UNIVERSITÉ LILLE III – CHARLES DE GAULLE

École Doctorale Sciences de l'Homme et de la Société

THÈSE DE DOCTORAT

Discipline : linguistique anglaise

Thèse présentée et soutenue publiquement par

Marc CAPLIEZ

le 13 septembre 2016

Acquisition and Learning of English Phonology by French Speakers

On the Roles of Segments and Suprasegments

Directeur de thèse : Maarten LEMMENS

JURY

Tracey DERWING, Professeur émérite, Université de l'Alberta

Mark GRAY, Maître de conférences, Université Paris-Est

Nadine HERRY-BENIT, Maître de conférences HDR, Université Paris 8

Philippe HILIGSMANN, Professeur, Université Catholique de Louvain

Maarten LEMMENS, Professeur, Université Lille 3

ACKNOWLEDGEMENTS

There are many people I am thankful to:

Maarten Lemmens, who supervised my Master's degree dissertation, and then this doctoral thesis. Thanks to him, I was able to develop this fascinating project. I am thankful to his constant help, advice, support, and kindness. Thank you for being a great supervisor!

The members of the jury – Tracey Derwing, Mark Gray, Nadine Herry-Bénit, Philippe Hiligsmann –, who kindly accepted to read and evaluate this thesis. I also thank Elisabeth Delais-Roussarie and Sophie Herment, for their useful and constructive feedback.

Researchers of the Université Lille 3: Cédric Patin, who contributed to my knowledge of French phonology; Kathleen O'Connor, who was of great help as to the elaboration of the experimental protocol; Efstathia Soroli, for her major help with methodological and psycholinguistic issues; Caroline Bouzon, who let me attend her *Praat* classes which were so useful to me.

Nadine Herry-Bénit, for showing such interest in my project, giving me her contribution with useful comments on the methodology, and sharing with me her experience in the field of English phonetics teaching.

Tracey Derwing, whose work was a real inspiration for me, and because she gave me so many pieces of advice as to readings and the elaboration of my experiment. Her sharing her experience with me has been essential.
Other researchers that I contacted or met at various conferences, who at some point gave me advice on important issues: Ewa Dabrowska, Dylan Glynn, Talia Isaacs, Jennifer Larson-Hall and Lucía Gómez Vicente.

The teachers of English as a foreign language, whose contributions through questionnaires enabled me to gain an interesting overview of the practical teaching of spoken English in France.

The French-speaking participants, that is all my students, who participated in my experiment, having to follow pronunciation lessons and take various tasks without even understanding, and yet asking no questions. Without them, my study would simply have been impossible to complete.

The native English speakers, who either recorded for me, or accepted to be the evaluators of the productions even though the amount of work was considerable. I also thank the people who helped me to find the participants. All those people, too, played a crucial role in the completion of my study.

My colleagues from the Université du Littoral Côte d'Opale, for always encouraging me in every way they could.

Other MA and PhD students from the Université Lille 3: Sabina, Perrine, Mathilde, Cécile, Julien, Aurore, for mutual support and enriching advice.

Guillaume Winter, who is at the origin of my genuine interest in the field of phonetics and phonology. His own liking for the subject has been influential. I thank him for all his advice and encouragement throughout my studies.

My family and friends, for the help, support, and motivation that they kept giving me all along.

