test and M = 1.28 in the post-test, with 1.26 gain scores versus the control group which obtained M = -1.46 in the pre-test and M = -0.08 in the post-test; gain scores 1.38.

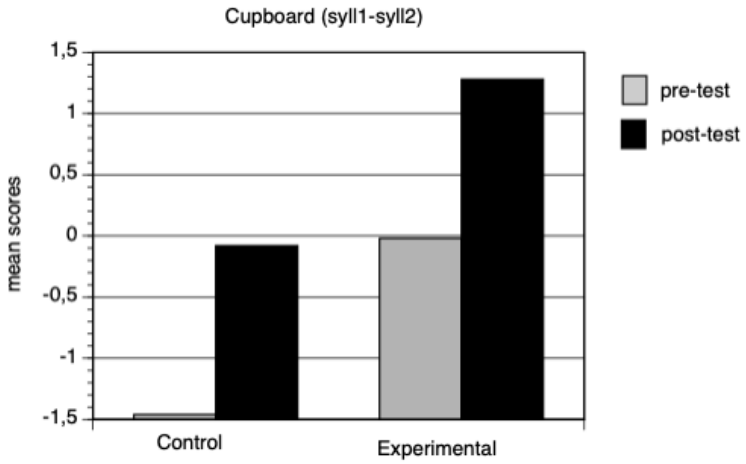


Fig. 41 Mean scores of the values obtained in pre-test and post-test of the word *cupboard*

There was not a significant difference in the t-test for the control group in the pre-test (M = -1.46, SD = 5.34) vs. the post-test (M = -0.08, SD = 6.74), t(11) -.63, p = .53. There was not a significant difference in the t-test for the experimental group in the pre-test (M = -0.02, SD = 4.24) vs. the post-test (M = 1.28, SD = 5.76), t(11) -.80 p = .43, either. Concerning the independent samples, there was not a significant difference in the t-test for the control group in the pre-test (M = -1.46, SD = 5.34) vs. the experimental group in the pre-test (M = -0.02, SD = 4.24), t(22) -.73, p = .47. There was no significant difference in the control group t-test either in the post-test (M = -0.08, SD = 6.74) vs. the experimental in the post-test (M = 1.28, SD = 5.76), t(22) -.53 p = .59.

- *Hospital (1-2)*

The seventh word analysed was *hospital,* the stressed syllable of which is the first one. Being a trisyllabic word, two analyses were needed in order to compare the results of the mean scores of the pre- versus post-test. Figure 42 shows the results of the first analysis in which the second syllable was subtracted from the first syllable.

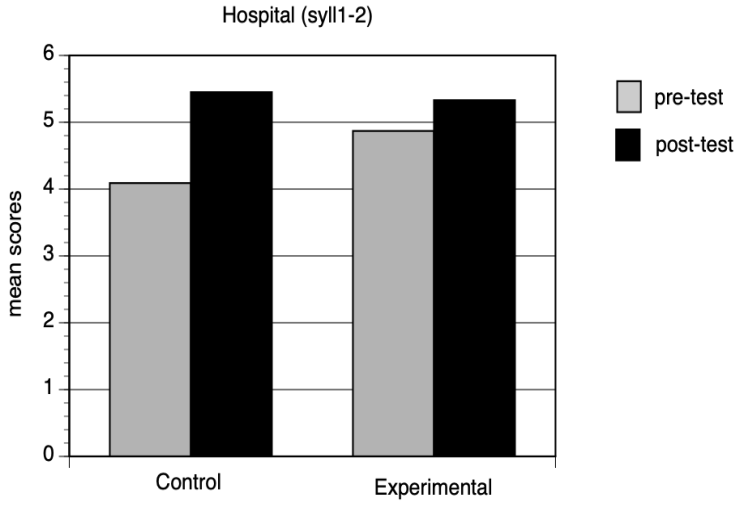


Fig. 42 Mean scores of the values obtained in pre-test and post-test of the word *hospital (first analysis)*

The control group obtained *M* = 4.09 in the pre-test and *M* = 5.45 in the post-test; gain scores 1.36. The experimental group obtained *M* = 4.87 in the pre-test and *M* = 5.33 in the post-test; gain scores 0.46. The control group did better in this case.

There was not a significant difference in the t-test for the control group in the pre-test (*M* = 4.09, *SD* = 5.85) vs. the post-test (*M* = 5.45, *SD* = 5.13), *t*(11) -.71, *p* = .48. There was not a significant difference in the t-test for the experimental group in the pre-test (*M* = 4.87, *SD* = 4.33) vs.the post-test (*M* = 5.33, *SD* = 4.87), *t*(11) -.27 *p* = .79, either. With regard to the independent samples, there was not a significant difference in the t-test for the control group in the pre-test (*M* = 4.09, *SD* = 5.85) vs. the experimental group in the pre-test (*M* = 4.87, *SD* = 4.33), *t*(22) -.36, *p* = .71. There was not a significant difference in the t-test for the control group in the post-test (*M* = 5.45, *SD* = 5.13) vs. the experimental group (*M* = 4.33, *SD* = 4.87), *t*(22) .05 *p* = .95, either.

- *Hospital (1-3)*

Figure 43 shows the second analysis done to the word *hospital*, in this case the third syllable was subtracted from the first syllable.

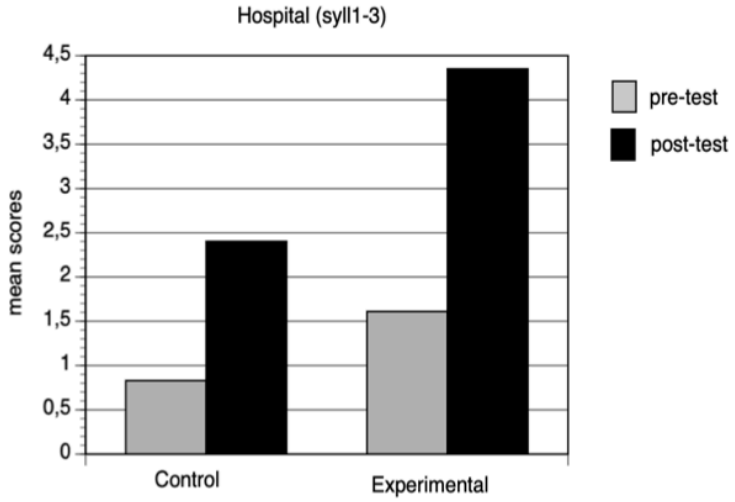


Fig. 43 Mean scores of the values obtained in pre-test and post-test for the word *hospital (second analysis)*

Unlike in the first analysis in which the results favoured the control group, the improvement was slightly more pronounced in the experimental group, which obtained *M* = 1.61 in the pre-test and *M* = 4.35 in the post-test, with 2.74 gain score; the control group, on the other hand, obtained *M* = 0.83 in the pre-test and *M* = 2.4 in the post-test, gain scores 1.75.

There was not a significant difference in the t-test for the control group in the pre-test (*M* = 0.83, *SD* = 3.88) vs. the post-test (*M* = 2.4, *SD* = 7.39), *t*(11) -.87, *p* = .39. There was not a significant difference in the t-test for the experimental group in the pre-test (*M*= 1.61, *SD* = 6.53) vs. the post-test (*M* = 4.35, *SD* = 6.66), *t*(11) -1.33, *p* = .21, either. Regarding the independent samples, there was not a significant difference in the t-test for the control group in the pre-test (*M* = 0.83, *SD* = 3.88) vs. the experimental group (*M* = 1.61, *SD* = 6.5), *t*(22) -.35, *p* = .72. There was not a significant difference in the t-test for the control group in the post-test (*M* = 2.4, *SD* = 7.39) vs. the experimental group (*M* = 4.35, *SD* = 6.66), *t*(22) -.68, *p* = .50, either.

- *Magazine (3-1)*

The eighth word analysed was *magazine*. As it is trisyllabic word, two analyses were required in order to compare the mean scores in the pre versus the post-test. In the first analysis, the first syllable was subtracted from the third one. The results favoured the control group, which obtained *M* = -2.42 in the pre-test, and *M* = -0.57 in the post-test, 1.85 gain scores. The experimental group obtained *M* = -0.2 in the pre-test, and *M* = -2.98 in the post-test, -2.78 gain scores.

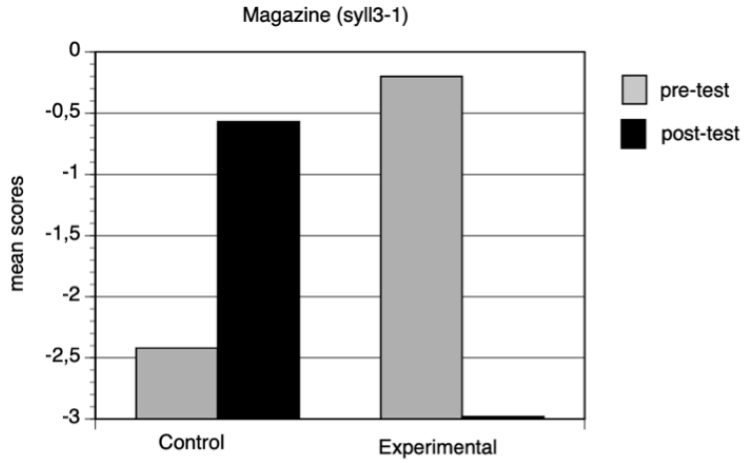


Fig. 44 Mean scores of the values obtained in pre-test and post-test of the word *magazine (first analysis)*

There was not a significant difference in the t-test for the control group in the pre-test (*M* = -2.42, *SD* = 3.55) vs. the post-test (*M* = -0.57, *SD* = 3.85), *t*(11) -1.58, *p* = .14. There was not a significant difference in the t-test for the experimental group in the pre-test (*M* = -0.2, *SD* = 4.75) vs the post-test (*M* = -2.98, *SD* = 5.52), *t*(11) -1.58, *p* = .14, either. Regarding the independent samples, there was not a significant difference in the t-test for the control group in the pre-test (*M* = -2.42, *SD* = 3.55) vs. the experimental group (*M* = -0.2, *SD* = 4.75), *t*(22) -1.29, *p* = .20. There was not a significant difference in the t-test for the control group in the post-test (*M* = -0.57, *SD* = 3.85) vs. the experimental group (*M* = -2.98, *SD* = 5.52), *t*(22) 1.23, *p* = .22, either.

- *Magazine (3-2)*

Figure 45 shows the second analysis done to the word *magazine*. In this case, the second syllable was subtracted from the third one. The control group obtained *M* = -2.09 in the pre-test, and *M* = 1.08 in the post-test; 3.17 gain scores. The experimental group obtained *M* = 2.39 in the pre-test, and *M* = -1.09 in the post-test; -3,48 gain scores. The results favoured the control group.

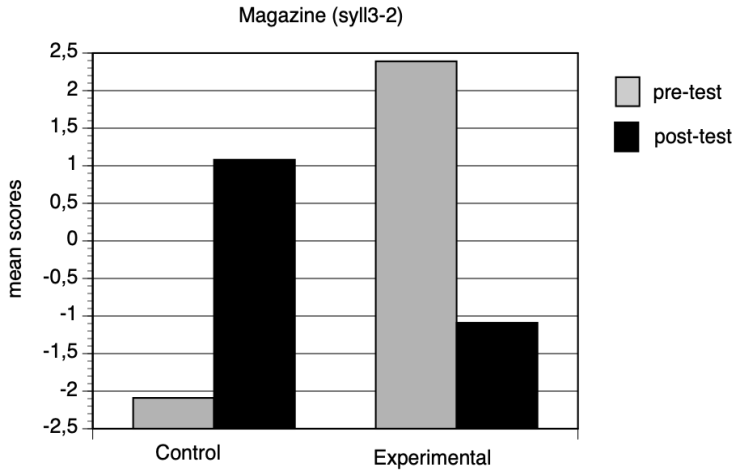


Fig. 45 Mean scores of the values obtained in pre-test and post-test of the word *magazine (second analysis)*

There was a significant difference in the t-test for the control group in the pre-test (M = -2.09, SD = 4.52) vs. the post-test (M = 1.08, SD = 4.12), t(11) -3.01, $p < .05$. There was not a significant difference in the t-test for the experimental group in the pre-test (M = 2.39, SD = 5.45) vs. the post-test (M = -1.09, SD = 3.54), t (11) 2.13, p = .05. Regarding the independent samples, there was a significant difference in the t-test for the control group in the pre-test (M = -2.09, SD = 4.52) vs. the experimental group (M = 2.39, SD = 5.45); t(11) -2.19, $p < .05$. There was not a significant difference in the t-test for the control group in the post-test (M = 1.08, SD = 4.12) vs. the experimental group (M = -1.09, SD = 3.54); t(22) 1.38, p = .17.

- *Vegetable (1-2)*

The ninth word analysed was *vegetable*. As this word is tetra-syllabic, three analysis were needed in order to obtain the difference of amplitude between the mean scores of the stressed and unstressed syllables. As figure 46 shows, the first analysis consisted of subtracting the second syllable from the first one. In this case, both groups improved,

favouring the experimental group with *M* = 0.35 in the pre-test, *M* = 7.55 in the post-test; 7.2 gain scores. The control group, on the other hand, obtained *M* = 2.54 in the pre-test, *M* = 5.48 in the post-test, 2.94 gain scores.

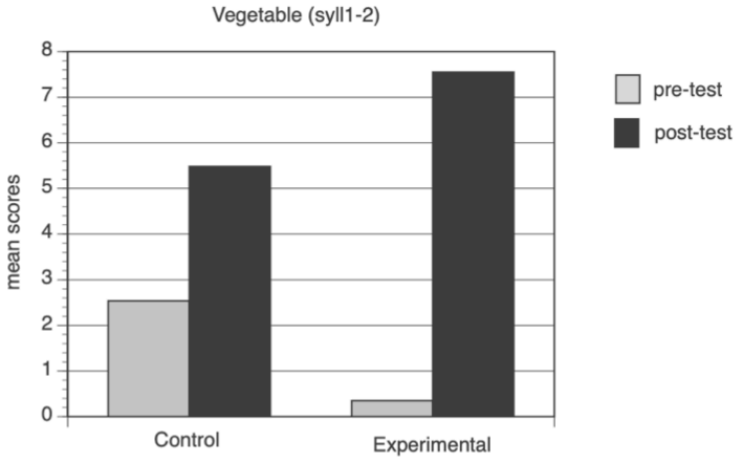


Fig. 46 Mean scores of the values obtained in pre-test and post-test of the word *vegetable (first analysis)*

Statistic results indicate significant differences in the t-test for the control group in the pre-test (*M* = 2.54, *SD* = 4.77) vs. the post-test (*M* = 5.48, *SD* = 4.7), *t*(11) -2.78, *p* < .05, as well as the experimental group in the pre-test (*M* = 0.35, *SD* = 5.8) vs. the post-test (*M* = 7.55, S*D* = 5.83); *t*(11) -3.44, p < .05. Concerning the independent samples, there was not a significant difference between the two groups in the pre-test, in which the control group obtained (*M* = 2.54, *SD* = 4.77) and the experimental group (*M* = 0.35, *SD* = 5.8), *t*(22) 1.00, *p* = .32. There was not a significant difference in the t-test for the control group in the post-test (*M* = 5.48, *SD* = 4.7) vs. the experimental group (*M* = 7.55, *SD* = 5.83), *t*(22) -.95, *p* =.35, either.

- *Vegetable (1-3)*

Figure 47 shows the second analysis done to the word *vegetable,* which consisted in subtracting the third syllable from the first one. In this case, both groups showed

improvement, favouring the experimental group with 6.88 gain scores: *M* = -0.42 in the pre-test; *M* = 6.45 in the post-test versus 3.13 gain scores the control group obtained: *M* = 2.09 in the pre-test; and *M* = 5.22 in the post-test.

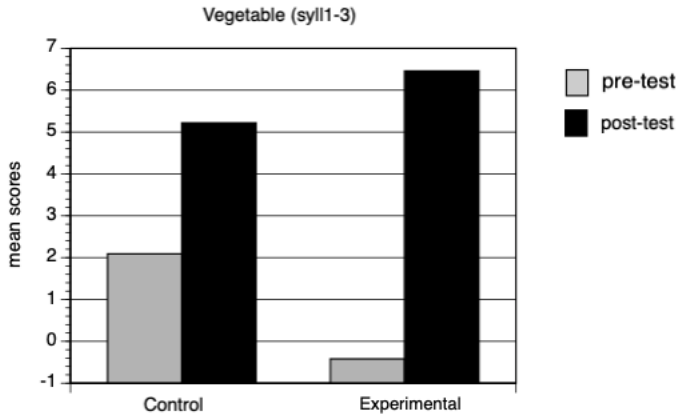


Fig. 47 Mean scores of the values obtained in pre-test and post-test of the word *vegetable (second analysis)*

There was not a significant difference in the t-test for the control group in the pre-test (*M* = 2.09, *SD* = 4.97) vs. the post-test (*M* = 5.22, *SD* = 7.24), *t*(11) -1.63 *p* = .13. Regarding the experimental group, results indicate a significant difference in the pre-test (*M* = -0.42, *SD* = 5.36) vs. the post-test (*M* = 6.45, *SD* = 5.22), *t*(11) -2.56 *p* < .05. Concerning the independent samples, there was not a significant difference between the two groups in the pre-test, in which the control group obtained (*M* = 2.09, *SD* = 4.97) and the experimental group obtained (*M* = -0.42, *SD* = 5.36), *t*(22) 1.18 *p* = .24. There was not a significant difference in the t-test for the control group versus the experimental group in the post-test in which the control group obtained (*M* = 5.22, *SD* = 7.24) and the experimental group obtained (*M* = 6.45, *SD* = 5.22), *t*(22) -.48 *p* = .63, either.

- *Vegetable (1-4)*

In the last analysis done to the word *vegetable,* the fourth syllable was subtracted from the first syllable. Figure 48 shows the mean scores both groups obtained. In this case, the results favoured the experimental group, which obtained 8.57 gain scores; *M* = -0.3 in the pre-test; and *M* = 8.27 in the post-test. On the other hand, the group obtained 1.53 gain scores; *M* = 1.57 in the pre-test, and *M* = 3.1 in the post-test.

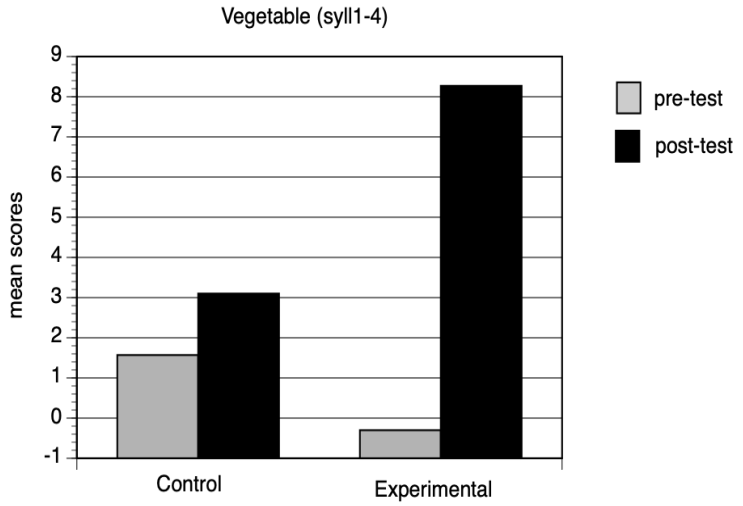


Fig. 48 Mean scores of the values obtained in the pre-test and post-test of the word *vegetable (third analysis)*

There was not a significant difference in the t-test for the control group in the pre-test (*M* = 1.57, *SD* = 5.47) vs. the post-test (*M* = 3.10, *SD* = 5.57), t(11) -.89 *p* = .39. With regard to the experimental group, results indicate a significant difference in the t-test in the pre-test (*M* = -0.3, *SD* = 5.73) vs. the post-test (*M* = 8.27, *SD* = 8.31), *t*(11) -2.85 *p* < .05. Concerning the independent samples, there was not a significant difference between the two groups in the pre-test, in which the control group obtained (*M* = 1.57, *SD* = 5.47) and the experimental group obtained (*M* = -0.3, *SD* = 5.73), *t*(22) .81 *p* = .42. There was not a significant difference between the two groups in the post-test, in

which the control group obtained (*M* = 3.10, *SD* = 5.57) and the experimental group obtained (*M* = 8.27, *SD* = 8.31), *t*(22) -1.79 *p* = .08, either.

- *Chocolate (1-2)*

Figure 49 shows the last word analysed, *chocolate*. Being a bisyllabic word, it required two analyses. In the first analysis, the second syllable was subtracted from the first syllable. In this case, both groups improved favouring the experimental, group with 5.66 gain scores; *M* = 3.78 in the pre-test and *M* = 9.4 in the post-test. The control group obtained 3.99 gain scores; *M* = 2.98 in the pre-test and *M* = 6.97 in the post-test.

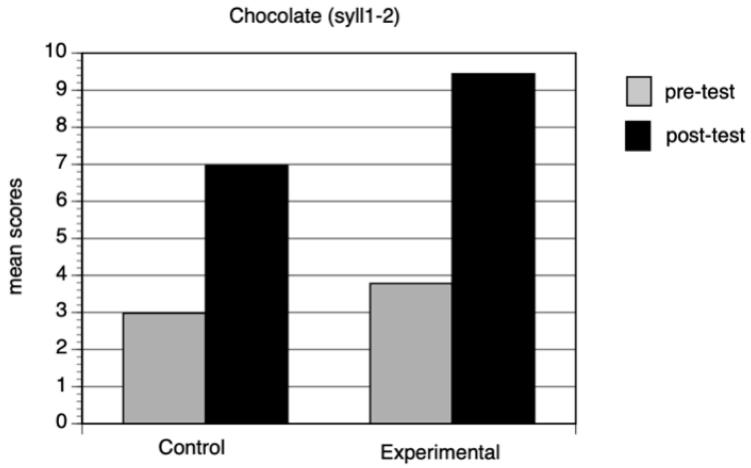


Fig. 49 Mean scores of the values obtained in pre-test and post-test of the word "*chocolate" (first analysis)*

There was not a significant difference in the t-test for the control group in the pre-test (*M* = 2.98, *SD* = 8.03) vs. the post-test (*M* = 6.97, *SD* = 5.73), *t*(11) -1.51 *p* = .15. Regarding the experimental group, results indicate a significant difference in the t-test in the pre-test (*M* = 3.78, *SD* = 4.49) vs. the post-test (*M* = 9.44, *SD* = 6.69), *t*(11) -2.25 *p* < .05. Concerning the independent samples, there was not a significant difference between the two groups in the pre-test, in which the control group obtained (*M* = 2.98, *SD* = 8.03) and the experimental group obtained (*M* = 3.78, *SD* = 4.49), *t*(22) -.30 *p*

= .76. There was not a significant difference between the two groups in the post-test in which the control group obtained (*M* = 6.97, *SD* = 5.73) and the experimental group obtained (*M* = 9.44, *SD* = 6.69), *t* (22) -.96 *p* = .34, either.