TABLE OF CONTENTS

ACKNOWLEDGEMENTS.....i

TABLE OF CONTENTS.....iii

LIST OF FIGURES.....vii

LIST OF TABLES.....viii

LIST OF ABBREVIATIONS.....xi

1. INTRODUCTION.....1

2. THE ACQUISITION PROCESS OF ORAL ENGLISH.....7

2.1. FIRST LANGUAGE ACQUISITION.....8

2.1.1. Early language perception: from suprasegments to segments.....8

2.1.2. The various stages of production.....12

2.1.3. The role of L1 prosodic features.....18

2.1.4. Conclusion: from L1 to L2 acquisition.....19

2.2. SECOND AND FOREIGN LANGUAGE ACQUISITION.....21

2.2.1. Language acquisition: interlanguage, interference, and errors.....21

2.2.2. The acquisition of L2 segmentals.....23

2.2.3. Is native-likeness attainable?.....26

2.2.4. The acquisition of L2 suprasegmentals.....29

2.2.5. Towards a stronger importance of prosody?.....36

2.3. L2 TEACHING AND LEARNING.....37

2.3.1. Acquisition and learning....37
2.3.2. A review of L2 teaching approaches....38
2.3.3. Should prosody be prioritised?....46
2.3.4. Towards an integration of research findings into classroom practices....48
2.4. CONCLUSION....50
3. FRENCH SPEAKERS AND ORAL ENGLISH....53
3.1. DEFINITIONS AND PRELIMINARIES....54
3.1.1. Terminology and disambiguation....54
3.1.2. Transcription systems....56
3.2. ENGLISH AND FRENCH: TWO DIFFERENT PHONOLOGICAL SYSTEMS....59
3.2.1. Suprasegmental features....60
3.2.2. Syllable- and stress-timing theory....73
3.2.3. Segmental features....77
3.2.4. Summary: on the role of prosody....85
3.3. INTERFERENCE, ERRORS, AND THE IMPACT ON COMMUNICATION....87
3.3.1. Recordings....87
3.3.2. Prosodic errors....91
3.3.3. Segmental errors....96
3.3.4. Is the impact of prosodic errors stronger?....102
3.4. CONCLUSION....110
4. EXPERIMENTS....113
4.1. INTRODUCTION....114
4.2. EXPERIMENTAL PROTOCOL....116
4.2.1. Pilot study....116
4.2.2. Revised study: participants and method....119
4.2.3. Treatments....125
4.2.4. Summary....138
4.3. PRODUCTION TESTS....139
4.3.1. Stimuli and evaluation methods....139
4.3.2. Analyses and hypotheses....153
4.3.3. Results....155

4.3.4. Discussion....161
4.4. PERCEPTION TESTS....170
4.4.1. Stimuli and evaluation methods....170
4.4.2. Analyses and hypotheses....179
4.4.3. Results....181
4.4.4. Discussion....188
4.5. GENERAL DISCUSSION....192
5. CONCLUSION....198
REFERENCES....206
INDEX....236

APPENDICES

APPENDIX A: QUESTIONNAIRE FOR EFL TEACHERS....243
APPENDIX B: QUESTIONNAIRE OF SELECTION....245
APPENDIX C: QUESTIONNAIRE FOR LISTENERS....247
APPENDIX D: DETAILED SCORES OF THE PRODUCTION TASKS....249
READ SPEECH TASK....249
General means....249
Means for words....251
Means for sentences....252
Detailed scores of the S-group....254
Detailed scores of the P-group....261
Detailed scores of the C-group....268
SPONTANEOUS SPEECH TASK....275
General means....275
Detailed scores of the S-group....277
Detailed scores of the P-group....278
Detailed scores of the C-group....279
APPENDIX E: DETAILED SCORES OF THE PERCEPTION TASKS....280
CLOZE TEST....280
General means....280

Detailed scores of the S-group....283
Detailed scores of the P-group....288
Detailed scores of the C-group....293
SENTENCE DICTATION TEST....298
General means....298
Detailed scores of the S-group....299
Detailed scores of the P-group....301
Detailed scores of the C-group....303

LIST OF FIGURES

Figure 1. Timeline of L1 perception development.....12
Figure 2. English monophthongs.....78
Figure 3. French oral vowels.....78
Figure 4. Interaction plot between Time and Group (read speech production).....158
Figure 5. Interaction plot between Time and Group (spontaneous speech production) 160
Figure 6. P02's “Stop playing with your phone” (pre-test).....164
Figure 7. P02's “Stop playing with your phone” (post-test).....164
Figure 8. P02's “How awful that party was!” (pre-test).....165
Figure 9. P02's “How awful that party was!” (post-test).....166
Figure 10. Interaction plot between Time and Group (mean number of correct answers per group in cloze tests).....185
Figure 11. Interaction plot between Time and Group (mean scores in cloze tests).....185
Figure 12. Interaction plot between Time and Group (dictation tests).....187