- *Chocolate (1-3)*

Figure 50 shows the second analysis done to the word *chocolate*. In this case, the third syllable was subtracted from the first one. The results were positive for both groups, favouring the control group with 6.84 gain scores; *M* = 5.64 in the pre-test and *M* = 12.48 in the post-test. The experimental group obtained 2.2 gain scores; *M* = 9.78 in the pre-test and *M* = 11.98 in the post-test.

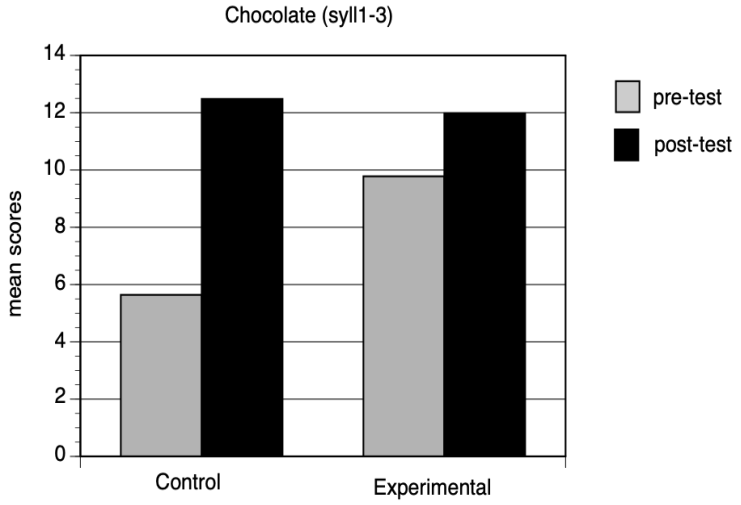


Fig. 50 Mean scores of the values obtained in pre-test and post-test of the word *chocolate (second analysis)*

Statistical results indicate a significant difference in the t-test for the control group in the pre-test (*M* = 5.64, *SD* = 7.99) vs. the post-test (*M* = 12.48, *SD* = 7.82), *t*(11) -4.83 *p* < .05. There was not a significant difference in the t-test for the experimental group in the pre-test (*M* = 9.78, *SD* = 7.61) and in the post-test (*M* = 11.98, *SD* = 3.65), *t*(11) -1.21 *p* = .25. Concerning the independent samples there was not a significant difference between the two groups in the pre-test, in which the control group obtained (*M* = 5.64,

SD = 7.99) and the experimental group obtained (*M* = 9.78, *SD* = 7.61), *t*(22) -1.30 *p*= .20. There was not a significant difference between the two groups in the post-test in which the control group obtained (*M* = 12.48, *SD* = 7.82) and the experimental group obtained (*M* = 11.98, *SD* = 3.65), t(22) .20 *p* = .84, either.

3.1.2. Acoustic and statistical measurement of phrases

In this section, the mean scores obtained from the acoustic measurements of the four phrases recorded in the pre- and the post-test will be shown. A number of graphs will show the mean scores obtained in the pre- and post-tests for both groups and a statistical description will follow each phrase. As Table 3 shows, if we compare the mean scores of the values both groups obtained in the pre and post conditions, we observe that both groups improved in their level of discrimination between the stressed and unstressed syllables, even if the improvement was more pronounced in the experimental group. For instance, in the phrase *many vegetables*, mainly in the second, third, fourth and fifth analyses, the experimental group obtained 1.09, 2.17, 2.93, 5.58 gain scores respectively, whereas the control group obtained 0.24, 1.83, 1.62, -0.7 gain scores. The same applies to the phrase *catholic receptionist*, mainly in the second, third, fifth and sixth analyses, even though both groups improved, the improvement was more pronounced in the experimental group. Thus, in the second analysis, the gain score of the control group was -0.31, while in the experimental group it was 0.31. In the third analysis, the gain score of the control group was -1.99, whereas in the experimental group it was 1.67. In the fifth analysis, the gain scores the control group obtained was 1.72, while in the experimental group it was 3.89; and in the last analysis, the control group obtained 2.76 gain scores, whereas the experimental group obtained 4.6.

Table 6. Pre-test, post-test and gain scores for the phrases recorded and analysed with the speech analysis software Praat

	Control group			Experimental group		
Phrases analysed	Pre-test	Post-test	Gain scores	Pre-test	Post-test	Gain scores
Above the hill (4-1)	-1.57	-0.25	1.32	-0.61	-0.86	-0.25
Above the hill (4-2)	-3.02	-2.24	0.78	-2.09	-5.51	-3.42
Above the hill (4-3)	0.73	1.28	0.55	-0.24	-1.37	-1.13
Many veg (3-1)	1.77	2.52	0.75	0.52	1.25	0.73
Many veg (3-2)	1.35	1.59	0.24	0.99	2.08	1.09
Many veg (3-4)	5.47	7.3	1.83	5.02	7.19	2.17
Many veg (3-5)	3.88	5.5	1.62	3.15	6.08	2.93
Many veg (3-6)	4.9	4.2	-0.7	2.61	8.19	5.58
Catholic rec (5-1)	-1.65	0.73	2.38	-2.04	-0.58	1.46
Catholic rec (5-2)	-2.76	-3.07	-0.31	-4.45	-4.14	0.31
Catholic rec (5-3)	-0.29	-2.28	-1.99	-2.15	-0.48	1.67
Catholic rec (5-4)	0.53	0.11	-0.42	1.05	-0.36	-1.41
Catholic rec (5-6)	1.65	3.37	1.72	0.84	4.73	3.89
Catholic rec (5-7)	5.4	8.16	2.76	4.8	9.4	4.6
Edinburgh sta (4-1)	-1.1	-3.37	-2.27	-2.92	-3.1	-0.18
Edinburgh sta (4-2)	-0.78	-0.83	-0.05	-2.15	-1.69	0.46
Edinburgh sta (4-3)	0.02	-3.23	-3.25	-1.93	-2.01	-0.08
Edinburgh sta (4-5)	5.51	7.23	1.72	5.35	7.85	2.5

Table 7 shows the results obtained from the four t-tests performed to analyse the data statistically: two paired-samples to compare the pre and post scores within the same group and two independent-samples to compare scores across the two groups. the shaded cells identify the significant results. As observed in Table 7, there were 3 significant cases in the case of the experimental group, even though in one case, the

results were in the wrong direction. In the case of the control group, there was only one significant result, pointing in the wrong direction. In the next section, a thorough description of the mean values as well as graphs will be shown for each phrase analysed, followed by the results obtained from the statistical analyses.

Table 7. Means, Standard Deviation and T-test results (p.values) for the phrases measured using Praat

	CONTROL GROUP				EXPERIMENTAL GROUP				t-tests (p<.05)			
	Pre-test		Post-test		Pre-test		Post-test		Paired samples		Independent samples	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	control	exp	pre	post
Above the hill 4-1	-1.57	3.96	-0.25	6.22	-0.62	3.4	-1.86	3.69	0.36	0.4	0.53	0.45
Above the hill 4-2	-3.02	3.72	-2.24	4.2	-2.09	3.18	-5.51	3.68	0.4	0.02	0.51	0.05
Above the hill 4-3	0.73	3.98	1.28	3.13	-0.24	4.08	-1.37	2.83	0.52	0.51	0.56	0.04
Many veg 3-1	1.77	3.61	2.52	2.48	0.52	3.56	1.25	3.22	0.56	0.56	0.4	0.28
Many veg 3-2	1.35	1.96	1.59	2.82	0.99	4.45	2.08	3.86	0.77	0.54	0.79	0.72
Many veg 3-4	5.47	6.45	7.3	5.6	5.02	4.03	7.19	6.4	0.3	0.26	0.83	0.96
Many veg 3-5	3.88	3.38	5.5	4.62	3.15	4.35	6.08	5.51	0.17	0.85	0.65	0.78
Many veg 3-6	4.9	5.1	4.2	6.03	2.61	4.99	8.19	7.5	0.78	0.02	0.27	0.16
Catholic recep 5-1	-1.65	3.38	0.73	6.07	-2.04	4.64	-0.58	3.81	0.12	0.32	0.81	0.53
Catholic recep 5-2	-2.76	2.74	-3.07	4.23	-4.45	2.4	-4.14	3.41	0.79	0.79	0.12	0.5
Catholic recep 5-3	-0.29	5.27	-2.28	4.1	-2.15	6.09	-0.48	3.57	0.11	0.24	0.43	0.26
Catholic recep 5-4	0.53	4.34	0.11	4.18	1.05	3.8	-0.36	3.43	0.73	0.19	0.64	0.77
Catholic recep 5-6	1.65	4.59	3.37	5.11	0.84	4.92	4.73	4.28	0.46	0.38	0.68	0.48
Catholic recep 5-7	5.4	5.96	8.16	4.51	4.8	7.4	9.4	6.73	0.17	0.04	0.83	0.6
Edinburgh station 4-1	-1.1	3.71	-3.47	2.4	-2.49	3.52	-3.1	3.27	0.14	0.88	0.23	0.75
Edinburgh station 4-2	-0.78	2.32	-0.83	3.76	-2.15	2.66	-1.69	3.85	0.96	0.73	0.19	0.58
Edinburgh station 4-3	0.02	4.81	-3.23	2.37	-1.93	3.68	-2.01	4.53	0.03	0.96	0.96	0.96
Edinburgh station 4-5	5.51	3.94	7.23	5.23	5.35	4.45	7.85	4.6	0.91	0.55	0.92	0.75

- *Above the hill (4-1)*

The first phrase analysed was *above the hill*. As this phrase was out of context, it was assumed that the most important word was *hill*. Consequently, three analyses were needed in order to compare the mean scores of both groups in the pre-and post-tests.

In the first analysis, and as Figure 51 shows, the first syllable of the phrase was subtracted from the fourth one. The results obtained showed no improvement in either group. The control group obtained *M* = -1.57 in the pre-test and *M* = -0.25 in the post-test, whereas the experimental obtained *M* = -0.62 in the pre-test and *M* = -1.86 in the post-test. Even if the results were negative for both groups, the control group showed a slight improvement.

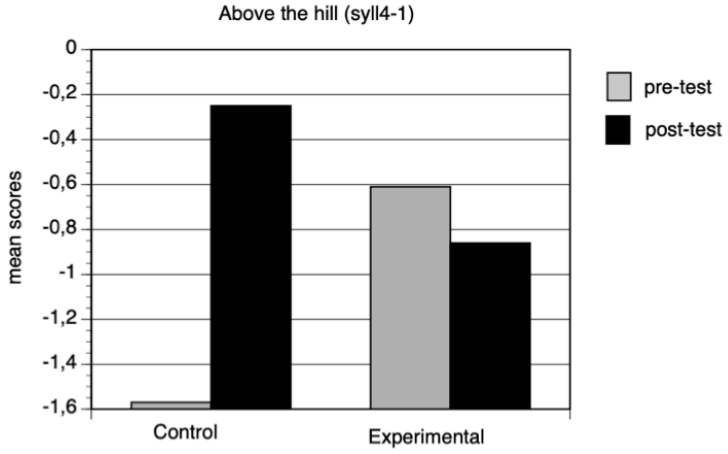


Fig. 51 Mean scores of the pre-test and post-test of the phrase *above the hill (first analysis)*

There was not a significant difference in the t-test for the control group in the pre-test (*M* = -1.57, *SD* = 3.96) vs. the post-test (*M* = -0.25, *SD* = 6.22), *t*(11) -.95 *p* = .36. There was not a significant difference in the t-test for the experimental group in the pre-test (*M* = -0.62, *SD* = 3.4) vs. the post-test (*M* = -1.86, *SD* = 3.69), *t*(11) .86 *p* = .40, either. Concerning the independent samples, there was not a

significant difference between the two groups in the pre-test, in which the control group obtained (*M* = -1.57, *SD* = 3.96) and the experimental group obtained (*M* = -0.62, *SD* = 3.4), *t*(22) -.63 *p* = .53. There was not a significant difference between the two groups in the post-test, in which the control group obtained (*M* = -0.25, *SD* = 6.22) and the experimental group obtained (*M* = -1.86, *SD* = 3.69), *t*(22) .76 *p* = .45, either.

- *Above the hill (4-2)*

The second analysis was done by subtracting the second syllable from the fourth syllable. As Figure 52 shows, both groups obtained negative values, favouring the control group with 0.78 gain scores; *M* = -3.02 in the pre-test, and *M* = -2.24 in the post-test, versus -3.42 gain scores the experimental group obtained; *M* = -2.09 in the pre-test, and *M* = -5.51 in the post-test.

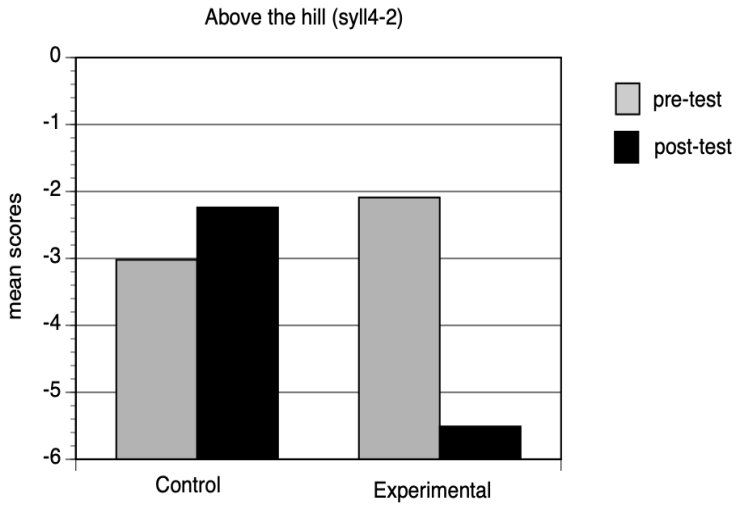


Fig. 52 Mean scores of the pre-test and post-test of the phrase *"above the hill" (second analysis)*

There was not a significant difference in the t-test for the control group in the pre-test (M = -3.02, SD = 3.72) and in the post-test (M = -2.24, SD = 4.2), t(11) -.86 p = .40. Concerning the experimental group, results indicate a significant difference in the scores in the pre-test (M = -2.09, SD = 3.18) and in the post-test (M = -5.51, SD = 3.68), t(11) 2.66 $p < .05$. Regarding the independent samples, there was not a significant difference between the two groups in the pre-test, in which the control group obtained (M = -3.02, SD = 3.72) and the experimental group obtained (M = -2.09, SD = 3.18), t(22) -.65 p = .51. There was not a significant difference between the two groups in the post-test, in which the control group obtained (M = -2.24, SD = 4.2) and the experimental group obtained (M = -5.51, SD = 3.68), t(22) 2.02 p = .05, either.

- *Above the hill (4-3)*

The third analysis was done by subtracting the third syllable from the fourth syllable. As shown in Figure 53, the results favoured the control group, which obtained M = 0.73 in the pre-test and M = 1.28 in the post-test, with 0.55 gain scores; the experimental group obtained M = -0.24 in the pre-test, and M = -1.37 in the post-test, -1.13 gain scores.

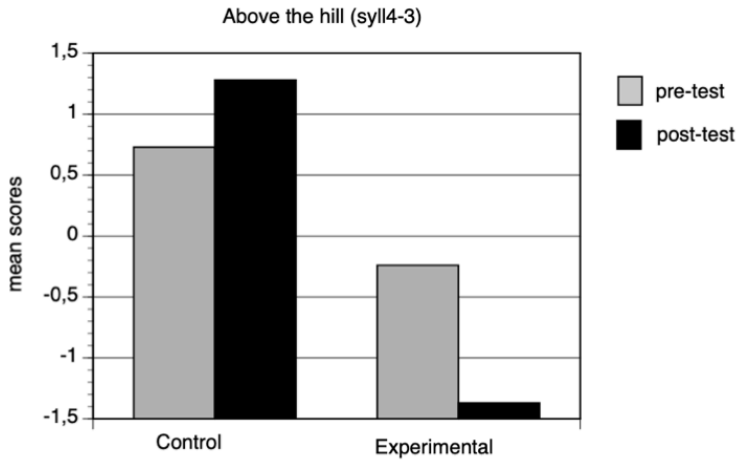


Fig. 53 Mean scores of the values obtained in pre-test and post-test for the phrase *above the hill (third analysis)*

There was not a significant difference in the t-test for the control group in the pre-test (M = 0.73, SD = 3.98) vs. the post-test (M = 1.28, SD = 3.13), t(11) -.66 p = .52. There was not a significant difference in the t-test for the experimental group in the pre-test (M = -0.24, SD = 4.08) vs. the post-test (M = -1.37, SD = 2.83), t(11) 66 p = .51, either. Concerning the independent samples, there was not a significant difference between the two groups in the pre-test, in which the control group obtained (M = 0.73, SD = 3.98) and the experimental group obtained (M = -0.24, SD = 4.08), t(22) .58, p = .56. There was a significant difference between the two groups in the post-test, in which the control group obtained (M = 1.28, SD = 3.13) and the experimental group obtained (M = -1.37, SD = 2.83), t(22) 2.18, p < .05.

- *Many vegetables (3-1)*

The second phrase analysed was *many vegetables*. As this phrase was out of context, it was assumed that the stressed word, the word which contains the most information, is *vegetables,* the stressed syllable of which is the first one. Accordingly, five different analyses were required in order to calculate the difference of amplitude between the

stressed syllable, the first one, and the unstressed syllables, the other four syllables. Figure 54 shows the first analysis, in which the first syllable was subtracted from the third one. The results obtained showed a slight improvement, favouring the control group with 0.75 gain scores, *M* = 1.77 in the pre-test, and *M* = 2.52 in the post-test versus 0.73 gain scores the experimental group obtained; *M* = 0.52 in the pre-test, and *M* = 1.25 in the post-test.

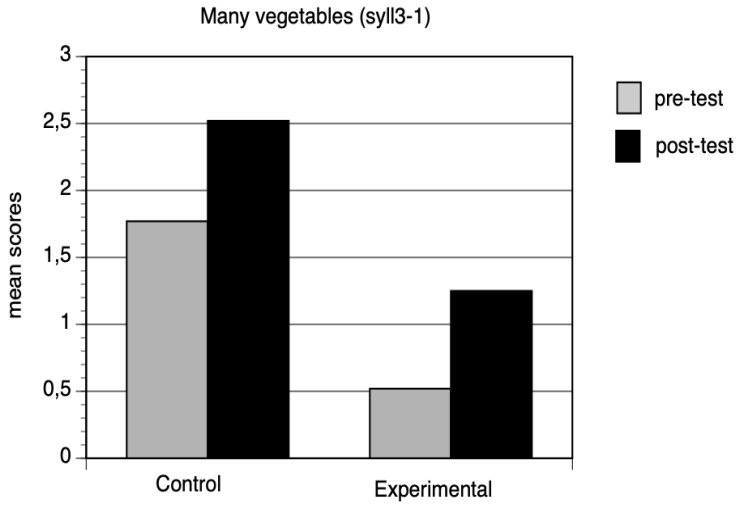


Fig. 54 Mean scores of the values obtained in pre-test and post-test of the phrase *many vegetables (first analysis)*

There was not a significant difference in the t-test for the control group in the pre-test (*M* = 1.77, *SD* =3.61) vs. the post-test (*M* = 2.52, SD = 2.48), *t*(11) -.58 *p* = .56. There was not a significant difference in the t-test for the experimental group in the pre-test (*M* = 0.52, *SD* = 3.56) vs. the post-test (*M* = 1.25, *SD* = 3.22), t(11) -.59 *p* = .56, either. Concerning the independent samples, there was not a significant difference between the two groups in the pre-test, in which the control group obtained (*M* = 1.77, *SD* =3.61) and the experimental group obtained (*M* = 0.52, *SD* = 3.56), *t*(22) .89, *p* = .38. There was not a significant difference between the two groups in the post-test, in which the

control group obtained (*M* = 2.52, *SD* = 2.48) and the experimental group obtained (*M* = 1.25, *SD* = 3.22), *t*(22) 1.09, *p* = .28, either.

- *Many vegetables (3-2)*

The second analysis was done by subtracting the second syllable from the third one. In this case, both groups showed a slight improvement, favouring the experimental group with 1.09 gain scores; *M* = 0.99 in the pre-test, and *M* = 2.08 in the post-test. The control group obtained 0.24 gain scores; *M* = 1.35 in the pre-test, and *M* = 1.59 in the post-test.

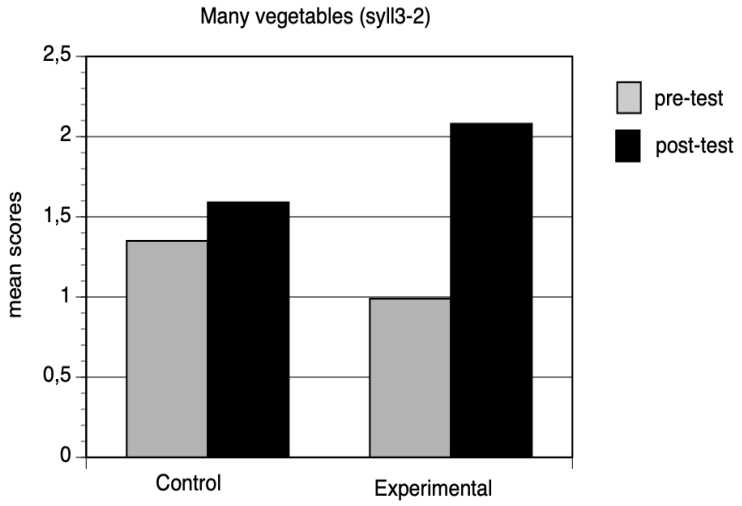


Fig. 55 Mean scores of the values obtained in pre-test and post-test of the phrase *many vegetables (second analysis)*

There was not a significant difference in the t-test for the control group in the pre-test (*M* = 1.35, *SD* = 1.96) vs. the post-test (*M* = 1.59, *SD* = 2.82), *t*(11) -.29 *p* = .77. There was not a significant difference in the t-test for the experimental group in the pre-test (*M* = 0.99, *SD* = 4.45) vs the post-test (*M* = 2.08, *SD* = 3.86), *t*(11) -.632 *p* = .54, either. As far as the independent samples are concerned, there was not a significant difference between the two groups in the pre-test, in which the control group obtained (*M* = 1.35,

SD = 1.96) and the experimental group obtained (*M* = 0.99, *SD* = 4.45; *t*(22) .26 *p* = .79. There was not a significant difference between the two groups in the post-test, in which the control group obtained (*M* = 1.59, *SD* = 2.82) and the experimental group obtained (*M* = 2.08, *SD* = 3.86), *t*(22) -.35 *p* = .72, either.

- *Many vegetables (3-4)*

As far as the third analysis is concerned, it was calculated by subtracting the fourth syllable from the third one. As Figure 56 shows, the results were positive favouring the experimental group with 2.17 gain scores; *M* = 5.02 in the pre-test and *M* = 7.19 in the post-test. The control group obtained 1.09 gain scores; *M* = 5.47 in the pre-test, and *M* = 7.3 in the post-test.

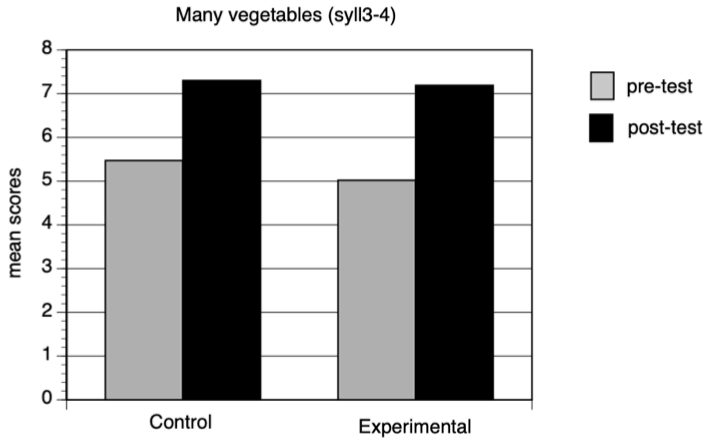


Fig. 56 Mean scores of the values obtained in pre-test and post-test of the phrase *many vegetables (third analysis)*

There was not a significant difference for the control group in the pre-test (*M* = 5.47, *SD* = 6.45) and in the post-test (*M* = 7.3, *SD* = 5.6), *t*(11) -1.08 *p* = .30. There was not a significant difference for the experimental group in the pre-test (*M* = 5.02, *SD* = 4.03) and in the post-test (*M* = 7.19, *SD* = 6.4), *t*(11) -1.16 *p* = .26, either. Concerning the independent samples, there was not a significant differences between the two groups in

the pre-test, in which the control group obtained (*M* = 5.47, *SD* = 6.45) and the experimental group obtained (*M* = 5.02, *SD* = 4.03), *t*(22) .20 *p* = .83. There was not a significant difference between the two groups in the post-test, in which the control group obtained (*M* = 7.3, *SD* = 5.6) and the experimental group obtained (*M* = 7.19, *SD* = 6.4), *t*(22) .04 *p* = .96, either.

- *Many vegetables (3-5)*

In the fourth analysis, the fifth syllable was subtracted from the third syllable. Figure 57 shows the mean scores both groups obtained. The results were positive, favouring the experimental group with 2.93 gain scores, *M* = 3.15 in the pre-test and *M* = 6.08 in the post-test; versus 1.62 gain scores the control group obtained, *M* = 3.88 in the pre-test and *M* = 5.5 in the post-test.

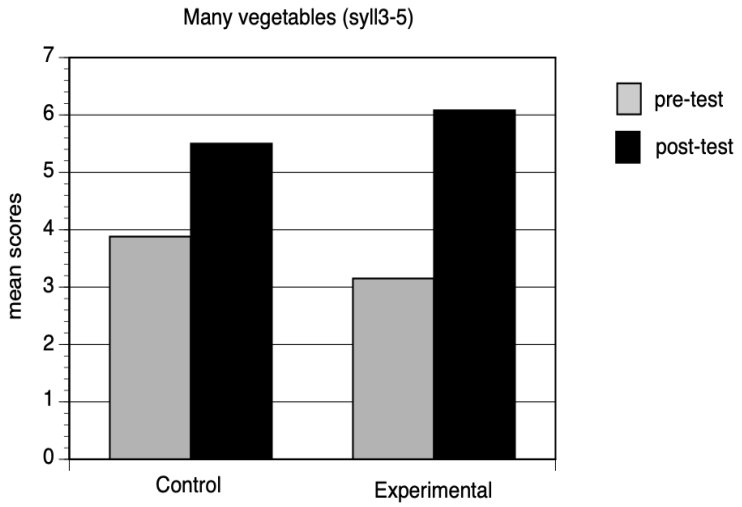


Fig. 57 Mean scores of the values obtained in pre-test and post-test of the phrase *many vegetables (fourth analysis)*

There was not a significant difference for the control group in the pre-test (*M* = 3.88, *SD* = 3.38) vs. the post-test (*M* = 5.50, *SD* = 4.62), *t*(11) -1.43 *p* = .17. There was not a significant difference for the experimental group in the pre-test (*M* = 3.15, *SD* = 4.35) vs. the post-test (*M* = 6.08, *SD* = 5.51), *t*(11) -1.89 *p* = .08, either. Concerning the

independent samples, there was not a significant difference in the pre-test in which the control group obtained (M = 3.88, SD = 3.38) and the experimental group obtained (M = 3.15, SD = 4.35), t(22) .45, p = .65. There was not a significant difference in the post-test in which the control group obtained (M = 5.50, SD = 4.62) and the experimental group obtained (M = 6.08, SD = 5.51), t(22) -.28, p = .78, either.

- *Many vegetables (3-6)*

The last analysis of this phrase was done by subtracting the sixth syllable from the third one. As Figure 58 shows, the results were more pronounced in the experimental group which obtained 5.58 gain scores; M = 2.61 in the pre-test, and M = 8.19 in the post-test. The control group obtained -0.7 gain scores; M = 4.9 in the pre-test and M = 4.2 in the post-test.

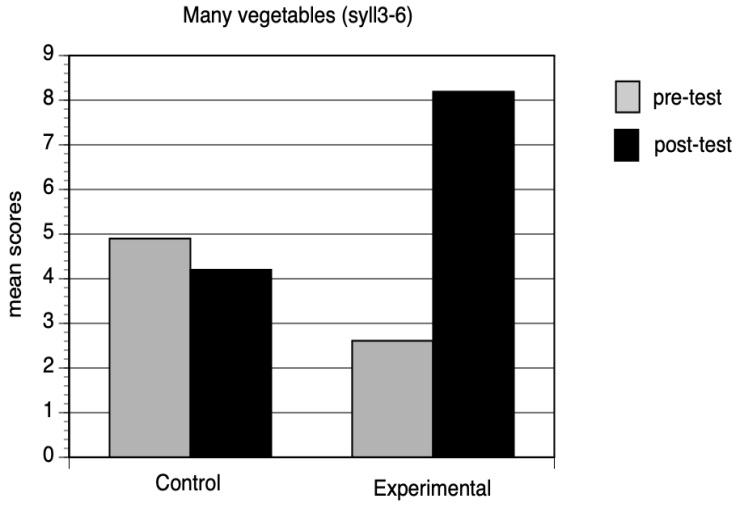


Fig. 58 Mean scores of the values obtained in pre-test and the post-test of the phrase *"many vegetables" (fifth analysis)*

There was not a significant difference for the control group in the pre-test (M = 4.90, SD = 5.1) vs. the post-test (M = 4.2, SD = 6.03), t(11) .28 p = .78. Regarding the experimental group, results indicate a significant difference in the pre-test (M = 2.61, SD = 4.99) and in the post-test (M = 8.19, SD = 7.5), t(11) -2.69, p < .05. Concerning

the independent samples, there was not a difference between the two groups in the pre-test, in which the control group obtained (M = 4.90, SD = 5.1) and the experimental group obtained (M = 8.19, SD = 7.5), t(22) 1.08, p = .28. There was not a significant difference between the two groups in the post-test, in which the control group obtained (M = 4.2, SD = 6.03) and the experimental group obtained (M = 8.19, SD = 7.5), t (22) -1.43, p = .16, either.

- *Catholic receptionist (5-1)*

The second phrase analysed was *catholic receptionist*. It was assumed that the word which carries the most information is *receptionist*. Accordingly, six analyses were required in order to compare the mean scores of both groups in the pre- and post-test. As Figure 59 shows, the first analysis was done by subtracting the first syllable from the fifth syllable. The results favoured the control group with 2.38 gain scores M = -1.65 in the pre-test and M = 0.73 in the post-test; versus 1.46 gain scores the experimental group obtained, M = -2.04 in the pre-test and M = -0.58 in the post-test.

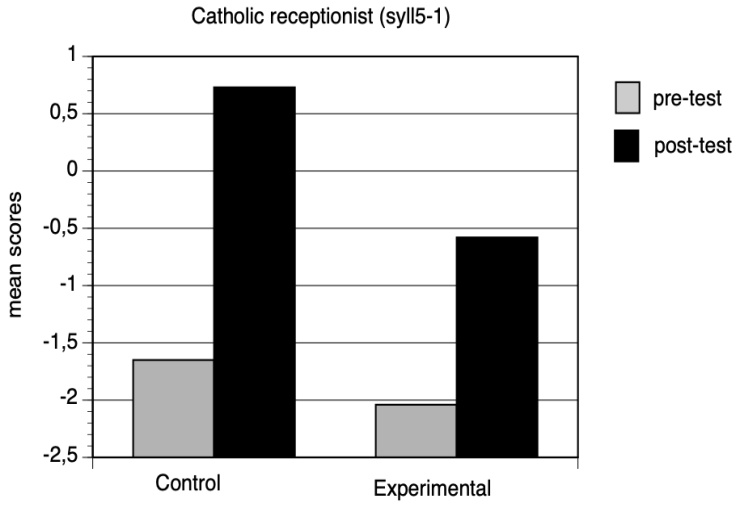


Fig. 59 Mean scores of the values obtained in pre-test and post-test of the phrase *"catholic receptionist" (first analysis)*

There was not a significant difference for the control group in the pre-test (*M* = -1.65, *SD* = 3.38) vs. the post-test (*M* = 0.73, *SD* = 6.07), *t*(11) -1.64, *p* = .12. There was not a significant difference for the experimental group in the pre-test (*M* = -2.04, *SD* = 4.64) vs. the post-test (*M* = -0.58, *SD* = 3.81), *t*(11) -1.03, *p* = .32, either. Concerning the independent samples, there was not a significant difference between the two groups in the pre-test, in which the control group obtained (*M* = -1.65, *SD* = 3.38) and the experimental group obtained (*M* = -2.04, *SD* = 4.64), *t*(22), .23 *p* = .81. There was not a significant difference between the two groups in the post-test, in which the control group obtained M = 0.73, SD = 6.07 and the experimental group obtained (*M* = -0.58, *SD* = 3.81), *t*(22) .63, *p* = .53, either.

- *Catholic receptionist (5-2)*

Figure 60 shows the second analysis of the phrase *catholic receptionist,* done by subtracting the second syllable from the fifth syllable. The results were negative for both groups. the control group obtained *M* = -2.76 in the pre-test and *M* = -3.07 in the post-test, gain scores: -0.31. The experimental group obtained *M* = -4.45 in the pre-test, *M* = -4.14 in the post-test, gain scores: 0.31.

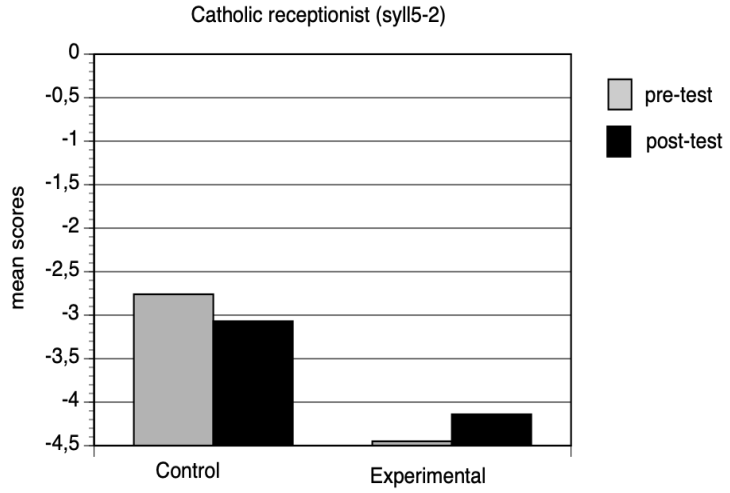


Fig. 60 Mean scores of the values obtained in pre-test and post-test of the phrase *"catholic receptionist" (second analysis)*

There was not a significant difference for the control group in the pre-test (*M* = -2.76, *SD* = 2.74) vs. the post-test (*M* = 3.07, *SD* = 4.23), *t*(11) .263, *p* = .79. There was not a significant difference for the experimental group in the pre-test (*M* = -4.45, *SD* = 2.4) vs. the post-test (*M* = -4.14, *SD* = 3.41; *t*(11) -.27, *p* = .79, either. Concerning the independent samples, there was not a significant difference between the two groups in the pre-test, in which the control group obtained (*M* = -2.76, *SD* = 2.74) and the experimental group obtained (*M* = -4.45, *SD* = 2.4), *t*(22) 1.60, *p* = .12. There was not a significant difference between the two groups in the post-test, in which the control group obtained (*M* =-3.07, *SD* = 4.23) and the experimental group obtained (*M* = -4.14, *SD* = 3.41), *t*(22) .68, *p* = .50, either.

- *Catholic receptionist (5-3)*

The third analysis of the phrase *catholic receptionist* consisted in subtracting the third syllable from the fifth syllable. Figure 61 shows the analysis done. The control group obtained *M* = -0.29 in the pre-test, *M* = -2.28 in the post-test, gain scores -1.99. The experimental group, on the other hand, obtained *M* = -2.15 in the pre-test, *M* = -0.48 in the post-test, with a gain score of 1.67.

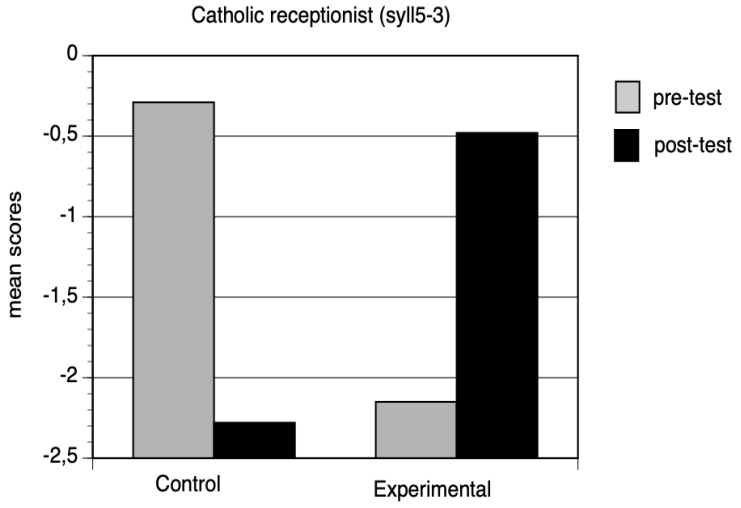


Fig. 61 Mean scores of the values obtained in pre-test and post-test of the phrase *catholic receptionist (third analysis)*

There was not a significant difference for the control group in the pre-test (M = -0.29, SD = 5.27) vs. the post-test (M = -2.28, SD = 4.1), t(11) 1.72, p = .11. There was not a significant difference for the experimental group in the pre-test (M = -2.15, SD = 6.09) vs. the post-test (M = -0.48, SD = 3.57), t(11) -1.22, p = .24, either. Regarding the independent samples, there was not a significant difference between the two groups in the pre-test, in which the control group obtained (M = -0.29, SD = 5.27) and the experimental group obtained (M = -2.15, SD = 6.09), t(22) .80, p = .43. There was not a significant difference between the two groups in the post-test in which the control group obtained (M = -2.28, SD = 4.1) and the experimental group obtained (M = -0.48, SD = 3.57), t(22) -1.15, p = .26, either.

- *Catholic receptionist (5-4)*

As Figure 62 shows, the fourth analysis was done by subtracting the fourth syllable was from the fifth syllable. Both groups obtained negative results. The control group obtained M = 0.53 in the pre-test and M = 0.11 in the post-test, with a gain score of -0.42. The experimental group, on the other hand, obtained M = 1.05 in the pre-test, M = -0.36 in the post-test, with a gain score of -1.41.

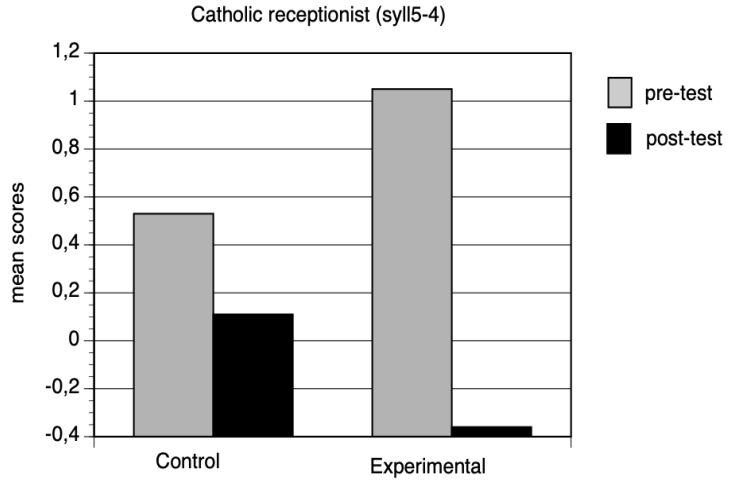


Fig. 62 Mean scores of the values obtained in pre-test and post-test of the phrase *"catholic receptionist" (fourth analysis)*

There was not a significant difference for the control group in the pre-test (M = 0.53, SD = 4.34) vs. the post-test (M = 0.11, SD = 4.18), t(11) .34, p = .73. There was not a significant difference for the experimental group in the pre-test (M = 1.05, SD = 3.8) vs. the post-test (M = -0.36, SD = 3.43), t(11) 1.39, p = .19, either. Concerning the independent samples, there were no significant differences between the two groups either in the pre-test, in which the control group obtained (M = 0.53, SD = 4.34) and the experimental group obtained (M = 1.05, SD = 3.8), t(22) -.47, p =.64, or in the post-test, in which the control group obtained (M = 0.11, SD = 4.18) and the experimental group obtained (M = -0.36, SD = 3.43), t(22) .29, p = .77.

- *Catholic receptionist (5-6)*

Figure 63 shows the mean scores both groups obtained in the pre- and post-test for the phrase *catholic receptionist* (fifth analysis). The control group obtained M = 1.65 in the pre-test, M = 3.37 in the post-test, with 1.72 gain score. The experimental group, on the other hand, obtained M = 0.84 in the pre-test, and M = 4.73 in the post-test, with 3.89 gain scores.

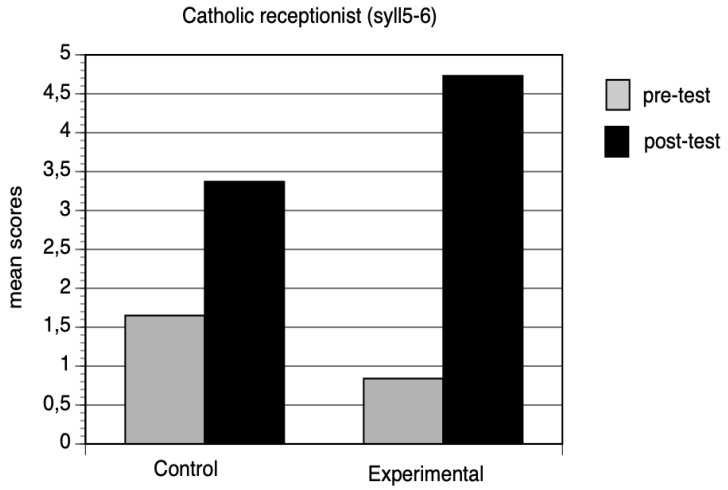


Fig. 63 Mean scores of the values obtained in pre-test and post-test of the phrase *catholic receptionist (fifth analysis)*

There was not a significant difference for the control group in the pre-test (M = 1.65, SD = 4.59) vs. the post-test (M = 3.37, SD = 5.11), t(11) -.76, p = .46. Regarding the experimental group, the results show a significant difference in the pre-test (M = 0.84, SD = 4.92) vs. the post-test (M = 4.73, SD = 4.28), t (11) -2.35, p < .05. Concerning the independent samples, there was not a significant difference between the two groups in the pre-test, in which the control group obtained (M = 1.65, SD = 4.59) and the experimental group obtained (M = 0.84, SD = 4.92), t(22) .41, p = .68. There was not a significant difference between the two groups in the post-test, in which the control group obtained (M = 3.37, SD = 5.11) and the experimental group obtained (M = 4.73, SD = 4.28), t(22) -.70, p = .48, either.

- *Catholic receptionist (5-7)*

The last analysis for this phrase was done by subtracting the seventh syllable from the fifth syllable. As Figure 66 shows, the results were positive for both groups, favouring the experimental group, which obtained M = 4.8 in the pre-test, M = 9.4 in the post-test, 4,6 gain scores. The control group, on the other hand, obtained M = 5.40 in the pre-test, M = 8.16 in the post-test, gain scores 3.02.