LIST OF TABLES

Table 1. Formant values of some English and French vowels (in Hertz).....81
Table 2. Participant and group information.....122
Table 3. Segmental Group.....123
Table 4. Prosodic Group.....124
Table 5. Control Group.....125
Table 6. Details of the words in the reading test.....141
Table 7. Details of the sentences in the reading test.....142
Table 8. Number of times each rater scored a repeated item differently.....152
Table 9. Within-groups differences: hypotheses on the production results.....154
Table 10. Between-groups differences: hypotheses on the production results.....155
Table 11. P values and significance (from Motulsky, 2010: 124).....155
Table 12. Mean scores for read speech (pre-post differences).....156
Table 13. Means scores for read words (pre-post differences).....156
Table 14. Mean scores for read sentences (pre-post differences).....157
Table 15. Mean scores for spontaneous speech (pre-post differences).....159
Table 16. Answers to the hypotheses on within-groups production tests.....161
Table 17. Answers to the hypotheses on between-groups production tests.....167
Table 18. Details of the words in the cloze test.....172
Table 19. Details of the sentences in the dictation test.....174
Table 20. Details on the scoring scale of the cloze test.....177
Table 21. Details on the scoring system of the dictation test.....179

Table 22. Within-groups differences: hypotheses on the perception results.....181
Table 23. Between-groups differences: hypotheses on the perception results.....181
Table 24. Number of correct answers per group in cloze tests (pre-post differences). .182
Table 25. Mean scores in cloze tests (pre-post differences).....182
Table 26. Mean scores in the dictation test (pre-post differences).....187
Table 27. Answers to the hypotheses on within-groups perceptual tests.....189
Table 28. Answers to the hypotheses on between-groups perceptual tests.....191
Table 29. Mean scores of the S-group in the read speech tests.....250
Table 30. Mean scores of the P-group in the read speech tests.....251
Table 31. Mean scores of the C-group in the read speech tests.....251
Table 32. Mean scores of the S-group in the read speech tests (words).....252
Table 33. Mean scores of the P-group in the read speech tests (words).....252
Table 34. Mean scores of the C-group in the read speech tests (words).....253
Table 35. Mean scores of the S-group in the read speech tests (sentences).....253
Table 36. Mean scores of the P-group in the read speech tests (sentences).....254
Table 37. Mean scores of the C-group in the read speech tests (sentences).....254
Table 38. Detailed scores of the S-group in the read speech tests.....261
Table 39. Detailed scores of the P-group in the read speech tests.....268
Table 40. Detailed scores of the C-group in the read speech tests.....275
Table 41. Mean scores of the S-group in the spontaneous speech tests.....276
Table 42. Mean scores of the P-group in the spontaneous speech tests.....276
Table 43. Mean scores of the C-group in the spontaneous speech tests.....277
Table 44. Detailed scores of the S-group in the spontaneous speech tests.....277
Table 45. Detailed scores of the P-group in the spontaneous speech tests.....278
Table 46. Detailed scores of the C-group in the spontaneous speech tests.....279
Table 47. Mean scores of the S-group in the cloze tests.....280
Table 48. Number of incorrect and correct answers of the S-group in the close tests...281
Table 49. Mean scores of the P-group in the cloze tests.....281
Table 50. Number of incorrect and correct answers of the P-group in the cloze tests. .282
Table 51. Mean scores of the C-group in the cloze tests.....282
Table 52. Number of incorrect and correct answers of the C-group in the cloze tests. .283

Table 53. Detailed scores of the S-group in the cloze tests.....288
Table 54. Detailed scores of the P-group in the cloze tests.....293
Table 55. Detailed scores of the C-group in the cloze tests.....298
Table 56. Mean scores of the S-group in the dictation tests.....299
Table 57. Mean scores of the P-group in the dictation tests.....299
Table 58. Mean scores of the C-group in the dictation tests.....300
Table 59. Detailed scores of the S-group in the dictation tests.....302
Table 60. Detailed scores of the P-group in the dictation tests.....303
Table 61. Detailed scores of the C-group in the dictation tests.....305