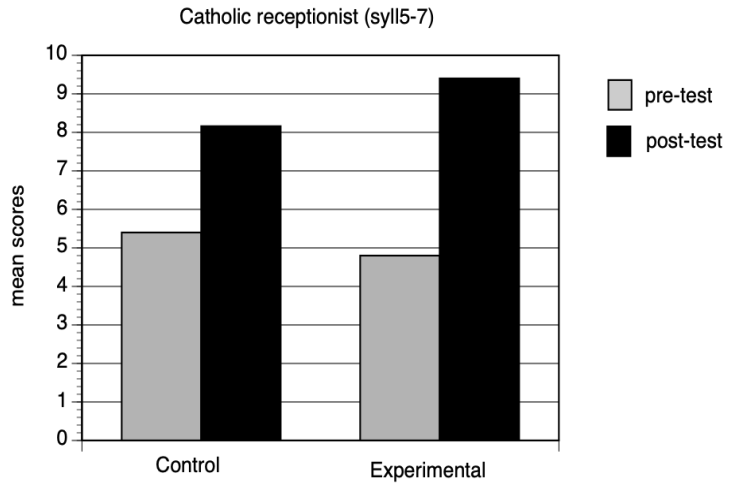


Fig. 64 Mean scores of the values obtained in pre-test and post-test of the phrase *"catholic receptionist" (sixth analysis)*

There was not a significant difference for the control group in the pre-test (M = 5.40, SD = 5.96) vs. the post-test (M = 8.16, SD = 4.51), t(11) -1.45, p = .17. Conversely, there was a significant difference for the experimental group in the pre-test (M = 4.80, SD = 7.40) vs. the post-test (M = 9.40, SD = 6.72), t (11) -2.20, $p < .05$. With regard to the independent samples, there were no significant differences between the two groups either in the pre-test, in which the control group obtained (M = 5.40, SD = 5.96) and the experimental group obtained (M = 4.80, SD = 7.40), t(22) -21, p = .83, or in the post-test, in which the control group obtained (M = 8.16, SD = 4.51) and the experimental group obtained (M = 9.40, SD = 6.72), t(22) -.53, p = .60.

- *Edinburgh station (4-1)*

The last phrase analysed was *Edinburgh station*. It was assumed that the most important word in this phrase was *station*. Accordingly, all the unstressed syllables were subtracted from the stressed syllable—the fourth one. Four analysis were required to compare the amplitude between the stressed and unstressed syllables. In the first analysis, as Figure 65 shows, the first syllable was subtracted from the fourth syllable. Both groups obtained negative results, the control group obtained M = -1.1 in the pre-test, M = -3.47 in the post-test, with a gain score of -2.37. The experimental group, on the other hand, obtained M = -2.92 in the pre-test, M = -3.1 in the post-test, with a gain score of -0.18.

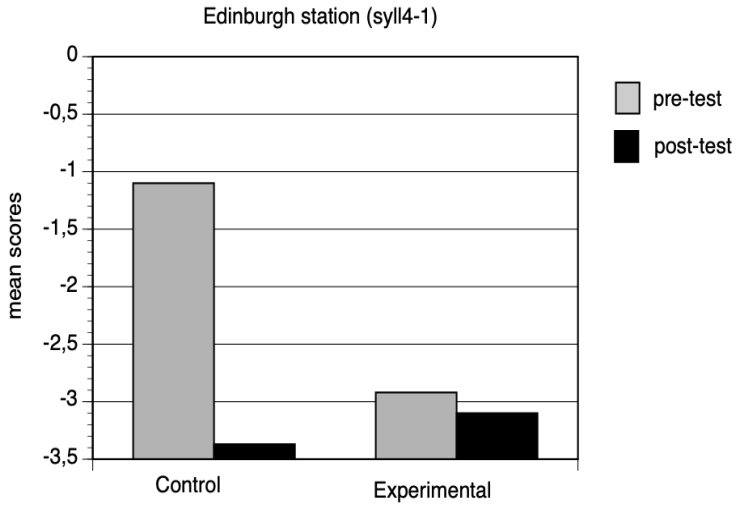


Fig. 65 Mean scores of the values obtained in pre-test and post-test of the phrase *Edinburgh station (first analysis)*

There was not a significant difference for the control group in the pre-test (*M* = -1.10, *SD* = 3.71)vs. the post-test (*M* = -3.47, *SD* = 2.4), *t*(11) 1.58, *p* =. 14. There was not a significant difference for the experimental group in the pre-test (*M* = -2.92, *SD* = 3.52) vs. the post-test (*M* = -3.10, *SD* = 3.27), *t*(11) .14, *p* = .88, either. Concerning the independent samples, there were no significant differences between the two groups in either the pre-test, in which the control group obtained (*M* = -1.10, *SD* = 3.71) and the experimental group obtained (*M* = -2.92, *SD* =3.52), *t*(22) 1.22, *p* = .23, or in the post-test, in which the control group obtained (*M* = -3.47, *SD* = 2.4) and the experimental group obtained (*M* = -3.10, *SD* = 3.27), *t*(22) -.32, *p* = .75.

- *Edinburgh station (4-2)*

The second analysis of the phrase *Edinburgh station* consisted of subtracting the second syllable from the fourth syllable. As it is clearly shown in figure 66, the results favoured the experimental group, which obtained *M* = -2.15 in the pre-test and *M* = -1.69 in the

post-test, gain scores 0.46. The control group, on the other hand, obtained -0.78 in the pre-test, -0.83 in the post-test, gain scores -0.05.

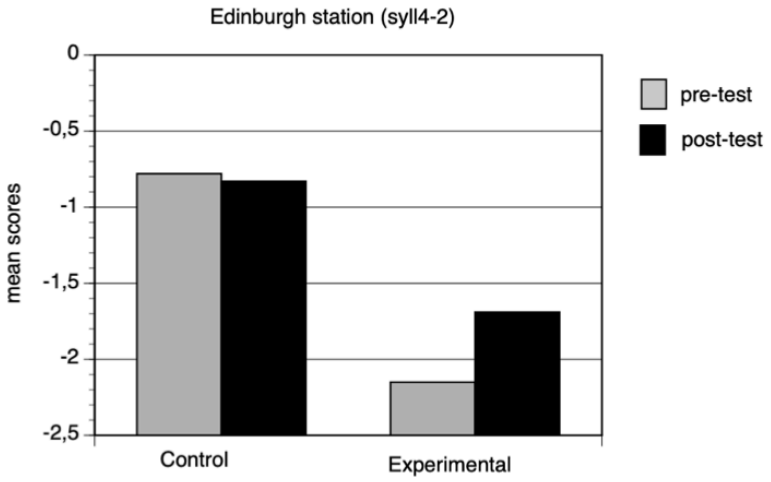


Fig. 66 Mean scores of the values obtained in pre-test and post-test of the phrase "*Edinburgh station" (second analysis*)

There were no significant differences either for the control group in the pre-test (*M* = -0.78, *SD* = 2.32) vs. the post-test (*M* = -0.83, *SD* = 3.76), *t*(11) .05, *p* = .96, or for the experimental group in the pre-test (*M* = -2.15, *SD* = 2.66) vs. the post-test (*M* = -1.69, *SD* = 3.85), *t*(11) -.354, *p* = .73. Concerning the independent samples, there was not a significant difference between the two groups in the pre-test, in which the control group obtained (*M* = -0.78, S*D* = 2.32) and the experimental group obtained (*M* = -2.15, *SD* = 2.66), *t*(22) 1.34, *p* = .19. There was not a significant difference between the two groups in the post-test, in which the control group obtained (*M* = -0.83, *SD* = 3.76) and the experimental group obtained (*M* = -1.69, *SD* = 3.85), *t* (22) .55, *p* = .58, either.

- *Edinburgh station (4-3)*

Figure 67 shows the third analysis done to *Edinburgh station*. The results were negative for both groups. The control group obtained *M* = 0.02 in the pre-test and *M* = -3.23 in

the post-test, with a gain score of -3.25. The experimental group, on the other hand, obtained *M* = -1.93 in the pre-test and -2.01 in the post-test, with a gain score of -0.08.

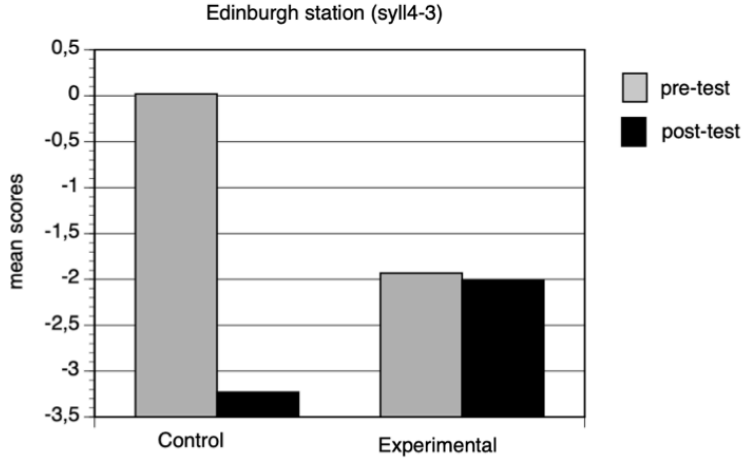


Fig. 67 Mean scores of the values obtained in pre-test and post-test of the phrase *"Edinburgh station" (third analysis*)

There was a significant difference for the control group in the pre-test (*M* = 0.02, *SD* = 4.81) vs. the post-test (*M* = -3.23, *SD* = 2.37), *t*(11) 2.45, p < .05, pointing in the wrong direction of the research hypothesis. There was not a significant difference for the experimental group in the pre-test (*M* = -1.93, *SD* = 3.67) vs.the post-test (*M* = -2.01, *SD* = 4.52), *t*(11) .04, *p* = .96. Concerning the independent samples, there was not a significant difference between the two groups in either the pre-test, in which the control group obtained (*M* = 0.02, *SD* = 4.81) and the experimental group obtained (*M* = -1.93, *SD* = 3.67), *t*(22) 1.11, *p* = .27, or in the post-test, in which the control group obtained (*M* = -3.23, *SD* = 2.37) and the experimental group obtained (*M* = -2.01, *SD* = 4.52), *t*(22) -.82, *p* = .41.

- *Edinburgh station (4-5)*

Figure 68 shows the last analysis done to *Edinburgh station*. In this analysis, the fifth syllable was subtracted from the fourth one. The results were positive favouring the experimental group, which obtained *M* = 5.35 in the pre-test, and *M* = 7.85 in the post-

test; 2.5 gain scores. The control group also improved but not as much as the experimental group, the mean score in the pre-test was *M* = 5.51 and in the post-test *M* = 7.23, with 1.82 gain scores.

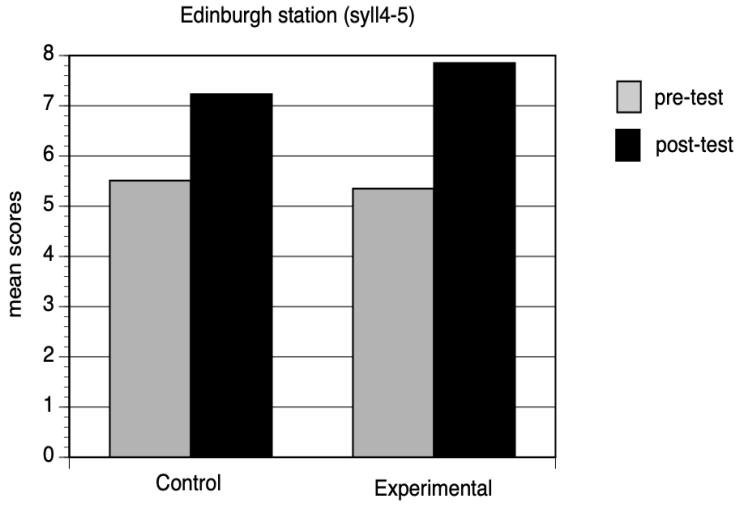


Fig. 68 Mean scores of the values obtained in the pre-test and post-test of the phrase *"Edinburgh station" (fourth analysis)*

There was not a significant difference for the control group in the pre-test (*M* = 5.51, *SD* = 3.94) vs. the post-test (*M* = 7.23, *SD* = 5.23), *t*(11) -1.85, *p* = .09. Regarding the experimental group, results show a significant difference in the pre-test (*M* = 5.35, *SD* = 4.45) vs. the post-test (*M* = 7.85, *SD* = 4.60), *t*(11) -2.14, *p* < .05. Concerning the independent samples, there was not a significant difference between the two groups in the pre-test, in which the control group obtained (*M* = 5.51, *SD* = 3.94) and the experimental group obtained (*M* = 5.35, *SD* = 4.45), *t*(22) 09, *p* = .92. There was not a significant difference between the two groups in the post-test in which the control group obtained *M* = 7.23, *SD* = 5.23 and the experimental group obtained *M* = 7.85, *SD* = 4.60; *t*(22) -.31, *p* = .75, either.

3.2. Production data by means of raters' judgements

In this section, the results of the production data analysed by means of ten native speakers' ratings will be presented. All the judges listened to all the recordings, 54 in total, in which pre- and post-tests data from both groups were mixed up randomly. The judges used a 6-point Likert scale to evaluate the participants' recordings in terms of comprehensibility, accentedness and fluency. The rating scale ranged from 1 (very poor production) to 6 (outstanding production). The results of the reliability analysis are shown in Table 8. Table 9 resumes the mean scores both groups obtained for comprehensibility, Table 10 shows the results of accentedness and Table 11 shows the results of fluency. At the end of each section, the results of four t-tests are shown, two paired and two independent samples were run for each variable. The level of statistical significance was set at <.05.

3.2.1. Results of the intra-class correlation coefficient

As observed in Table 8, the results of the Cronbach's alpha values were higher than 9, which indicate excellent reliability and a robust agreement on the analysis of the six tests with 95% confident interval = .903—.970 in comprehensibility pre-test and .895—.967 in comprehensibility post-test; .894—.967 in accentedenss pre-test and .902—.970 in accentedness post-test; and .923—.976 in fluency pre-test and .912—.973 in fluency post-test.

Table 8. Cronbach's Alpha values for each test measured

Rating test	Cronbach's Alpha (α)	95 % Confidence Interval
Comprehensibility pre-test	α =.942	.903-.970
Comprehensibility post-test	α =.937	.895-.967
Accentedness pre-test	α =.937	.894-.967
Accentedness post-test	α =.942	.902-.970
Fluency pre-test	α =.954	.923-.976
Fluency post-test	α =.947	.912-.973

3.2.2. Results of the mean rating for comprehensibility, accentedness and fluency

Having concluded that the ten judges agreed in their ratings in the six tests, the mean scores of both groups were calculated. Table 9 shows the mean scores of comprehensibility in the pre- and post conditions, Table 10 shows the mean scores of accentedness, and Table 11 presents the results of fluency.

Table 9 shows that the results of both comprehensibility post-test and accentedness pre-test indicate good reliability, whereas the other four tests (comprehensibilty pre-test, accentedness post-test, and fluency pre- and post-test) indicate excellent reliability.

Table 9. Mean rating (1-6) for the pre- and post-tests for comprehensibility

Comprehensibility						
	Control group			Experimental group		
Raters	pre-test (Mean)	post-test (Mean)	Gain scores	post-test (Mean)	post-test (Mean)	Gain scores
1	2.66	2.41	-0.25	2.5	2.67	0.17
2	3.08	3.16	0.08	3.16	3.16	0
3	4.75	5.16	0.41	4.75	5.17	0.42
4	4.41	5	0.59	4.75	5	0.25
5	3	3.25	0.25	2.75	3	0.25
6	3.83	4	0.17	3.67	3.83	0.16
7	4.08	4.58	0.5	4.08	4.58	0.5
8	3.66	3.16	-0.5	3.5	2.83	-0.67
9	3.75	3.91	0.16	3.66	3.58	-0.08
10	4.58	4.91	0.33	4.33	4.5	0.17
Mean	3.78	3.95	0.18	3.71	3.83	0.13
SD	1.37	1.37		1.23	1.23	

As observed in Table 9, the scores assigned to both groups in their production as far as comprehensibility is concerned resulted in an increase from the pre-test to the post-test slightly favouring the control group, which obtained M = 3.78 in the pre-test and M = 3.95 in the post-test, with 0.18 gain scores. In the case of the experimental group, they obtained M = 3.71 in the pre-test and 3.83 in the post-test, with 0.13 gain scores. As far as the paired sample t-tests are concerned, there was not a significant difference in the scores for the control group in the pre-test (M = 3.78, SD = 0.70) and in the post-test (M = 3.95, SD = 0.94), $t(119) = -1.89$, $p = .06$. There was not a significant difference in the scores for the experimental group in the pre-test (M = 3.71, SD = 1.23) and in the post-test (M = 3.83, SD = 1.23) $t(119) = .09$, $p = .921$, either. Regarding the independent sample t-tests, there was not a significant difference between the two groups in the pre-

test, in which the control group obtained (M = 3.78, SD = 0.70) and the experimental group obtained (M = 3.71, SD = 1.23), t(238) 23, p = .69. There was not a significant difference between the two groups in the post-test either, in which the control group obtained (M = 3.95, SD = 0.94) and the experimental group obtained (M = 3.83, SD = 1.23), t(238) .74, p = .46.

Table 10. Mean rating (1-6) for pre- and post-test for accentedness

Accentedness						
Raters	Control group			Experimental group		
	pre-test	post-test	Gain scores	pre-test	post-test	Gain scores
1	2.75	2.41	-0.34	2.58	2.66	0.08
2	3.25	3	-0.25	3.42	2.84	-0.58
3	3.58	3.83	0.25	3.25	3.5	0.25
4	4.5	4.66	0.16	4.16	4.5	0.34
5	2.91	3.08	0.17	3.08	3.17	0.09
6	3.5	3.16	-0.34	2.92	3	0.08
7	2.91	3.25	0.34	2.41	3.5	1.09
8	3	2.75	-0.25	2.58	2.25	-0.33
9	3.16	3.25	0.09	3.25	3.16	-0.09
10	2.58	2.66	0.08	2.25	2.33	0.08
Mean	3.21	3.20	-0.01	2.99	3.09	0.1
SD	1.18	1.18		1.07	1.03	

As we can see from the results presented in Table 10, whereas the control group showed a slight numerical decrease from the pre-test to the post-test, M = 3.21 in the pre-test and M = 3.20 in the post-test, with a negative gain score of -0.01, the scores assigned to the experimental group resulted in a slight increase: M = 2.99 in the pre-test and M = in the post-test; 0.1 gain scores. As far as the paired samples t-tests are concerned, there was not a significant difference in the scores for the control group in the pre-test (M = 3.21, SD = 1.18) and in the post-test (M = 3.20, SD = 1.18), t(119) .09, p = .92. There

was not a significant difference in the scores for the experimental group in the pre-test (M = 2.99, SD = 1.07) and in the post-test (M = 3.09, SD = 1.03), t(119) -1.14, p = .25 either. As far as the independent sample t-tests are concerned, there was not a significant difference between the two groups in the pre-test, in which the control group obtained (M = 3.21, SD = 1.18) and the experimental group obtained (M = 2.99, SD = 1.07), t(238)153, p = .12. There was not a significant difference between the two groups in the post-test either, in which the control group obtained (M = 3.20, SD = 1.18) and the experimental group obtained (M = 3.09, SD = 1.03), t(238) .81, p = .41.

Table 11. Mean rating (1-6) for pre- and post-test for fluency

Fluency						
	Control group			Experimental group		
Raters	pre-test	post-test	Gain scores	pre-test	post-test	Gain scores
1	2.91	2.75	-0.16	2.42	2.58	0.16
2	3.33	3.25	-0.08	3.25	3.08	-0.17
3	4.25	4.5	0.25	3.67	4.5	0.83
4	4.16	4.33	0.17	4.25	4.25	0
5	3	3.41	0.41	3.17	3.33	0.16
6	3.33	3.91	0.58	3.08	3.58	0.5
7	3.16	4	0.84	3.25	4.08	0.83
8	4.08	4.16	0.08	3.83	3.83	0
9	3.33	3.41	0.08	3.25	3.17	-0.08
10	3.66	4.25	0.59	3.58	3.92	0.34
Mean	3.52	3.80	0.28	3.37	3.63	0.26
SD	1.32	1.21		1.12	1.04	

As shown in Table 11, the scores assigned to both groups for fluency increased slightly, favouring the control group, which obtained M = 3.52 in the pre-test, M = 3.80 in the post-test; 0.28 gain scores. The experimental group, on the other hand, obtained M = 3.37 in the pre-test, and M = 3.63 in the post-test: 0.26 gain scores. As far as the paired

sample t-tests are concerned, there was a significant difference in the scores for the control group in the pre-test (M = 3.52, SD = 1.32) and in the post-test (M = 3.80, SD = 1.21), t (119) -2.73, $p < .05$. Concerning the experimental group, there was also a significant difference in the scores for the experimental group in the the pre-test (M = 3.37, SD = 1.12) and in the post-test (M = 3.63, SD = 1.04), t (119) -2.65, $p < .05$. Regarding the independent sample t-tests, there was not a significant difference between the two groups in the pre-test, in which the control group obtained (M = 3.52, SD = 1.32) and the experimental group obtained (M = 3.37, SD = 1.12), t (238) .94, p = .34. There was not a significant difference between the two groups in the post-test either, in which the control group obtained (M = 3.80, SD = 1.21) and the experimental group obtained (M = 3.63, SD = 1.04), t(238) 1.14, p = .25.

3.2.3. Discussion of the picture narrative

Figure 69 summarises the results of the judges' ratings for comprehensibility, accentedeness and fluency.

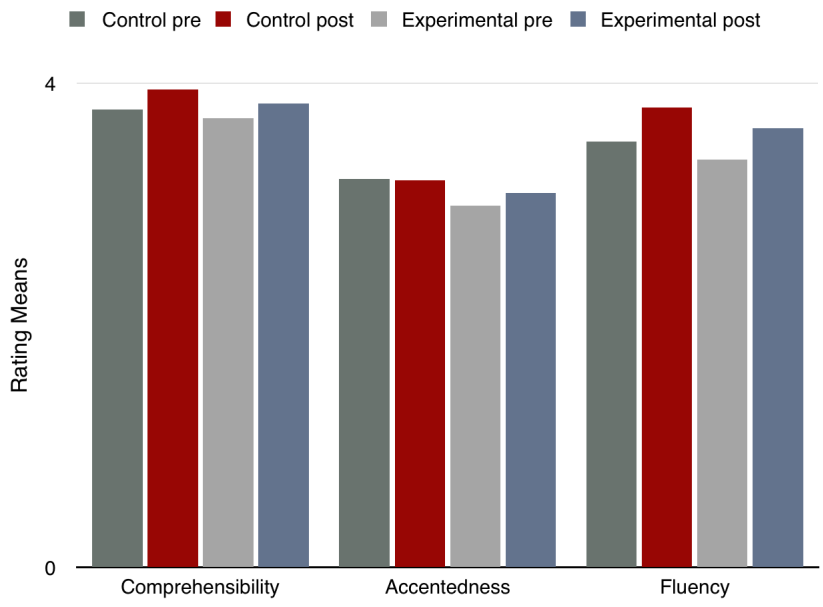


Figure. 69 Ratings Means for comprehensibility, accentedness, and fluency for both groups

As observed in Figure 69, the experimental group improved in the three areas measured, even though in accendeness the improvement was slight, *M* = 2.99 in the pre-test and *M* = in the post-test; 0.1 gain scores. The control group, on the other hand, improved in both comprehensibility and fluency, but did slightly worse in accendeness, *M* = 3.21 in the pre-test and *M* = 3.20 in the post-test, with a negative gain score of -0.01. These results suggest that the judges perceived the participants production as being highly comprehensible and fluent even if their speech was quiet accented. In fact, these results go in line with previous studies which suggest that there is not a direct correlation between accentedness and comprehensibility. In other words, L2 speakers' speech may be perceived as heavily accented, yet still comprehensible (Derwing & Munro, 2015). On the other hand, many studies associated comprehensibility to suprasegmental features, fluency and lexis/grammar (Crowther, Trofimovich, Isaacs, & Saito, 2015a; Isaacs & Trofimovich, 2012; Saito, Webb, Trofimovich, & Isaacs, 2016) while accentedenss has primarily been correlated to segmental accuracy. Since the aim of the training of this study was a suprasegmental feaature, the results of the picture narrative task go in line with the research hypothesis.

Regarding fluency, it is relevant to mention that both groups obtained statistically significant results, which means that the improvement occurs no matter the methodology adopted. Even though the results were not as hypothesised, they go in line with previous studies which state that explicit training on suprasegmentals results in improving the communicative aspects of spoken language (Derwing, Munro and Wiebe, 1997, 1998; Derwing and Rossiter, 2003; Moyer, 1999).

3.3. Results of the post-training questionnaire

In order to make students reflect on the pronunciation training they received, participants were asked to answer a questionnaire after finishing their training course, which lasted 8 weeks. The questionnaire, in which students were required to give their opinion and comments on their learning process, diagnosed different aspects of the training. In some of the questions, they used a 5-point Likert scale, where 1 = does not agree, 5 = completely agrees. Participants' answers were simplified to 3-point: 1 = does not agree, 2 = neutral, 3 = definitely agrees. General results and comments related to both groups will be presented first, followed by group-specific results.

3.3.1. General results

Table 12 summarises some of the results of the trainees. Generally speaking, the explicit pronunciation course was beneficial and useful for students, as 100% of the trainees agree that accurate pronunciation is very important in communicating with native speakers. Additionally, 80% of the trainees think that English will be very useful for them in the future. On the other hand, 92% of the participants claimed that they had never had any specific training on pronunciation before they took this course. Furthermore, 55% of the participants claimed that pronunciation was the major handicap causing misunderstanding with native speakers. As a result, 56% of the trainees claimed that they did not feel confident about their pronunciation before they started the training. However, only 28% of the participants were still feeling insecure about their pronunciation during the training. Regarding the use of technology, more than half of the students reported that it is a very important and useful tool to use in the

classroom. Finally, 96% of the trainees reported that they felt very satisfied about doing the pronunciation course.

Table 12. Participants' comments about their pronunciation training

Questions	Experimental group		Control group	
1- Feedback about the usefulness of English in the future	Not useful	Very useful	Not useful	Very useful
	0%	73,3%	0%	90%
2- Feedback about the use of technology in the classroom	Not important	Very important	Not important	Very important
	6,6%	53,3%	20%	50%
3- Feedback about the importance of accurate pronunciation	Not important	Very important	Not important	Very important
	0%	100%	0%	100%
4- Feedback about the level of confidence about their pronunciation before the training	Not confident	Very confident	Not confident	Very confident
	66,6%	6.6%	40%	20%
5- Feedback about the level of confidence about their pronunciation during the training	Not confident	Very confident	Not confident	Very confident
	40%	33,3%	10%	30%
6- Feedback about the level of satisfaction about doing the course in general	Not satisfied	Very satisfied	Not satisfied	very satisfied
	0%	46,6%	0%	90%

3.3.2. Group-specific results

The questions administered to both groups were the same. However, participants of the experimental group gave their feedback about the use of the website and the integrated recording tool. On the other hand, the control group were asked to give their feedback about reading aloud as a way to make them aware of their pronunciation mistakes. In

the next section, first the experimental group answers are reported, followed by the answers of the control group.

3.3.2.1. Experimental group

The main hypothesis of this study is about the use of technology in the teaching of pronunciation in the classroom. Accordingly, the experimental group, which actually made use of the website and the integrated recording tool, were asked to give their opinion about their learning experience. As observed in Table 13, 60% of the trainees found the use of the website easy. Moreover, 74% of the participants found the recording tool easy to use. Furthermore, 100% of the participants could recognise some of the differences between their production and the native speaker one and they actually gave some examples. In addition, 93% of the trainees claimed that using the recordings helped them reflect on their production. Finally, 80% believed that comparing their pronunciation to the native speaker improved their pronunciation. For questions 3, 4, and 5, participants were asked to give further explanations and examples, some of their responses are presented.

Table 13. Feedback about the use of technology in the classroom: the use of the website and the recording tool

questions	yes
1. Was the website user-friendly?	60%
2. Was the recording tool user-friendly?	74%
3. In all the exercises in which you were asked to record yourself and compare your performance with the native speaker, did you notice any differences between your production and the native speaker? Please give some examples.	100%
4. Do you think that using the recordings helped you reflect on your pronunciation? Please give some examples.	93%
5. Do you think comparing your pronunciation to the native speaker improved somehow your pronunciation? Please give some examples.	80%

Below are some selected responses from the experimental group for questions 3, 4, and 5.

Question 3:

- "yes, the rhythm between the native speaker and me [sic]; the pronunciation of unstressed vowels; the pronunciation of sentences in general like *give it to her*.
- "yes, the way the native speaker put [sic] emphasis on the stressed syllables; the way the vowels are pronounced; the importance of stressing the right syllable, the case of homographs for instance".
- "yes, how some vowels are pronounced; the stressed syllables; the hierarchy between the highlighted and swallowed words".

Question 4:

- "Yes, because listening to the recordings help [sic] you recognise the mistakes and correct them the next time you speak in English".
- "Yes, because I can hear myself and recognise my mistakes more easily".
- "I believe that the recordings have helped me to reflect on my pronunciation because when you record yourself you can listen to the recordings afterwards, which make you aware about your mistakes".
- " Yes, because sometimes you think you pronounce the words correctly, but when you listen to the recordings and you compare your production to the native speaker you become aware of your mistakes".
- "Yes, because until I compared my recordings with the native's one I thought that I was doing it right. After this comparison I corrected my mistakes".

Question 5:

- "now I pronounce some words better, I corrected my pronunciation in some words/sentences, I understand more vocabulary".
- "Some words with the schwa sound, the hierarchy of words, the difference between homographs (nouns and verbs), stressed syllables".
- "yes, now I can distinguish between the stressed and unstressed sounds of some words depending on their part of speech; I noticed how different I sound from a native".

Below are some selected open responses from the participants' feedback about the course in general:

- "I felt very satisfied with this course, because I learned a lot of things about pronunciation and I learned some ways to improve my English pronunciation".
- "I feel more confident about my pronunciation now because I have realised I have some fossilised mistakes I was not aware of before".
- "I believe that the pronunciation course in general has been an interesting way to learn how to pronounce some words. Moreover, we have been in contact with some experiences of native speakers, so this help us to improve our English and this helps us to be more conscious about some of our mistakes".
- "I liked this course because I think it's interesting how changing a little bit the pronunciation the meaning of the sentence changes. Also, I think that computers were a great option and they make the class a little less formal".

- "I felt very good. The teacher was nice and the class was big, but the audio-phones were of low quality".
- "I liked the course because I like English and I want to visit the UK and the USA, and the first problem I see is that even when I say a correct sentence they don't understand me, so the pronunciation is as important as the grammar, and this course helped me with that".

3.3.2.2. Control group

Instead of recording themselves, participants who belonged to the control group were asked to read aloud the words, phrases and sentences, listen to the native speaker reading them, compare their production to the native speaker and write down any differences they could recognise. As observed in Table 14, 50% of the participants could recognise some differences between their production and the native speaker's one. However, only 42% of the participants said that reading the words helped them reflect on their pronunciation. Finally, 50% of the participants said that comparing their pronunciation to the native speaker improved somehow their pronunciation.

Table 14.Feedback about reading aloud and compare their performance to the native speaker

questions	yes
3. In all the exercises in which you were asked to read aloud and compare your performance to the native speaker, did you notice any differences between your production and the native speaker?	50%
4. Do you think reading the words helped you reflect on your pronunciation?	42%
5. Do you think comparing your pronunciation to the native speaker improved somehow your pronunciation?	50%

Below are some selected responses from the control group for questions 3, 4, and 5.

Question 3:

- "The native speaker reads the words faster; my pronunciation sounded quite different from the native speaker".
- "The native speaker's pronunciation was different from mine; they speak too fast, good pronunciation seems simpler for them".
- "There were no big differences between my pronunciation and the native speaker's one".
- "I realised that I pronounce some words like I pronounce them in Spanish, for example the word *hotel*; also, the rhythm of the sentences sound [sic] very different".

Question 4:

- "Reading the words probably did not help me to reflect on my pronunciation but listening to the native speaker's pronunciation did".
- "Yes, since I identified my mistakes and I could correct them".
- "Reading aloud helps if you know already how to pronounce words, but it does not really help if nobody gives you any feedback on how to pronounce the word".
- "yes, because reading helps you practice your pronunciation".

Question 5:

- "When I listen to the native speaker's pronunciation I try to read the words the same way".

- "I know what words I have to highlight; I know how to pronounce some verbs, nouns, adverbs, and compound words; I've learned that depending on the stressed the syllables, the meaning of a sentence can change; correct pronunciation is very important so that the others can understand you".

Below are some selected open responses about the course in general.

- "I've improved a little bit my pronunciation and now I understand why sometimes I don't understand native speakers. In addition to this, I have learned some keys to try to understand them".
- "I felt very good because I could correct my mistakes and I could practice pronunciation, but also I felt that some things could be skipped because I already knew them".
- "I think this course can be very useful if students work more time on pronunciation. It has been very short and just one hour a week so although I found it very interesting, I don't know if I'm going to speak better in that short time".
- "The course helped me in my pronunciation and this is good to speak with other people in English that could understand me".
- "I feel [sic] very good because I learn [sic] of different way [sic]. The teacher is really good because if she should [sic] to repeat a word many times, she do [sic] it. I learn [sic] a lot with her".
- "Very satisfied because I improve [sic] thanks to this course. I think that this is very important and I'm very happy to have this experience".

As we can observe from the participants' responses, both groups found the explicit pronunciation course useful and beneficial, as it made them aware of some of their

pronunciation mistakes as far as word and sentence stress are concerned. However, due to the short duration of the course, some participants were not sure if their pronunciation could improve in that short time.

Chapter IV. Discussion and conclusions

This chapter presents a summary of the main research findings as well as its implications for the field, L2 pronunciation research. First, a summary of the result is provided. Then, the main objectives and methods used are discussed in the light of the proposed research hypothesis and the existing literature. Limitations of the current study and suggestions for further research are offered, alongside with the main conclusions.

This chapter is divided in three parts. First, the results of the acoustic speech analysis of the words and phrases reading-task will be summarised and discussed, followed by the results of the judges' ratings of the timed picture description. Finally, the implications of the questionnaire will be examined and summed up.

The present study explored the potential of the use of technology in the teaching/learning of pronunciation in the classroom. It was hypothesised that, if tertiary level students use computer assisted pronunciation teaching, they will improve their pronunciation skills as far as word and sentence stress are concerned. To test the research hypothesis, an original pronunciation course was designed and implemented in the participants' usual course of English. The main focus of the course was to provide the participants with an understandable and teachable suprasegmental feature, word and sentence stress, this being one of the handicaps which hinder effective communication. As Pennington & Rogerson-Revell (2019) pointed out, "the insufficient distinction (or no) differentiation between stressed/unstressed words"… "is a source of irritation for the listener and requires a high degree of tolerance to accept or ignore" (p.154-155).

Throughout the training, which lasted eight weeks, 50 minutes per sessions/week, the participants of both groups were provided with a full and comprehensible course on word and sentence stress. Not only did they learn some basic rules and tendencies of

word and sentence stress in English, but were also provided with some techniques and strategies to raise their awareness about a) the difference between stress rules in English, a stress-timed language, and Spanish/Catalan, syllable-timed languages, b) the pronunciation of many words in English and Spanish written the same but pronounced differently, c) the difference between the vowel systems of English and Spanish, d) their typical mistakes shared because of their first languages interference, e) the importance of stressing the right syllables/words in order to make their speech intelligible.

Generally speaking, taking in account the extensive yet relatively short training students were provided with, the results proved to be positive for both groups of participants. However, the experimental group, which made use of the website and the integrated recording tool, outperformed their counterparts, the control group, who learned the pronunciation course in a conventional way.

4.1. Discussion of the acoustic analysis results

The first research question investigated the impact of the use of technology as a tool to improve students' perception and production skills as far as word and sentence stress are concerned. As many studies have suggested, incorporating computer assisted technology in the teaching of pronunciation can be effective in helping foreign language learners improve their pronunciation (e.g. Kawai and Hirose 2000; Cauldwell 2002; Levis and Pickering 2004; Levis 2007, among others). This part of the data was analysed using the speech analysis software Praat (Boersma & Weenink, 2017). As mentioned in Chapter II, to obtain the difference in amplitude between the stressed and unstressed syllables, each syllable in the words and phrases was identified in the acoustic signal and a reading of the intensity peak was obtained. As shown in Table 5, the scores assigned to both groups resulted in an increase in almost all the words

measured. More specifically, the experimental group obtained positive values in 82% of the words measured, whereas the control group obtained 94%. However, when the data was evaluated statistically by means of *t*-tests, even if both group improved their level of discrimination between the stressed and unstressed syllables of the words recorded, the experimental group outperformed the control group in that they obtained significant improvement ($p < .05$) in 24% of the words recorded. The control group, on the other hand, obtained statistical significance in 18% of the words recorded.

As far as phrases are concerned, and as illustrated in Table 6, the results also favoured the experimental group, who improved in 67% of the phrases, whereas the control group improved in 61% of the phrases recorded. The same conclusion was confirmed when the data was analysed statistically, the experimental group obtained significant results ($p < .05$) in three cases, although in one case the results pointed in the wrong direction of the hypothesis of the study, whereas the control group obtained only one significant result, pointing in the wrong direction.

The fact that neither group improved their discrimination between the stressed and unstressed syllable in all the words and phrases measured is probably due to the short amount of training. It is relevant to mention here that the fact that there was more significant improvement in the words-reading task than the phrases-reading task is probably due to the degree of difficulty imposed by each task. It is important to point out that in order to test whether potential improvement applied to items which did not appear in the training, the items used as stimuli for the reading tasks were divided into familiar (in the case of the words) and novel (in the case of the phrases). Besides, in the phrases reading-task, the participants were not only required to reflect on the position of stress on each of the components of the phrases, words they have not seen during the

treatment, but they also had to be aware of the position of the nuclear stress in the phrases, which probably added to the difficulty of the task.

Even though the results of this part of data did not turn out significant in all the words and phrases measured, still, the participants who used technology in their pronunciation course, and recorded the words and phrases, actually improved their level of discrimination between the stressed and unstressed syllables more than their counterparts. This goes in line with the research hypothesis and the existing literature that using technology can actually be beneficial for tertiary level students (Celce-Murcia, Brinton, Goodwin & Grinner, 2011; Neri, Cucchiarini, Strik & Boves, 2002; Pennington, 1999; Shirer, 2005).

4.2. Discussion of the timed picture-description task

Following Derwing & Munro (1997) analysis of comprehensibility, accentedness and fluency to test the effectiveness of the pronunciation intervention, the second research question of this study concerned whether improvement would occur in the participants' production skills. As mentioned earlier, the timed picture-description task was analysed by means of 10 native English judges. The results of the data showed that statistically significant pre-post change was only observed for the fluency rating and that change over time is observed in both groups, slightly favouring the control group.

It is important to point out here that the timed picture-description task was more difficult and demanding than the controlled production tasks, since participants were required to create spontaneous sentences to describe the photo, with the added pressure of the timed nature of the task.

Thus, there may have been a task demand effect among the students affecting their performance in describing the photo. Some seemed a bit more tentative than others,

even across those who seemed roughly equal in comprehensibility. This makes one wonder if a factor similar to test anxiety was interfering with performance on the task. Furthermore, there may have been other factors affecting the judges ratings such as rater fatigue effect, or order effect across the ratings. One of the judges points out after doing some of the ratings:

> "…There may have been an order effect across the ratings. Raters will be trying to calibrate their judgments based on the first audio unless they were trained ahead of time using examples that typically would represent the ends of the scale. I think I did around 16-17 ratings. Among those, one really stood out as sounding quite "native" and I encountered that case well into the progression. That individual caused me to question my previous ratings and influenced my ratings after. Had I began with that case as an exemplar, I could have calibrated it to a 5 or 6 value and used it as a more solid comparison for subsequent judgements.
>
> You may also have a rater fatigue effect. I only made it through around 16 audios before needing to attend to my day job. Even so, they all began to sound quite similar as time progressed. Also, I forgot how many ratings I would be doing, so I lost my reference as to how far along I was in the task. This can create a distraction resulting in more homogeneous ratings".

Even though the results of this part of the data did not yield statistically significant differences between the groups in the three constructs analysed, the results still suggest that the pronunciation course did not only help learners overcome their seemingly fossilised errors about the position of stress in words, but it also helped them develop their fluency skills. The results of this part of the data go in line with the previous studies which support the effectiveness of explicit instruction of pronunciation on the learners' improvement (Lee, Jang & Plonsky, 2015; Saito, 2012; Thomson & Derwing, 2015, among others). According to Levis (2018, p.2), "the improvement may be in

accuracy or intelligibility, but improvement is the dominant results of teaching or learning opportunities".

Also, the results go in line with previous studies which suggest that explicit training on suprasegmentals results in improving the communicative aspects of spoken language, mainly in fluency-oriented training (Anderson-Hsieh, 1990; Derwing, Munro and Wiebe, 1997, 1998; Derwing and Rossiter, 2003; Missaglia, 1999; Moyer, 1999; Stevens, 1989).

4.3. Discussion of the learners' perception of the pronunciation training course

The last research question of the present study explored the participants' opinions about the pronunciation training course in general, and about the use of technology as a tool to improve their perception and production skills. As discussed earlier, the results of the questionnaire show that, generally speaking, the explicit pronunciation course was beneficial and useful for the students.

All the trainees agreed that accurate pronunciation is crucial to communicate effectively with native speakers. However, 92% of the participants claimed that they had never had any specific training on pronunciation before they took this course. Regarding the use of technology, more than half of the students reported that it is a very important and useful tool to use in the classroom. Finally, 96% of the trainees reported that they felt very satisfied about doing the pronunciation course.

The results of the questionnaire go in line with other studies which suggest that EFL learners found training on pronunciation effective. Edwards (1992), in a questionnaire conducted among students enrolled in an introductory course to English phonetics, reported that 94% of the students perceived the course to be very useful for learning

pronunciation. Similarly, Cenoz and García Lecumberri (1999), in a survey conducted among their English philology students, reported that students found the specific training through phonetics to have a positive influence on their pronunciation learning. The authors remark that "more than half of the participants (56.7%) think that pronunciation is better taught through phonetics in all cases (p. 640).

On the other hand, concerning the methodology used, the learners of both groups reacted positively towards the training. However, participants of the experimental group were more enthusiastic towards the use of technology in the classroom. This is not surprising, given the fact that many studies have found that incorporating technology into instruction has "positive impacts" (Jamil & shab, 2011, p.39). Prensky (2001) refers to the students as "digital natives", they "think and process information fundamentally differently from their predecessors" in the sense that they are constantly exposed to technology (Prensky, 2001, p.1). Most students of this generation have grown in a technology era which previous generations have not experienced (Kennedy, Gray, & Krause, 2008). Other studies conclude that students reacted positively when technology is incorporated in their courses because of increased engagement, convenience, interest in technology itself, and presence of new learning opportunities (Kennedy, Judd, Churchward, Gray, & Krause, 2008).

4.4. Conclusions

Research has shown that students and teachers alike are aware of the importance of pronunciation (Cenoz & Lecumberri, 1999; Levis, 2015; Zielinski & Yates, 2014). However, pronunciation has often been neglected if we compare it to the other areas of teaching English as a second or a foreign language (Rubin, 1992; Scovel, 1969). Most teachers find pronunciation the most intimidating aspect of teaching the language, either

because of its difficulty (Henderson et al, 2012; MacDonald, 2002) or because they feel underprepared to teach it (Baker, 2014; Foote, Hotlby, & Derwing, 2011; Murphy, 2014). Nevertheless, avoiding such an important part of instruction has negative effects, it may lead learners to misunderstanding, thus to communication breakdown (Jenkins, 2000).

The situation in Spain is not different. Even though most teachers acknowledge the importance of pronunciation, most of them feel underprepared to give it its right weight among the other aspects of teaching the language. Walker (1999) reported in a survey conducted in Spain among 350 primary, secondary and adult teachers that "teachers in Spain have demonstrated a constant demand for education in the teaching of pronunciation" (p.25). He added that 65% of the teachers he surveyed reported to be "keen or very keen that their students pronounce English well" (p.25). However, 75% of the teachers surveyed claimed they had received "little or no specialist training in the teaching of pronunciation" (Walker, 1999, p. 25).

In contrast to the above, many studies have demonstrated that when instructed explicitly, pronunciation results in improvement in learners in any stage of language learning (Levis, 2016). In fact, research has shown that even learners with fossilised mistakes can significantly improve their comprehensibility after many years in L2 environments (Derwing, Munro, Foote, Waugh, & Flemimg, 2014).

On the one hand, a large body of literature has shown that the use of recordings has long been recommended as a way to significantly improve participants pronunciation through self-awareness (Acton, 1984; Couper, 2003; Fraser 2001; Lord, 2008, among others). On the other hand, computer assisted pronunciation in the classroom can be

beneficial for ESL and EFL learners to improve their perception and production skills (Celce-Murcia, et al, 2011).

Following all these notions, this study investigated the impact of the use of technology in the learning/teaching of pronunciation in the classroom. It was conducted to test a) whether incorporating technology and the use of the recordings in the teaching/learning of pronunciation would improve participants' perception and production skills, as far as word and sentence stress are concerned; b) if explicit pronunciation instruction would improve participants' intelligibility, fluency and accentedness; c) participants' personal perspectives towards pronunciation teaching and learning. To test the research hypothesis, a web-based pronunciation course was created and integrated in the participants' regular course of English.