LIST OF ABBREVIATIONS

ANOVA = analysis of variance

BNC = British National Corpus

C(-group) = Control (group)

C00 = Participant 00 from the C-group

CEFR/CEF = Common European Framework of Reference for Languages

EFL = English as a foreign language

EIL = English as an international language

ESL = English as a second language

F0 = fundamental frequency

GA = General American

H00 = Hypothesis n°00

Hz = Hertz

IH = intonational highlighting

IPA = International Phonetic Alphabet

k = number of experimental groups

L1 = mother tongue

L2 = foreign/second language

N = total number of participants

n = number of participants per group

NLM = Native Language Magnet model

NPA = nuclear pitch accent

P(-group) = Prosodic (group)

P00 = Participant 00 from the P-group

PAM = Perceptual Assimilation Model

PME = Perceptual Magnet Effect

RP = Received Pronunciation

S(-group) = Segmental (group)

S00 = Participant 00 from the S-group

SLA = second language acquisition

SLM = Speech Learning Model

ToBI = Tones and Breaks Indices

1. INTRODUCTION

"It's not what you said, but how you said it".

This common utterance can often be heard in everyday speech, for example in a conversation where a person is offended by what his or her interlocutor has said despite the "surface" words. The sentence is also frequently quoted by researchers who wish to insist on the major role of the prosody of a language. In the speech chain, sentences consist of words, themselves formed by a succession of *segments* which correspond to individual sounds (i.e., vowels and consonants). It may therefore be tempting to believe that speech and language exclusively rely on these segmental features to convey meaning and make communication possible because they form the syllables, and thereby minimal elements of meaning. Nevertheless, *suprasegmental* features, which correspond to prosody (i.e., stresses, accents, rhythm, intonation), are always pervasive and closely intertwined with – and inseparable from – segments. As is pointed out in Roach's (2009: 69) glossary of phonological terms, the definition of this aspect as the features above/added to the segments and the mere use of the prefix *supra-* when referring to suprasegmentals "sometimes give the misleading impression that prosody is something optional, added like a coat of paint, when in reality at least some aspects of prosody are inextricably bound up with the rest of speech". In the fields of language acquisition, language learning, and language teaching, suprasegmental aspects thus tend to be neglected, contrary to consonants and vowels.

Quite some time ago, Jones (1922: IV) noted the growing acknowledgement of the considerable role of prosody, particularly through intonation, in both language and the

acquisition of a foreign language (L2), but he also pointed out: “It is however desirable to warn students against starting this subject too soon. It should not be begun until considerable facility in the use of the vowels and consonants has been attained”. It appeared that segmental aspects were regarded as having a major role to play in communication, and they should be teachers' and learners' primary concern in L2 teaching and learning (Thomson & Derwing, 2014). Even today, many teachers tend to emphasise the realisation of consonants and vowels when they explain the pronunciation of a target language to learners. For example, one can think of the typical teaching of the pronunciation of the English dental fricatives /θ, ð/ to French-speaking learners whose native language does not contain those phonemes. Over the last few decades, however, a recurrent claim among researchers has contradicted that belief, as L2 suprasegmental inaccuracy is often said to have a more detrimental effect than segmental inaccuracy in the acquisition of a foreign language (e.g., Derwing, Munro & Wiebe, 1998; Gilbert, 1984; Hahn, 2004; Herry, 2001; Horgues, 2010; Tortel, 2009, to mention just a few). Shifting from a rising intonation to a falling intonation when uttering a sentence, for example, can completely alter the meaning, as can be understood from the common reaction mentioned above (i.e., “it's not what you said, but how you said it”). The considerable importance of prosodic aspects does not only concern one's choice of tone; in English, lexical stress can have a disambiguating role when distinguishing between grammatically different words such as *'present* (i.e., the noun meaning “a gift”) and *pre'sent* (i.e., the verb meaning “to introduce something”), and it is also the basis of the typical melody and rhythm of the language, making it easily differentiated from other languages such as French. One of the functions of prosody is also to provide information on the syntactic structure. For example, *He struck the man with a stick* can have two interpretations regardless of the segmental cues, depending on the chunking of the utterance, which is indicated by intonation through the use of phrase boundaries and tones: *he struck the man* ⎪*with a stick* (i.e., the stick was the weapon used to strike the man) vs. *he struck* ⎪*the man with a stick* (i.e., the stick belonged to the man who was struck). Consequently, non-native speakers' accurate realisation of L2 prosodic aspects may not only contribute to reducing foreign-accentedness (Kjellin, 1999; Reed, 2012), particularly in the case of L2 learners whose mother tongue (L1) is