As a general conclusion of the study, the results of the data analysed showed that the explicit pronunciation course was positive and beneficial for both groups of participants, mainly for the experimental group, in that they improved their perception and production skills in all the tasks analysed. Even if the results of the data analysed did not reach statistical significance in all the cases, the findings of this study can be taken into consideration while designing a pronunciation course for Spanish and Catalan tertiary level students. Since the duration of the treatment was limited to only eight hours of training, it is speculated that dedicating more time of explicit instruction on pronunciation will result in higher awareness about their mistakes, which, in turn, should result in an improvement of their pronunciation as far as word and sentence stress are concerned. To conclude, the results seem to provide evidence of the benefits of the use of information technologies in the learning of pronunciation in the classroom.

4.5. Limitations of the current study and suggestion for further research

Even though the results obtained from this study were pointing in the direction of the research hypothesis, a number of limitations need to be acknowledged. For instance, the most obvious limitation of this study was the short amount and the time constraint of the training. It is important to highlight that the pronunciation course was integrated in the participants' usual course of English. That is to say, the activities created to improve the participants' pronunciation were divided in such a way as to fit within the time allowed for the training. Thus, time constraint pressure has probably affected the results in that the participants were not given enough time to assimilate and practice all the new concepts, taking into account that the majority of the participants have never had any explicit instruction on pronunciation before this course. Furthermore, as the experimental group did the activities in a computer lab, the participants could not record themselves simultaneously. Therefore, much time was spent on having all the participants record the target language. Conversely, as the time of training was the same for both groups, the control group benefitted more and better from the instruction.

An additional important factor which affected the results negatively was the very limited sample size of the population and the rate of the attendance of the trainees. Only 24 participants completed the treatment, of whom only 29% attended 100% of the training, 8.33% attended 87.5% of the classes, 16.66% attended 75%, 12.5% attended 62.5%, 12.5% attended 50%, 8.33 % of the participants attended 37.5% and finally 12.5% of the students attended only 12.5% of the classes. Therefore, the statistical results must be interpreted with caution because of the relatively small size of the population and because of the rate of attendance.

Besides, very limited tests were performed. In fact, a delayed test was not performed to test if the improvement would actually occur over time. Furthermore, the lack of homogeneity of the participants' level of English has probably affected the results. Of the 24 participants, 5 had the A2 level, 8 had the B1 level, 9 had the B2 level, and 2 had the C1 level (according to the Common European Framework of Reference of Languages). The diversity of levels obviously added to the variability of the results. In fact, many of the participants' command of the language was very poor and their difficulties did not exclusively concern pronunciation, but extended to poor word choice and grammar. Previous studies showed a direct correlation between pronunciation and the level of grammar. Varonis & Gass (1982) concluded that a lack of command of the latter affects negatively the perception of speech of these individuals.

Another limitation of the design of the study lies on the fact that there were only two groups, who acted as experimental and control. As mentioned before, both groups received the same and exact amount of training. Ideally, a third group with no instruction on pronunciation would have been crucial in order to show whether the improvement was because of the use or non-use of technology or it was simply because of the extensive explicit training on pronunciation. It is well demonstrated that explicit instruction has proved to be effective, and that participants almost without exception improve some aspects of their pronunciation (Lee, Jang, & Plonsky, 2015; Saito, 2012; Thomson & Derwing, 2015, among others). Therefore, it is not very clear whether the improvement was attributed to the use of technology or to the explicit pronunciation training.

To sum up, even though the results suggested that the pronunciation course has been effective, in general terms, further research is needed in order to investigate the

correlation between the use of technology and the teaching/learning of pronunciation. Longer training periods are needed in order to yield more positive results. Ideally, participants should have homogenous level of the language, at least an intermediate level of English. In addition, the population size should be large enough in order to generalise the outcomes of the study. Furthermore, at least three groups are needed in order to test the effectiveness of the treatment. Finally, but not least important, more tests are needed in order to interpret the data, at least a delayed test which could demonstrate whether the improvement has been effective over time.

References

Abercrombie, D. (1967) *Elements of General Phonetics.* Edinburgh, Scotland: Edinburgh University Press.

Acton, W. (1984). Changing fossilized pronunciation. *TESOL Quarterly*, *18*(1), 71–85. https://doi. org/10.2307/3586336

Alameda, J. R. & Cuetos, F. (1995). *Diccinario de Frecuencias de las Unidades Lingüísticas del Castellano*. Oviedo, Spain: Universidad de Oviedo. Oviedo.

Anderson-Hsieh, J. (1990). Teaching suprasegmentals to international teaching assistants using field-specific materials. *English for Specific Purposes, 9,* 195-214.

Arnold, G. F. (1957). *Stress in English Words*. Amsterdam, The Netherlands: North-Holland Publishing Company.

Asher, J. (1965). The strategy of the total physical response: An application to learning Russian. *International Review of Applied Linguistics, 3,* 291- 300.

Asher, J. (1977). *Learning Another Language through Actions: The Complete Teachers Guide Book* (2nd ed.). Los Gatos, CA: Sky Oaks Production.

Baker, A. (2011a). Discourse prosody and teachers' stated beliefs and practices. *TESOL Journal, 2*(3), 263-292. http://dx.doi.org/10.5054/tj.2011.259955.

Baker, A. (2011b). ESL teachers and pronunciation pedagogy: Exploring the development of teachers' cognitions and classroom practices. In J. M. Levis & K. LeVelle (Eds.), *Proceedings of the 2nd Pronunciation in Second Language Learning and Teaching Conference* (2010, 82-94). Ames, IA: Iowa State University.

Baker, A. (2014). Exploring teachers' knowledge of L2 pronunciation techniques: Teacher cognitions, observed classroom practices and student perceptions. *TESOL Quarterly, 48*(1), 136-163. http://dx.doi.org/10.1002/tesq.99

Baker, A., & Murphy, J. (2011). Knowledge base of pronunciation teaching: Staking out the territory. *TESL Canada Journal*, *28*, 29-50.

Benrabah, M. E. (1997). Word stress: A source of unintelligibility in English. *International Review of Applied Linguistics, 35*(3), 157-165.

Bell, A. G. (1906). *The Mechanism of Speech.* New York (N.Y): Funk & Wagnalls.

Boersma, P., & Weenink, D.(2017). *Praat: Doing phonetics by computer. Version 6.0.26*, Retrieved from http://www.fon.hum.uva.nl/praat/

Bolinger, D. L. (1947). American English intonation. *American Speech, 22*(2), 134-136.

Brown, A. (1991). Functional load and teaching of pronunciation. In A. Brown (Ed.), *Teaching English Pronunciation. A Book of Readings,* 211-224. Cambridge: Cambridge University Press.

Brown, C., & Matthews, J. (1997). The role of feature geometry in the development of phonemic contrasts. In S. J. Hannahs & M. Young-Scholten, (Eds.) *Focus on Phonological Acquisition*, 67-78. Amsterdam: John Benjamins. doi:10.1075/lald.16.05bro.

Burgess, J., & Spencer, S. (2000). Phonology and pronunciation in integrated language teaching and teacher education. *System, 28,* 191–215.

Burzio, L. (1994). *Principles of English Stress*. Cambridge, England: Cambridge University Press.

Carbonell, J. F. & Llisterri, J. (1999). 'Catalan.' In International Phonetic Association (Ed.), *Handbook of the international phonetic association* (61-65). Cambridge, England: Cambridge University Press.

Cardoso, W., & Trofimovich, P. (2014) Second language speech perception and production: Implications for language teaching. *Special Issue of the Canadian Modern Language Review, 70*(4), I-IX.

Cauldwell, R. (2002). The functional irrhythmicality of spontaneous speech: A discourse view of speech rhythms. *Apples, 2,* 1-24.

Celce-Murcia, M. (1983). Teaching pronunciation communicatively. *MEXTESOL Journal, 1*(7), 10-25.

Celce-Murcia, M., Brinton, D. M., & Goodwin, J. M. (1996). *Teaching Pronunciation: A Reference for Teachers of English to Speakers of other Languages.* Cambridge, England: Cambridge University Press.

Celce-Murcia, M., Brinton, D. M., Goodwin, J. M., & Griner, B. (2010). *Teaching Pronunciation: A Course Book and Reference Guide.* (2nd ed.). New York: Cambridge University Press.

Cenoz, J., & García-Lecumberri, M. L. (1999). The acquisition of English pronunciation: learners' views. *International Journal of Applied Linguistics, 9* (1), 3-15. doi:10.1111/j.1473-4192.1999.tb00157.x

Chomsky, N., & Halle, M. (1968). *The Sound Pattern of English.* New York: Harper and Row.

Clarey, E. & Dixon, R. J. (1947). *Pronunciation Exercises in English*. New York: Regents.

Couper, G. (2003). The value of an explicit pronunciation syllabus in ESOL teaching. *Prospect, 18*(3), 53-70.

Cronbach, L. J. & Meehl, P. E. (1955), Construct validity in psychological tests. *PsychologicalBulletin*, (52) , 281 302.

Cruttenden, A. (2014). *Gimson's Pronunciation of English* (8th ed.). London: Routledge.

Crystal, D. (2006). *Language and the Internet*. Cambridge: Cambridge University Press. doi: 10.1017/CBO9780511487002.012

Dalton, C., & Seidlhofer, B. (1994). *Pronunciation*. Oxford: Oxford University Press.

De Bot, K. (1983). Visual feedback of intonation I: Effectiveness and induced practice behavior. *Language and Speech*, *26* (4), 331-350.

Derwing, T. M. (2010). Utopian goals for pronunciation teaching. In J. Levis & K. LeVelle (Eds.)*, Proceedings of the 1st Pronunciation in Second Language Learning and Teaching Conference, Iowa State University, Sept. 2009.* (24-37), Ames, IA: Iowa State University.

Derwing, T. M. & Munro, M. J. (1997). Accent, intelligibility, and comprehensibility: evidence from four L1s. *Studies in Second Language Acquisition, 19,* 1-16.

Derwing, T. M., Munro, M. J. & Wiebe, G. E. (1997). Pronunciation instruction for 'fossilized'learners: Can it help? *Applied Language Learning*, *8*, 217-235.

Derwing, T. M., Munro, M. J. & Wiebe, G. E. (1998). Evidence in favour of a broad framework for pronunciation instruction. *Language Learning*, *48*, 393-410. doi: 10.1111/0023-8333.00047

Derwing, T. M. & Marian R. (2003),The effects of pronunciation instruction on the accuracy, fluency, and complexity of L2 accented speech. *Applied Language Learning 13,* 1-17.

Derwing, T. M., & Munro, M. J. (2005). Second Language accent and pronunciation teaching: A research-based approach. *TESOL Quarterly*, *39*, 379-397. doi: 10.2307/3588486

Derwing, T. M. & Munro, M. J. (2010) Symposium-accentuating the positive: Directions in pronunciation research. *Language Teaching, 43*(3), 366–368.

Derwing, T. M., Munro, M. J., Foote, J. A., Waugh, E. & Fleming, J. (2014). Opening the window on comprehensible pronunciation after 19 years: A workplace study. *Language Learning*, *64*, 526–548. doi: 10.1111/lang.12053.

Dewey, M. (2007). English as a lingua franca and globalization: an interconnected perspective. *International Journal of Applied Linguistics, 13*(3), 332-354.

Dlaska, A. & Krekeler, C. (2013). The short-term effects of individual corrective feedback on L2 pronunciation. *System, 41*, 25-37.

Edwards, M. (1992). Modelos lingüísticos de la enseñanza aprendizaje de segundas lenguas: la enseñanza-aprendizaje del sistema fonológico del inglés en hispanohablantes. In F. Etxeberría and J. Arzamendi, (Eds.), *Bilingüismo y Adquisición de Lenguas: Actas del IX Congreso Nacional de AESLA.* Bilbao, Spain: Universidad del País Vasco, 219-229.

Ellis, R. (1994). *The study of Second Language Acquisition*. Oxford: Oxford University Press.

Field, J. (2005). Intelligibility and the listener: The role of lexical stress. *TESOL Quarterly*, *39*, 399–423. doi: 10.2307/3588487

Flege, J. E. (1981). The phonological basis of foreign accent: A hypothesis. *TESOL Quarterly*, *15*, 443-455.

Foote, J. A., Holtby, A., & Derwing, T. M. (2011). Survey of pronunciation teaching in adult ESL programs in Canada, 2010. *TESL Canada Journal, 29,* 1-22.

Fraser, H. (2001). *Teaching Pronunciation: A Handbook for Teachers and Trainers: Three Frameworks for an Integrated Approach.* Sydney, Australia: TAFE NSW Access Division.

Fudge, E. (1984). *English Word-Stress*. London: George Allen and Unwin.

Gass, S. (1997). *Input, Interaction, and the Second Language Learner*. Mahwah, NJ: Lawrence Erlbaum Associates.

Guiora, A. Z. (1972). Construct validity and transpositional research: Toward an empirical study of psychoanalytical concepts. *Comprehensive Psychiatry, 13(*2), 139-150.

Hahn, L. (2004) Primary stress and intelligibility: Research to motivate the teaching of suprasegmentals. *TESOL Quarterly*, *38,* 201–223. doi: 10.2307/3588378

Halle, M. & Keyser, S. J. (1971). *English Stress: Its Growth, and its Role in Verse.* New York City, NY: Harper.

Harmer, J. (2007) *The Practice of English Language Teaching.* Harlow: Longman.

Henderson, A., Frost, D., Tergujeff, E., Kautzsch, A., Murphy, D., Kirkova-Naskova, A., Waniek-Klimczak, E., Levey, D., Cunningham, U. & Curnick, L. (2012). The English pronunciation teaching in Europe survey: Selected results. *Research in Language*, *10*, 5-27.

Hooper, J. B. & Terrell, T. (1976). Stress assignment in Spanish: a natural generative analysis. *Glossa, 10,* 64-110.

Hornby, A. S. (1950a). The situational approach to language teaching (I), *English Language Teaching Journal, 4*(4), 98-103.

Hornby, A. S. (1950b). The situational approach to language teaching (II), *English Language Teaching Journal, 4*(5), 121-128.

Hornby, A. S. (1950c). The situational approach to language teaching (III), *English Language Teaching Journal, 4*(6),150-156.

Howatt, A. P. R & Widdowson, H. G. (2004). *A History of English Language Teaching* (2nd ed.) New York, NY: Oxford University Press.

Isaacs, T., & Trofimovich, P. (2012). Deconstructing comprehensibility: Identifying the linguistic influences on listeners' L2 comprehensibility ratings. *Studies in Second Language Acquisition*, *34*, 475–505. doi: 10.1017/S0272263112000150

Jamil, M., & Shah, J. H. (2011). Technology: Its potential effects on teaching in higher education. *New Horizons in Education, 59*(1), 38-51.

Jenkins, J. (2000). *The Phonology of English as an International Language: New Models, New Norms, New Goals*. Oxford: Oxford University Press.

Jesperson, O. (1904). *How to Teach a Foreign Language*. London: George Allen & Unwin, Ltd.

Jones, D. (1960). *An Outline of English Phonetics.* Cambridge:W. Heffer & Sons Ltd.

Jones, D. (1962). *An Outline of English Phonetics* (9th ed.). Cambridge: Cambridge University Press.

Kawai, G., Hirose, K., (2000). Teaching the pronunciation of Japanese double-mora phonemes using speech recognition technology. *Speech Communication, 30*, 131-143.

Kelly, L. G. (1969). *25 Centuries of Language Teaching: An Inquiry into the Science, Art, and Development of Language Teaching Methodology, 500 BC-1969*. Rowley, MA: Newbury House Publishers.

Kennedy, G. E., Judd, T. S., Churchward, A., Gray, K., & Krause, K.-L. (2008). First year students' experiences with technology: Are they really digital natives? *Australian Journal of Educational Technology, 24*(1), 108-122. Retrieved from http://www.ascilite.org.au/ajet/ajet24/kennedy.pdf

Kennedy, S. and Trofimovich, P. (2008). Intelligibility, comprehensibility, and accentedness of L2 speech: The role of listener experience and semantic context. *The Canadian Modern Language Review/La Revue canadienne des langues vivantes, 64.* 459–489.

Kenworthy, J. (1987). *Teaching English Pronunciation.* Harlow: Longman.

Knowles, G. (1987). *Patterns of Spoken English*. Harlow: Longman.

Krashen, S. D. (1973). Lateralization, language learning, and the critical period: Some new evidence. *Language Learning*, *23*, 63-74.

Krashen, S. D. (1982). *Principles and Practice in Second Language Acquisition.* New York, NY:Pergamon Press Inc.

Ladefoged, P., & Johnson, K. (2010). *A Course in Phonetics* (6th ed) New York, NY: Thomson-Wadsworth.

Lado, R. (1957). *Linguistics across Cultures.* Ann Arbor, MI: University of Michigan Press.

Lado, R., Fries, C. C., & Robinett, B. W. (1954). *English Pronunciation*. Ann Arbor, MI: University of Michigan Press.

Lee, J., Jang, J., & Plonsky, L. (2015). The effectiveness of second language pronunciation instruction: A meta-analysis. *Applied Linguistics, 36*, 345-366.

Lennenberg, E. H. (1967). *Biological Foundations of Language.* New York, NY: John Wiley & Sons.

Levis, J. M. & Pickering, P. (2004). Teaching intonation in discourse using speech visualization technology. *System, 32,* 505-524.

Levis, J. M. (2006) Pronunciation and the assessment of spoken language. In R. Hughes (Ed.) *Spoken English, TESOL and Applied Linguistics: Challenges for Theory and Practice* (245–270). New York, NY: Palgrave Macmillan.

Levis, J. M. (2007). Computer technology in teaching and researching pronunciation. *Annual Review of Applied Linguistics, 27*, 184-202.

Levis, J. M. (2015). Learners' views of social issues in pronunciation learning. *Journal of Academic Language and Learning, 9,* A42-A55.

Levis, J. M. (2016). Research into practice: How research appears in pronunciation teaching materials. *Language Teaching*, *49*(3), 423- 437.

Levis, J. M. (2018). *Intelligibility, oral communication and the teaching of pronunciation*. Cambridge, England: Cambridge University Press.

Levy, M. (1997). Theory-driven CALL and the development process. *Computer Assisted Language Learning, 10*(1), 41-56.

Long, M. H. (1996). The role of the linguistic environment in second language acquisition. In W. R. Ritchie and T. J. Bhatia (Eds.), *Handbook of Second Language Acquisition* (413-468). San Diego, CA: Academic Press.

Lord, G. (2008). Podcasting communities and second language pronunciation. *Foreign Language Annals*, *41*, 374-389.

Loup, G. (1984) Is there a structural foreign accent? A comparison of syntactic and phonological errors in second language acquisition, *Language learning, 34*(2), 1-17.

Macdonald, S. (2002). Pronunciation:Views and practices of reluctant teachers. *Prospect, 17*(3), 3-18.

Major, R. C. (1987) A model for interlanguage phonology. In Loup, G. & Weinberger, S. H (Eds.) *Interlanguage Phonology* (101-24). Cambridge, MA: Newbury House.

Martínez Celdrán, E., Fernández Planas, A. M. & Carrera Sabaté, J. (2003). Castilian Spanish, *Journal of the International Phonetic Association, 33(*2), 255-259.

Missaglia, F. (1999). Contrastive prosody in SLA: An empirical study with adult Italian learners of German. *Proceedings of the XIVth International Congress of Phonetic Sciences, 1*, 555-558.

Morley, J. (1987). *Current Perspectives on Pronunciation.* Washington, D.C.: TESOL.

Morley, J. (1991). The pronunciation component in teaching English to speakers of other languages. *TESOL Quarterly, 25*(3), 481-520. doi:10.2307/3586981

Mott, B. (1991). *A Course in Phonetics and Phonology for Spanish Learners of English.* Barcelona, Spain: Promociones y Publicaciones Universitarias, S.A.

Moyer, A. (1999), Ultimate attainment in L2 phonology: The critical factors of age, motivation, and instruction. *Studies in Second Language Acquisition, 21,* 81-108.

Munro, M. J. (2008). Foreign accent and speech intelligibility. In J. G. Hansen & M. L. Zampini (Eds.), *Phonology and Second Language Acquisition* (193–218). Amsterdam, The Netherlands: John Benjamins. doi: 10.1075/sibil.36.10mun

Munro, M. J. & Derwing, T. M. (1995). Foreign accent, comprehensibility and intelligibility in the speech of second language learners. *Language Learning*, *45*, 73–97. doi: 10.1111/j.1467-1770.1995.tb00963.x

Munro, M. J., & Derwing, T. M. (1998). The effects of speaking rate on listener evaluations of native and foreign-accented speech. *Language Learning*, *48,* 159–182.
doi: 10.1111/1467-9922.00038

Murphy, J. (2014). Teacher training programs provide adequate preparation in how to teach pronunciation. In L. Grant (Ed.) *Pronunciation Myths: Applying Second Language Research to Classroom Teaching* (188-224). Ann Arbor, MI: University of Michigan Press.

Murphy, J. M. & Baker, A. A. (2015). History of ESL pronunciation teaching. In M. Reed & J. M. Levis (Eds.), *The Handbook of English Pronunciation* (36-65). United Kingdom: Wiley-Blackwell.

Naiman, N. (1987). Teaching pronunciation communicatively. In P. Avery & S. Ehrlich (Eds.), *The Teaching of Pronunciation: An Introduction for Teachers of English as a Second Language* [Special issue]. *TESL Talk, 17*, 141-147.

Neri, A., Cucchiarini, C., Strik, H., & Boves, L. (2002). The pedagogy-technology interface in Computer Assisted Pronunciation Training. *Computer Assisted Language Learning, 15*(5), 441-467.

O'Connor, J. D. (1980). *Better English Pronunciation.* Cambridge, England: Cambridge University Press.

Palmer, H. E. (1917). *The Scientific Study and Teaching of Languages: A Review of the Factors and Problems Connected with the Learning and Teaching of Modern Languages with an Analysis of the Various methods which may be Adopted in order to Attain Satisfactory Results,* Yonkers, N.Y.: World Book Company.

Palmer, H. E. (1924). *Memorandum on Problems of English Teaching in the Light of a New Theory,* Tokyo, Japan: Institute for Research in English Teaching.

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

Pike, K. (1945). *The Intonation of American English.* Ann Arbor, MI: The University of Michigan Press.

Pica, T. (1991). Pronunciation activities with an accent on communication. In A. Brown (Ed.) *Teaching English Pronunciation* (332-342). New York, NY: Routledge.

Pennington, M. C. (1999). Computer-aided pronunciation pedagogy: Promise, limitations, directions. *Computer Assisted Language Learning*, *12* (5), 427–440.

Pennington M. C. & Rogerson-Revell P. (2019). Framing the teaching of pronunciation. In *English Pronunciation Teaching and Research:Contemporary Perspectives.* London: Palgrave Macmillan.

Postovsky, V. A. (1974). Effects of delay in oral practice at the beginning of second language learning. *Modern Language Journal, 58.* 229-241.

Prator, C., Jr. (1951). *Manual of American English Pronunciation for Adult Foreign Students*. Berkeley, CA: University of California Press.

Prensky, M. (2001). Digital natives, digital immigrants. *On the Horizon, 9* (5). Retrieved from http://www.marcprensky.com/writing/Prensky%20-%20Digital%20Natives,%20Digital%20Immigrants%20-%20Part1.pdf

Recasens, D. (1991). *Fonètica Descriptiva del Català: Assaig de Caracterització de la Pronúncia del Vocalisme i Consonantisme del Català al Segle XX.* Barcelona, Spain: Institut d'estudis Catalans.

Recasens, D. (1993). *Fonètica i Fonologia.* Barcelona, Spain: Enciclopèdia Catalana.

Reed, M. & Levis, J. (2015). *The Handbook of English Pronunciation.* Hoboken, NJ: John Wiley & Sons.

Richards, J. C., & Rodgers, T. S. (1986). *Approaches and Methods in Language Teaching*. Cambridge, England: Cambridge University Press.

Roach, P. (1991). *English Phonetics and Phonology: A Practical Course* (2nd ed). Cambridge, England: Cambridge University Press.

Roca, I. (1986) Secondary stress and metrical rhythm. *Phonology Yearbook, 3*, 341-370.

Rogerson-Revell, P. (2011). *English Phonology and Pronunciation Teaching.* London: Bloomsbury.

Rogerson, P. & Gilbert, J. B. (1990). *Speaking Clearly.* Cambridge: Cambridge University Press.

Rogerson, P. & Gilbert, J. (2011). *English Phonology and Pronunciation Teaching.* Continuum International Publishing Group.

Rubin, D. L. (1992). Non-language factors affecting undergraduate's judgments of nonnative English-speaking teaching assistants. *Research in Higher Education*, *33,* 511–531.
doi: 10.1007/BF00973770

Saito, K. (2012). Effects of instruction on L2 pronunciation development: A synthesis of 15 quasi-experimental intervention studies. *TESOL Quarterly, 46* (4), 842-854.

Saito, K. & Lyster, R. (2012). Effects of form-focused instruction and corrective feedback on L2 pronunciation development of /ɹ/ by Japanese learners of English. *Language Learning, 62.* 595–633. doi: 10.1111/j.1467-9922.2011.00639.x.

Saito, K., Webb, S., Trofimovich, P., & Isaacs, T. (2016). Lexical profiles of comprehensible second language speech: The role of appropriateness, fluency, variation, sophistication, abstractness, and sense relations. *Studies in Second Language Acquisition, 38*(4), 677-701.
https://doi.org/10.1017/S0272263115000297

Scovel, T. (1969). Foreign Accent. Language acquisition and cerebral dominance. *Language learning, 19*, 245-254.

Scovel, T. (1988). *A Time to Speak: A Psycholinguistic Inquiry into the Critical Period for human Speech.* New York, NY: Newbury House.

Setter, J. & Jenkins, J. (2005). State-of-the-art review article. *Language Teaching*, *38*(1), 1-17.

Selinker, L. 1992. Rediscovering Interlanguage. London: Longman.

Shirer, N. (2005). My true voice: Fundamental content, individual capability, social progress. *Arts Education Policy Review, 106(*4), 25-33.

Soler, A. & Romero, J. (2010). Developing pronunciation skills at tertiary level: an online pronunciation tutorial for academic purposes. *Files of the 9th International Conference of the European Asociation of Languages for Specific Purposes*. University of Hamburg, Hamburg (Germany), 58-69

Stevick, E. (1976). *Memory, Meaning, and Method.* Rowley, MA: Newbury House.

Stevens, S. (1989). A 'dramatic' approach to improving the intelligibility of ITAs. *English for Specific Purposes, 8,* 181-194.

Suter, R. W. (1976). Predictors of pronunciation accuracy in second language learning. *Language Learning, 26*, 233–253. doi: 10.1111/j.1467-1770.1976.tb00275.x

Swain, M. & Lapkin, S. (1991). Heritage language children in an English-French bilingual program. *The Canadian Modern Language Review, 47(*4), 635-41.

Terrell, T. D. & Salgüés de C. M. (1979). *Lingüística Aplicada a la Enseñanza del Español a Anglohablantes*. New York, NY: John Wiley & Sons.

Thomson, R. I. & Derwing, T. M. (2015). The effectiveness of L2 pronunciation instruction: A narrative review. *Applied Linguistics, 36*, 326-344.

Walker, R. (1999). Proclaimed and perceived wants and needs among Spanish teachers of English. *Speak Out! (Newsletter of the IATEFL Pronunciation Special Interest Group), 24,* 25-32.

Wong, R. (1987a). Learner variables and prepronunciation considerations in teaching pronunciation. In J. Morley (Ed.), *Current Perspectives on Pronunciation: Practises Anchored in Theory* (13-28). Alexandria, VA: TESOL

Zielinski, B., & Yates, L. (2014). Pronunciation instruction is not appropriate for beginning-level learners. In L. Grant (Ed.), *Pronunciation myths: applying second language research to classroom teaching* (56-79). Ann Arbor, MI: University of Michigan Press.

Appendix A. Level Test

		Level tests marks	Level of English (according to official Cambridge test)
S1	Control	10/25	A2
S2	Control	10/25	A2
S3	Control	13/25	B1
S4	Control	17/25	B2
S5	Control	21/25	C1
S6	Control	18/25	B2
S7	Control	18/25	B2
S8	Control	16/25	B2-
S9	Control	14/25	B1
S10	Control	17/25	B2
S11	Control	10/25	A2
S12	Control	11/25	B1-
S13	Exp	21/25	C1
S14	Exp	13/25	B1
S15	Exp	11/25	B1-
S16	Exp	13/25	B1
S17	Exp	17/25	B2
S18	Exp	7/25	A2
S19	Exp	18/25	B2
S20	Exp	16/25	B2-
S21	Exp	16/25	B2-
S22	Exp	14/25	B1
S23	Exp	13/25	B1
S24	Exp	7/25	A2

Appendix B. Speaking Test

1. Read the following words carefully, and then get ready to read them aloud.
    - doctor
    - hotel
    - coffee
    - internet
    - banana
    - cupboard
    - hospital
    - magazine
    - vegetable
    - chocolate

2. Read the following phrases carefully, and then get ready to read them aloud.
    - above the hill
    - many vegetables
    - catholic receptionist
    - Edinburgh station

3. Read the following sentences carefully, and then get ready to read them aloud.
    - David loves biscuits.
    - American supermarkets are identical.
    - They suggest a brilliant project on phonology.
    - Deborah is responsible for their presentation.
    - Workers object all the time.
    - I go to the cinema every Saturday afternoon.
    - I went to an airport last summer.
    - She bought an expensive bag from the department store.

4. Read the following text carefully, and then get ready to read it aloud.

    Hello, my name's Sean, I live in Portugal. I'm studying biology at the university. The education here is fantastic and interesting.
    A few days ago, I went to a fabulous restaurant, I had some vegetables with vinegar sauce.
    I'd like to work in Canada, in an important organization.

5. Look carefully at the following photograph and talk about it.

Appendix C. Training Materials

Stress - Overview

Overview

why is it sometimes hard for Spanish and Catalan learners of English to understand thenatural speech of English native speakers?

Warm up

How do you distinguish between a stressed syllable and an unstressed syllable in a word in your language? Probably it took you a few seconds to come up with the answer. In Spanish, words are usually stressed on the penultimate syllable; otherwise, an accent is used to mark the tonic syllable, apart from some exceptions. Unfortunately, stress in English does not have as clear-cut rules as your language does. First, no accents are used to mark the stressed syllable in a word. Second, unless you listen to a native speaker pronouncing a given word, you would never guess which syllable is stressed. Third, even though there are some rules which govern word stress, they are too hard to remember and use while speaking spontaneously. In addition, there are so many exceptions to stress rules that sometimes it is hard to guess where the rule finishes and where the exception starts.

The good news is that in this section, you will have the opportunity to improve your knowledge about word and sentence stress. To achieve your objectives, you are required to follow the instructions carefully, record yourself and then compare your performance with that of a native speaker. Next, you will be invited to reflect on the differences between your model and the native speaker model, write them down and try to correct any mistakes you have made before. Your performance will be assessed by qualified

teachers and by other learners with whom you are going to share probably the best personalized tutorial you have ever received!

Activity 1

A- Look at the words in the table, all of which have their counterpart in your first language. Read them aloud as many times as you need, and then, get ready to record them. Don't forget to save the file (you will need it later to check your progress).

Set 1 words

internet
hotel
hospital
coffee
chocolate
vegetable
banana
doctor

Typical mistakes

Set 1 words

internet
hotel
hospital
coffee
chocolate
vegetable

banana

doctor

Did you pronounce these words the way they were produced in the "typical mistakes" section? Now, click on the "check" icon and listen to the model version.

Set 1 words

internet

hotel

hospital

coffee

chocolate

vegetable

banana

doctor

Now compare your production with the model, and write down any differences you could recognize.

Difference 1	
Difference 2	
Difference 3	

B. Now do the same with the following phrases. Read them carefully first and then record them using the recording tool.

Set 2 phrases

Many vegetables

Above the cupboard

Open air

Several opportunities

Broken hearted

Typical mistakes

Set 2 phrases

Many vegetables

Above the cupboard

Open air

Several opportunities

Broken hearted

Was your pronunciation different or the same from the ones in the "typical mistakes" section? Now listen to the model's production.

Set 2 phrases

Many vegetables

Above the cupboard

Open-air

Several opportunities

Broken-hearted

Listen to the model as many times as you need. Then, write any differences between your production and the native speaker' one in the following table.

Difference 1	
Difference 2	
Difference 3	

C. Again, read the sentences carefully before you decide to record them.

Set 3 Sentences

David went for a walk.

Deborah hasn't got any friends.

Sean flew to Edinburgh in August.

You should tell her about it.

Tom must have taken the bus.

Typical mistakes

Set 3 Sentences

David went for a walk

Deborah hasn't got any friends

Sean flew to Edinburgh in August

You should tell her about it

Tom must have taken the bus

Did your sentences sound the same as the ones in the "typical mistakes" section? Now, click on the "check" button to listen to the model's answer.

Set 3 Sentences

David went for a walk.

Deborah hasn't got any friends.

Sean flew to Edinburgh in August.

You should tell her about it.

Tom must have taken the bus.

How many differences were there between your production and the model's ones? Write down up to three differences.

Difference 1	
Difference 2	
Difference 3	

Activity 2

Now listen again to the "typical mistakes" section, your own production and the model's answers and tick the options which best fit you.

1.
   A. In set 1 (words), I put the stress on a different syllable in all the words.
   B. In set 1, I put the stress on a different syllable in most of the words.
   C. In set 1, my production was quite the same as the models.
2.
   A. In set 2 (phrases), I put the stress on the wrong words.
   B. In set 2, some vowels and consonants sounded quite different from mine.
   C. In set 2, my production was quite the same as the model.
3.
   A. In set 3 (sentences), I pronounced all the words in a very different way from the model.
   B. In set 3, I pronounced almost all the words in a quite different manner from the model.
   C. In set 3, my pronunciation sounded quite the same as the model.

Now check your answers. If most of your answers were As or Bs you should consider looking at the "stress background" section and learn some basic rules about stress.

If all your answers were Cs, congratulations! but you still need some more training about word and sentence stress if your goal is to sound almost like a native speaker.

Activity 3

Look at the statements below and then tick the ones that are true for you.

- I think misplacement of stress affects the perception of words.
- I don't think misplacement of stress affects the perception of words.
- When I listen to a native speaker's natural speech I find it difficult to understand the whole message because they speak too fast.
- If I read a script while I'm listening to a native speaker I understand the conversation perfectly well.

- Sometimes I fail to understand native spoken English even if I know the meaning of words.
- Misplacement in sentence stress affects the perception of the meaning of the whole sentence.
- I think word and sentence stress is only important to communicate with native speakers but not so important to communicate with my classmates and my teachers - we understand each other perfectly well!
- I remember an anecdote where misplacement of word or sentence stress caused a communication breakdown. (If yes, tell us about it).

Stress. Background

Background – why is it so important to consider some basic stress patterns in English? As word stress is regular and fixed in Spanish, most Spanish learners have many difficulties in predicting English stress placement. However, stress placement in English is not as random as it seems and there are many stress patterns and tendencies which can help predict it. Yet, it is highly recommended to learn stress placement for each new word in order to avoid any fossilized problems later on.

1. Syllables

Read the sets of words in the table below and decide how many syllables there are in each set. Then, listen to a model and check your answers.

Set 1	**Set 2**	**Set 3**	**Set 4**
ago	potato	information	university
country	tomato	supermarket	communication
winter	magazine	American	personality
upstairs	difficult	competition	diabolical
sandwich	umbrella	majority	electricity
guitar	Canada	helicopter	organization
colour	carpenter	receptionist	bibliography

Answers:

- Set one: two syllables.
- Set 2: three syllables.
- Set 3: four syllables.
- Set 4: five syllables.

What did you notice?
Some syllables, no matter where they actually occur in a word, are heard more prominent than the others in terms of pitch, duration and vowel quality.
Are there any clear-cut rules of word stress in English in order to predict where the stress falls?
Unfortunately, word stress in English does not have as clear-cut rules as in Spanish (apart from some exceptions, stress usually falls on the 2nd-to-last syllable. Words which end with n or s usually have stress at the end of a word. Otherwise, a written

accent will show stress in irregular positions. In words ending in consonants, stress usually falls on the last syllable). On the other hand, stress in English is not as chaotic as it seems at first sight. Yet, it is much recommended to learn the right stress pattern for each new word you learn. In the following sections, you will be provided with some common patterns of word stress.

2. Word stress guidelines

2.1 Nouns and adjectives

Look at sets 1 and 2 (nouns and adjectives) in the tables below, all of which have more or less their counterpart in your language in terms of how they are spelled. Now, listen to a native speaker pronouncing them. Are they pronounced the same way as in Spanish? Can you guess the "rule"?

Set 1 Nouns

microphone
Portugal
vinegar
station
hotel
vegetable
table
category
catholic
biscuit

Set 2 Adjectives

fantastic
fabulous
excellent

brilliant

magnificent

stupid

difficult

basic

regular

famous

tolerant

Can you see the pattern?

Tip 1 Apart from some exceptions, most nouns and adjectives in English share the same pattern of word stress: the stress falls on the first syllable. However, there are many exceptions to this general rule, for example *mistake, garage, asleep, machine*, *alone, guitar, hotel, lagoon* have the stress on the second syllable.

2.2 Stress in verbs

Now, look at set 3 (verbs) in the following table. Read them carefully, and then, listen to a model saying these words.

Set 3 Verbs

prefer

suggest

transfer

present

repeat

import

invent

per<u>mit</u>

re<u>vise</u>

in<u>form</u>

Can you guess the "rule"?

Tip 2 In many English verbs the most prominent stress falls on the second syllable. However, there are many exceptions to this general rule. For example: *enter, open and profit have the stress on the first syllable.*

2.3 Stress in nouns versus verbs

Look at the words in set 1 and set 2 in the following table, all of which are written the same but are pronounced in a different manner. Try to read them first before you check your answers; remember that verbs are stressed on the second syllable whereas nouns are stressed on the first syllable.

Set 1 verbs	**Set 2 nouns**
present	present
record	record
object	object
project	project
transfer	transfer
contrast	contrast
export	export

Now, listen to a model and check your answers.

Set 1 verbs	**Set 2 nouns**
pre<u>sent</u>	<u>pre</u>sent
re<u>cord</u>	<u>re</u>cord
ob<u>ject</u>	<u>ob</u>ject

project	project
transfer	transfer
contrast	contrast
export	export

Tip 3 Misplacement of stress in words can alter the whole meaning of a sentence.

2.4 Stress in compound words

Look at set 1, compound nouns, read them carefully and then click on them to listen to how they are pronounced. Can you guess the pattern?

Set 1 Compound nouns

foresight

greenhouse

blackbird

newspaper

girlfriend

shop assistant

town hall

Whitehouse

lipstick

airport

Tip 4 in most compound nouns the most prominent stress usually falls on the first part. Now do the same with set 2, compound verbs. Read them carefully first and then click on them to listen to their pronunciation.

Set 2 Compound verbs

understand

overlook

complain

outgrow

foresee

outlay

become

release

overload

outdone

Tip 5 Most compound verbs are stressed on the second syllable.

2.5 Stress in words with suffixes

Look at sets of words 3, 4, 5 and 6 and click on the words you want to listen to. Can you guess the general "rule"?

Set 3 Words ending in -ic

athletic

realistic

academic

democratic

catastrophic

allergic

apologetic

static

photographic

Set 4 Words ending in -tion and –sion

organization

solution

celebration

prosecution

education

evolution

admission

decision

persuasion

expression

Set 5 Words ending in -gy, -phy, -cy and –ty

anthropology

phonology

biology

geography

photography

democracy

aristocracy

consistency

anxiety

masculinity

Set 6 Words ending in "al"

critical

medicinal

economical

influential

financial

accidental

historical

marginal

occidental

hysterical

Tip 6 generally speaking, in words with suffixes, the primary stress falls on the syllable that comes just before the suffix.

3. Sentence stress

In the previous sections we have seen that, in English, in every word with two or more syllables one syllable is said more prominently than the others in terms of length, pitch and loudness.

In this section, you are going to learn that the same phenomenon happens to sentences. In every sentence in English and depending on many factors, some particular words will be highlighted more than the others in terms of loudness and "weight" because they are "more important" than the others.

3.1 Content words versus function words

Look at the sentences below, and then click on the words which you think carry the most important information.

1. I went to India last summer.
2. My father bought a very nice car.
3. I have been ill for ages.
4. Will you buy some oranges from the supermarket, please?
5. My cousin drives very fast.
6. I can't stand him.

Now, listen to a model and check your answers.

1. I went to India last summer.
2. My father bought a very nice car.
3. I have been ill for ages.
4. Will you buy some oranges from the supermarket, please?
5. My cousin drives very fast.
6. I can't stand him.

What did you notice?

Tip 7 In English, content words (words carrying information) are usually more prominent than function words.

3.1.1. Content words

Content words are the most important words within a sentence- words which carry the most information.
Here is a list of content words as well as some examples.

Content words

Nouns e.g. car, India, summer, oranges…etc.
Adjectives e.g. red, nice, ill…etc.
Main verbs e.g. went, bought, buy…etc.

Adverbs e.g. fast…etc.
Negative auxiliaries e.g. can't, don't…etc.

3.1.2 Function words

Unlike content words, which carry the most important information within a sentence, function words are unstressed because they don't really carry any information.
Here you have a list of function words and some examples.

Function words
Pronouns e.g.: I, you, they…etc.
Prepositions e.g.: to, for, from…etc.
Articles e.g.: the, a, an.
Conjunctions e.g.: so, and, but…etc.
Auxiliary verbs e.g.: will, can, do…etc.
Verb "to be" e.g. been, am, is, etc.

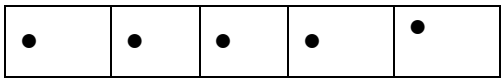
Now listen to the following sentences as many times as you need. Fill in the blanks below. Tick in places where the word is stressed. Then, match each sentence with its stress pattern.

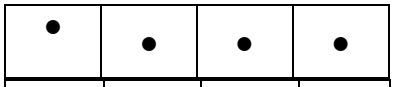
1. Are you a student?
2. Where do you study?
3. Do you enjoy it?
4. What's your favourite subject?

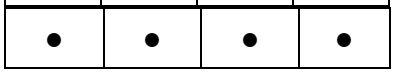
1. _____ _____ _____ _____?
2. _____ _____ _____ _____?
3. _____ _____ _____ _____?
4. _____ _____ _____ _____ _____ ?

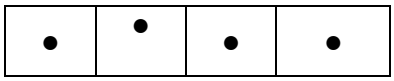
Check your answers

1. _____ _____ _____ _____✓?
2. _____✓ _____ _____ _____✓?
3. _____ _____ _____✓ _____?
4. _____✓ _____ _____ _____✓ _____✓?

a. 

b. 

c. 

d. 

Solutions

1b, 2c, 3d, 4a.

3.2 English schwa /ə/ versus Spanish vowels

Look at the words in the following tables. Read them carefully as many times as you need and then record them using the recording tool. Special attention should be paid to the bold vowels.

a) /ə/ versus /ɪ/

Set 1: /ɪ/	set 2:/ə/	words in Spanish
Al**i**	All**a**h	allá
cruis**e**s	cruis**e**rs	crucero
accus**e**s	accus**e**rs	acusar
sall**ie**d	sal**a**d	ensalada
enem**ie**s	enem**a**s	enemigo

Ann**ie**	Ann**a**	Ana

b) /ə/ versus /eɪ/

Set 1: /eɪ/	set 2:/ə/	words in Spanish
merm**ai**d	murmur**e**d	murmurar
viol**a**te	viol**e**t	violeta
approxim**a**te	approxim**a**te	aproximado
certific**a**te	certific**a**te	certificado
anim**a**te	anim**a**te	animado
appropr**ia**te	appropr**ia**te	apropiado

c) /ə/ versus/ aɪ/

Set 1: /aɪ/	set 2:/ə/	words in Spanish
philosoph**i**ze	philosoph**e**rs	filósofos
alumn**i**	alumn**a**	alumna

all**y**	All**a**h	allá
carb**i**ne	carb**o**n	carbón
layb**y**	lab**ou**r	labor
typography	**to**pography	topografía

d) /ə/ versus /əʊ/

Set 1: /əʊ/ set 2:/ə/ words in Spanish

plat**eau**	platt**e**r	plato
v**o**cation	v**a**cation	vocación
bell**ow**	Bell**a**	vela
her**o**	hear**er**	héroe
command**o**	command**er**	comando

quart**o**	quart**er**	cuarto

Activity 1

Listen carefully to a model saying these words, and then, say if the following statements are true or false.

1. Schwa is a very short sound.
2. Schwa can be spelled with any of the five vowels.
3. It is impossible for a schwa to occur in a stressed syllable.
4. Schwa is the most common sound in English.
5. There is no counterpart of schwa in Spanish vowels.
6. Schwa makes native speakers sound very fast.
7. Schwa makes your speech sound natural.
8. It is important to use schwa in unstressed syllables in order to be understood.
9. Substitution of schwa by its strong pronunciation of the written vowels affects the perception of a word.
10. There are many minimal pairs in English between schwa and other vowels and diphthongs, which means substitution of schwa by its written vowel form can alter the meaning of words and may cause communication breakdown.

Check your answers

All the statements above are true. In fact, /ə/ is a very short sound, it only can occur in unstressed syllable. To articulate this sound, your lips must not be rounded and your jaws must not be too far apart and must not be moving. The spelling of schwa can be a

source of confusion and difficulty to nonnative learners of English because it does not have any specific vowel letters.

In the following video, a native speaker will show you how to produce this sound accurately. You should imitate the speaker as much as you can in order to articulate this sound correctly, and then, try to record the words of the previous activity again.

http://www.youtube.com/watch?v=wg0P0oYkniE

Activity 2

Look at the following sentences carefully. Read them aloud as many times as you need before you decide to record them using the recording tool.

1. I miss him.
2. Give it to her.
3. He's proud of them.

Now listen to a model saying these sentences. What did you notice?

In natural speech, native speakers of English may not pronounce quite a lot of sounds. This is done for the sake of economy, simplification and saving time and energy in rapid colloquial speech. There are no specific rules for this but it is very important for you to be aware of such a process in order to understand native fast speech.

In sentences 1, 2 and 3, *him*, *her* and *them* are pronounced /ɪm/, /ər/ and /əm/ respectively.

Activity 3

Write out the following sentences in normal script.

1. kəd aɪ tel im huːz kɔːlɪŋ?
2. jə kɑːnt wɪn əm ɔːl.
3. let ər rɪp.

Check your answers

1. Could I tell him who's calling?
2. You can't win them all.
3. Let her rip.

3.3 Contractions of verb forms

Activity 4

Look at the following sentences carefully. Read them as many times as you need and then decide in which sentences the auxiliary verbs can be contracted.

1. I have got a headache.
2. I have a car.
3. I have been to Sweden.
4. They would give it to you if they could.
5. Yes, I would.
6. Are they Scottish? No, they are not.
7. She will not be lonely.
8. No, I did not expect he would.

Now listen to a model saying these sentences. What did you notice? Can you guess the "rules"?

1. I've a got a headache.
2. I have a car.
3. I've been to Sweden.
4. They'd give it to you if they could.
5. Yes, I would.

6. Are they Scottish? No, they aren't.
7. She won't be lonely.
8. No, I didn't expect he would.

Rule1 In connected speech, auxiliary verbs are usually contracted. E.g. "she is" is usually written *she's* in informal writing and pronounced /ʃiz/. This is by far the easiest feature of connected speech because such contractions are at least marked in writing with an apostrophe (She's). These contractions are usually used because they do not convey "important" information in a sentence, e.g. she's the queen; the most important word in this sentence is *the queen*. Thus, in order to make it sound "more important", *she's* should sound "less important". However, not all contracted auxiliaries are de-emphasized. Negative auxiliaries for example are highlighted in order to emphasize negation. *Are they Scottish? No, they aren't*, here, "aren't" is emphasized in order to make it very clear that this is not true.

Rule2 Main verbs and modals are not usually contracted when they come at the end of a sentence, or when they are used in a short positive sentence e.g. *I have a car*, and *yes, I would* are emphasized because they carry the most information in a sentence.

Activity 5

Look at the following sentences. Tick on the stressed words and the probable contractions. Then, listen to a model and check your answers.

1. I did not see him.
2. Yes, he did.
3. Are you bored? Yes, I am.
4. She is glad to be here.
5. I have got a sore throat.

6. I have so many loans to pay.

Check your answers. Stressed words are highlighted.

1. I didn't see him.
2. Yes, he did.
3. Are you bored? Yes, I am.
4. She's glad to be here.
5. I've got a sore throat.
6. I have so many loans to pay.

Activity 6

Read carefully the following questions, and then, click on either YES or NO (In some sentences, you will be required to give more details). Then, check your answers.

1) Do you think stress misplacement on words alters the meaning of sentences?
2) Have you ever failed in perceiving a message because you didn't pay attention to the stressed words?
3) Have you ever failed in conveying a message because you didn't stress the right words, or you overstressed every word?
4) Do you think that words which carry information should be said more prominently than the others in order to make the message understood?
5) Now can you understand why native speakers tend to highlight some words and "swallow" the others?

Answers

1) Misplacement on word stress can alter the whole meaning of sentences mainly if you are talking to native speakers, who depend much on the stressed words (stressed syllables of the important words) to get the message.
2) When you stress the wrong words, the listeners will obviously get the wrong message; sometimes it will even lead to communication breakdown. Similarly, if you overstress every word in a sentence, the listeners will get bored and they will probably finish the conversation abruptly.
3) When you are talking in Spanish and you want to highlight some important information, you'll probably change the word order of a given sentence. In English. However, you can't use this technique because English has a fairly strict word order. Thus, if you want to convey some important information when you are talking in English, you should try to focus on the words which carry the

most information and make them sound more prominent. Give it a try! It's not as difficult as it seems!

4) One of the most striking differences between English and Spanish is the fact that English is a stress-timed language whereas Spanish is a syllable-timed language. That means that, in Spanish, every syllable of a word and every word of a sentence will be said in exactly the same way; thus, equal time and effort are required. On the other hand, there is a" hierarchy" in English sentences: in order to make some words predominant, some others should be swallowed in between.

Stress - perception

Perception – why do many Spanish learners fail sometimes in understanding native speakers' natural conversations even if the language used is familiar to them? Is it because native speakers speak too fast? Is it because they highlight some words and swallow many others?
In this section, you will be provided with some training in order to understand how perceiving features of stress is crucial to understand native speakers' natural speech.

Activity 1

A- Listen to the following words, and then, put them in the table below according to the number of syllables they have.).
present, eye, disposable, maleficent, teacher, begin, performer, ear, revelation, photograph, decide, car, dog, demand, pregnancy, photographic, above, sell, important, green, television, commitment, identical, decision.

Set 1: 1 syllable	Set 2: 2 syllable	Set 3: 3 syllables	Set 4: 4 syllables

Now check your answers

Set 1: 1 syllable	Set 2: 2 syllables	Set 3: 3 syllables	Set 4: 4 syllables
eye	present	commitment	disposable
ear	teacher	performer	revelation
car	begin	decision	photographic
dog	decide	photograph	identical
sell	above	pregnancy	television
green	demand	important	Maleficent

B- Now, listen again to the speaker saying these words, and then, click on the stressed syllable. Remember that in words which have two syllables or more, one syllable will be said more prominently than the others in terms of length, pitch and loudness.
C- Can you think of any words from your first language (either Spanish or Catalan) which have the same number of syllables? Below you have some room to write up to three words either in Spanish or Catalan with one syllable, two syllables, three syllables and four syllables.

Spanish

1 syllable words	2 syllable words	3 syllable words	4 syllable words

Catalan

1 syllable words	2 syllable words	3 syllable words	4 syllable words

Activity 2

Listen to how these words are pronounced, and then, for each of the following questions, tick the correct answer.

1. Which verb does not follow the rule i.e., stress on the second syllable?
   a) begin
   b) Forget
   c) Manage
   d) decide

2. Which noun does not follow the rule i.e., stress on the first syllable?
   a) present
   b) hotel
   c) station
   d) worker

3. Which word do you hear, a verb or a noun?
   a) Export N
   b) Present N
   c) record N
   d) protest V
   e) progress N

4. Now listen carefully to the following words and then tick on N if you hear a noun or V if you hear a verb. Remember that verbs usually have the stress on the second syllable whereas nouns usually have the stress on the first syllable.
   a) My country exports V a large number of goods to the USA.
   b) I bought a present N for my mother's birthday.
   c) There are many protests N because of the current economic situation.
   d) Do not forget to record V yourself in order to check your progress N.

Activity 3

Look at the following lyrics from a song by The Beatles *With a little help from my friends*. The content words were removed so obviously the lyrics are nonsense. Before

you listen, decide if the missing words are nouns, verbs, adjectives or adverbs…etc. Then, listen to the song and fill in the blanks with the missing words. *With a little help of my friends* is a nice song for practicing word stress. Enjoy it.

_____ would you _____ if I _____ out of _____
would you _____ up and _____ out on _____.
_____ me your _____ and I'll you _____ a , _____
And I'll _____ not to _____ out of _____.
Oh I _____ with a _____ _____from my _____ ,
Mmm,I _____ _____ with a _____ _____ from my _____,
Mmm, I'm gonna _____ with a _____ _____ from my _____.

Do you _____ _____?
I _____ _____ to _____ .
Could it be _____?
I _____ _____ to _____.

_____ do I _____ when my _____ is _____?
(Does it _____ you to be _____)
_____ do I _____ by the _____ of the _____
(Are you _____ because you're on your_____)
No, I _____ with a _____ _____from my _____,
Mmm, _____ _____ with a _____ _____from my _____,
Mmm, _____ to _____ with a _____ _____from my _____

Do you _____ _____?
I _____ _____ to _____ .
Could it be _____?
I _____ _____ to _____.

Would you _____ in a _____at _____ _____?
Yes I'm _____ that it _____all the _____.
_____do you _____when you _____out the _____?
I can't _____ you, but I _____ it' _____.
Oh, I _____ by with a _____ _____from my _____,
Mmm I _____ _____with a _____ _____from my _____,
Oh, I'm gonna _____with a _____ _____from my _____

Do you _____ _____?
I just _____ _____ to _____.

Could it be _____?
I _____ _____to _____

Oh, I _____by with a _____ _____from my _____,
Mmm, gonna _____ with a _____ _____from my _____
Ooh, I get _____ with a _____ _____from my _____
Yes I _____ by with a _____ _____from my _____,
with a _____ _____from my _____

Now listen to the song and check your answers

http://www.youtube.com/watch?v=jBDF04fQKtQ
What would you think if I sang out of tune,
Would you stand up and walk out on me.
Lend me your ears and I'll sing you a song,
And I'll try not to sing out of key.
Oh I get by with a little help from my friends,
Mmm,I get high with a little help from my friends,
Mmm, I'm gonna try with a little help from my friends.

What do I do when my love is away.
(Does it worry you to be alone)
How do I feel by the end of the day
(Are you sad because you're on your own)
No, I get by with a little help from my friends,
Mmm, get high with a little help from my friends,
Mmm, gonna to try with a little help from my friends

Do you need anybody?
I need somebody to love.
Could it be anybody?
I want somebody to love.

Would you believe in a love at first sight?
Yes I'm certain that it happens all the time.
What do you see when you turn out the light?
I can't tell you, but I know it's mine.
Oh, I get by with a little help from my friends,
Mmm I get high with a little help from my friends,
Oh, I'm gonna try with a little help from my friends

Do you need anybody?
I just need someone to love.
Could it be anybody?
I want somebody to love

Oh, I get by with a little help from my friends,
Mmm, gonna try with a little help from my friends
Ooh, I get high with a little help from my friends
Yes I get by with a little help from my friends,
with a little help from my friends

Activity 4

You will hear a part of the *Fast and Furious 6* movie trailer. Listen carefully as many times as you need, and then, look at the sentences below taken from the trailer. The function words were removed, yet; the context is still understandable. Before you fill in the gaps, try to predict if the missing words are pronouns, articles, auxiliary verbs, etc…

- *This _____ what _____ hundred million buys, huh?*
- *_____ wasn't _____ hard _____find _____, Toretto.*
- *_____ wasn't hiding.*
- *Last week, _____ team _____ highly coordinated drivers took down _____entire military convoy.*
- *_____ know Rio _____ _____ last job?*
- *No, _____ know _____ didn't do _____, but _____ _____ _____ help _____ take down _____ team _____ did.*
- *_____ why _____ that, Hobbs?*
- *_____ _____ _____ chasing this crew _____ 12 countries. This _____ taken _____ week ago.*
- *_____ _____ impossible.*
- *_____ need _____ help, Dom. _____need _____ team.*

Now listen or watch the trailer and check your answers

Fast and Furious 6 Trailer Official 2013 Movie [HD].flv

- *This is what a hundred million buys, huh?*
- *It wasn't that hard to find you, Toretto.*
- *I wasn't hiding.*

- *Last week, a team of highly coordinated drivers took down en entire military convoy.*
- *You know Rio was my last job?*
- *No, I know you didn't do it, but you're gonna help me take down the team who did.*
- *And why is that, Hobbs?*
- *We've been chasing this crew across 12 countries. This was taken a week ago.*
- *It's impossible.*
- *I need your help, Dom. I need your team.*

Now look at again at activity 3 and 4. What did you notice?

When content words are removed from a sentence, it becomes nonsense. However; when function words are removed, obviously the sentences are grammatically incorrect, but still, we can understand the meaning. To sum up, native English speakers "underline" content words when they are speaking i.e. the most important words which carry information are more highlighted than the rest. Similarly, when they are listening, they depend much more on the "underlined" words (stressed words, or content words) to get the message. Of course, if they hear a word which does not match their mental repertoire, because its highlighted syllable is wrong, or if they hear a sentence in which the highlighted words are not the ones which carry the most information, they will obviously miss the meaning of the message, which may lead to communication breakdown.

Stress - Production

Production: why do many Spanish speakers fail to convey a message in English even if they use the correct words and grammar?
Apart from using the correct language and grammar, the way utterances are produced is crucial to make the message understood.

Activity 1

Look at the following words, tick on the odd one out according to their stress pattern. Then, record yourself saying them using the recording tool.

A. Verbs

- Remove
- Dislike
- Rebuild
- Offer

B. Nouns and adjectives

- Artist
- Mistake
- Driver
- Friendly

C- Compound nouns

- Travel agent
- Half price
- Book shop
- Art gallery

Activity 2

Listen to the following sentences and say in which one the speaker says that he was only suggesting that his neighbour may have stolen his car.

1. **I** didn't say my neighbour stole my car.
2. I **didn't** say my neighbour stole my car.
3. I didn't **say** my neighbour stole my car.
4. I didn't say **my** neighbour stole my car.
5. I didn't say my **neighbour** stole my car.
6. I didn't say my neighbour **stole** my car.
7. I didn't say my neighbour stole **my** car.
8. I didn't say my neighbour stole my **car**.

Now check your answers.

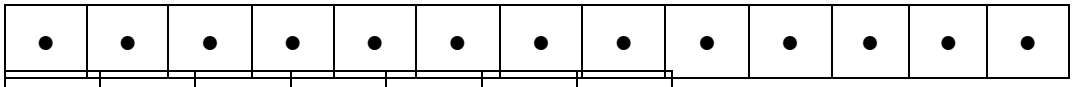
9. **I** didn't say my neighbour stole my car. But somebody else said it.
10. I **didn't** say my neighbour stole my car. This is not true at all.
11. I didn't **say** my neighbour stole my car. I was only making a guess.
12. I didn't say **my** neighbour stole my car. It was my brother's neighbour.
13. I didn't say my **neighbour** stole my car. It was my mother-in-law who did it.
14. I didn't say my neighbour **stole** my car. He only borrowed it.
15. I didn't say my neighbour stole **my** car. He stole my wife's car.
16. I didn't say my neighbour stole my **car**. He stole my van.

Now, read all the sentences above and get ready to record yourself. Don't forget to put the stress on different words in each sentence.

Activity 3

Read the following sentences carefully, and then, match each sentence with its stress pattern.

1- I gave up smoking a year ago.
2- She dresses up beautifully.
3- He got away.
4- You should cut down on chocolate.
5- It was foggy up the mountain, but very shiny down by the coast.

a.


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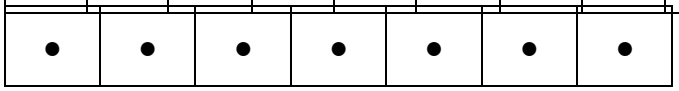

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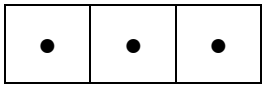

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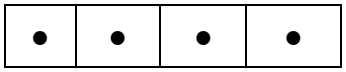

e.


Now check your answers. C3, A5, B1, E4, D2.

Now, look again at activities 1, 2 and 3. What did you notice?

1- Verbs usually have the stress on the second syllable, but sometimes they have the stress on the first syllable e.g. offer, listen, happen and enter.

2- Nouns and adjectives usually have the stress on the first syllable but sometimes they have the stress on the second syllable e.g. mistake, hotel, asleep and alone.
3- Most compound nouns have the stress on the first part, but if the first part of the compound is an adjective, then the second part may be also stressed e.g. half price.
4- Prepositions are not usually stressed because they are considered to be function words. However, when they are used as part of a phrasal verb, the stress then may move from the main verb to the particle. This is due to the rhythm rule (in order to learn more about this issue, please go to unit 4, connected speech background).
5- Sometimes, and for emphasis or contrast, function words which are normally unstressed can have the most prominent stress within a sentence.

Activity 4

Listen to a part of Steve Jobs' 2005 Stanford University commencement speech. Steve Jobs was the chief executive officer and co-founder of Apple Computer and of Pixar animation studios. In this speech, he urged graduates to pursue their dreams. Listen carefully as many times as you need, and then, tick on the stressed words. The first sentence is done for you.

_____ _____ _____✓ _____ _____ _____ _____
_____✓_____ _____ _____✓_____ _____ _____ _____
_____✓_____ ✓_____ _____ _____✓.

_____ _____ _____, _____ _____ _____ _____ _____ ._____

_____ _____.

_____ _____ _____ _____ _____ _____ _____ _____ _____
_____ _____. _____ _____ _____. _____ _____ _____. _____
_____ _____._____ _____ _____ _____ _____ _____ _____
_____ .

_____ _____ _____ _____ _____ _____ _____ _____ _____
_____ _____, _____ _____ _____ _____ _____ _____ _____
_____ _____ _____ _____ _____ _____ _____ _____ _____
_____ .

_____ _____ _____ _____ _____ _____?

_____ _____ _____ _____ _____ _____ _____ _____ _____
_____ _____ _____,_____ _____ _____ _____ _____ - _____
, _____ _____ _____ _____ _____ _____ _____ _____ _____.

Now, check your answers. Look at the speech carefully. You can listen to it at the same time you are reading. Were you right? Have you ticked all the content words? After reading the speech several times, get ready to record yourself; don't forget to copy the rhythm.

I'm honored✓ to be with you today✓ at your commencement✓ from one of the finest✓ universities ✓in the world✓.

Truth✓ be told✓, I never✓ graduated✓ from college✓. This is the closest✓ I've ever gotten✓ to a college✓ graduation✓.

Today✓ I want ✓to tell✓ you three✓ stories✓ from my life✓. That's✓ it. No big✓ deal✓ just three✓ stories✓. The first✓ story✓ is about connecting✓ the dots✓.

I dropped✓ out✓ of Reed✓ College✓ after the first✓ six✓ months✓, but then stayed✓ around as a drop-in✓ for another eighteen✓ months✓ or so before✓ I really quit✓.

So why✓ did I drop✓ out✓?

I naively✓ chose✓ a college✓ that was almost as expensive✓ as Stanford✓, and all of my working- class✓ parents'✓ savings✓ were being spent✓ on my college✓ tuition✓.

Appendix D. Qualitative questionnaire

1. Please indicate your name, age, sex, level of English, the degree you're studying and what year you are in.
   a) Name:
   b) Age:
   c) Sex:
   d) Level of English:
   e) Degree:
   f) Year:

2.

Please rate the following on a scale from 1 to 5 (please give further explanations below)		
I.	To what extent do you think English will be useful for you in the future?	Not useful 1 2 3 4 Very useful 5
II.	How did you feel about your pronunciation before you started this course?	Not confident 1 2 3 4 Very confident 5
III.	How did you feel about your pronunciation when you were asked to record yourself?	Not confident 1 2 3 4 Very confident 5
IV.	To what extent do you think accurate pronunciation is important in communicating mainly with native speakers?	Not important 1 2 3 4 Very important 5
V.	How do you feel about the use of technology in the classroom?	Not important 1 2 3 4 Very important 5
VI.	How do you feel about doing the course in general?	Not satisfied 1 2 3 4 Very satisfied 5

3. Please explain in detail your answers to question 2.
   i. .....
   .....
   .....
   .....
   ii. .....
   .....

.....
.....

iii. .....
.....
.....
.....

iv .....
.....
.....
.....

v. .....
.....
.....
.....

vi. .....
.....
.....
.....

4. Had you ever had any training in English pronunciation before you started this course? If yes, what aspects of pronunciation did you deal with?

5. If your answer to the previous question was yes, were you exposed to native accents?

6. Have you ever failed in conveying a message in English? If yes, was it because…please give examples.

    a) You didn't use the right words?
    b) You didn't use the right grammar?
    c) Of your pronunciation?
    d) Other

7. Have you ever failed in perceiving a message in English? If yes, was it because…please give examples.

    a) The language used was difficult to understand?
    b) The native speaker was speaking too fast?
    c) The words sounded different from what you expected them to be?
    d) There was a hierarchy between words, some words were highlighted whereas others were swallowed?
    e) Other

8. Please list four major improvements of your pronunciation after finishing the course.
    a) First improvement: .....
    b) Second improvement: .....
    c) Third improvement: .....
    d) Fourth improvement: .....

9. Please explain how you felt about using the website.
    a) It was user-friendly.
    b) It was sometimes tricky to use.
    c) It was tricky to use almost all the time.

10. Please indicate how you felt about using the recording tool.
    a) The recording tool was user-friendly.
    b) It was sometimes difficult to use it.
    c) It was difficult to use almost all the time.

11. In all the exercises in which you were asked to record yourself and compare your performance with the native speaker, did you notice any differences between your production and the native speaker one? If yes, please give some examples.

    a) .....
    b) .....
    c) .....
    d) .....

12. After the recordings, were you able to identify any differences between your production and the native speaker one? If yes, please indicate at least four differences.

    a) .....
    b) .....
    c) .....
    d) .....

13. Do you think that using the recordings helped you to reflect on your pronunciation? Please give some further explanations.

14. Do you think comparing your pronunciation to the native speaker improved somehow your pronunciation? Please give some examples.

    a) .....
    b) .....
    c) .....
    d) .....

15. Please explain briefly how you felt about the course in general.