prosodically different from the target language, but it also contributes to avoiding misinterpretations (Cutler, 1980).

Prosodic accuracy in the acquisition of a foreign language helps to increase intelligibility and comprehensibility – the former being defined as "the degree to which a listener understands a speaker" and the latter, "a judgement of how easy or difficult an individual's pronunciation is to understand", as explained by Derwing (2010: 29). That is why it is crucial to highlight this linguistic aspect in the teaching of a foreign language, especially as the ultimate objective of learning an L2 should be to be able to communicate in any personal or professional situation with other non-native or native speakers. For French speakers who learn English as a foreign language (EFL), the task is quite difficult, because the two languages differ both at the segmental level and the suprasegmental level.

As is pointed out in Derwing and Munro (2005: 386), among others, "it is widely accepted that suprasegmentals are very important to intelligibility, but as yet few studies support this belief", and in many cases, the claim on the superior role of prosody is based on the author's subjective experience (Ohala & Gilbert, 1981). There has been a growing body of research on prosody, its place in the acquisition of the mother tongue, and its acquisition by non-native speakers. In fact, there is a recurrent claim that suprasegmental aspects should be prioritised in L2 teaching approaches over segmental aspects. However, little empirical evidence has been brought as to the efficacy of an L2 prosody-centred teaching approach in comparison with an L2 segment-centred teaching approach on learners' oral skills.

French learners of English as a foreign language in France usually begin learning the L2 as a compulsory subject either in primary school, or in secondary school, and those who undertake higher education generally have to continue studying the language, no matter what field they specialise in. However, the major differences between the French and the English phonological systems result in a number of difficulties that learners encounter in the acquisition process. That is why their typical "French accent" in English can easily be recognised – and is sometimes mocked – by native English speakers or speakers of other languages (Kristiansen, 2015), one of the most famous examples being the substitution of the dental fricative /θ/ by the alveolar fricative [s]

(i.e., *I think* is pronounced *I sink*). However, the detection of a foreign accent does not exclusively rely on segments. The different prosodic structures of two languages equally lead to difficulties and errors that may cause a decrease in intelligibility and an increase in foreign-accentedness.

In order to help non-native speakers – particularly French speakers in the scope of the present thesis – to learn English, one must understand the role of prosody as well as the role of segments, and the way in which the two aspects are connected. The research question at the heart of the present thesis pertains precisely to the importance of prosody in comparison with the importance of segments in L2 learning and teaching:

Is the role of suprasegmentals more important than the role of segmentals in the learning of English by French speakers?

The objective of the present research project is to understand the priorities in L2 teaching by comparing the importance of prosodic features with the importance of segmental features in the learning of English phonology by French EFL learners. To do so, we have set up an experiment that compares the effects of two different teaching approaches to improve French learners' oral skills: a segment-based teaching approach and a prosody-based teaching approach. The production and perception skills of French learners in English are tested before and after they are trained on either segmentals or suprasegmentals. While arguing in favour of a separation of segmental features and suprasegmental features in L2 teaching would be impossible, irrelevant, and counterproductive, the ultimate goal of this study is to understand the L2 learning process better, but also to contribute to the field of L2 teaching, at least as far as French EFL learners in France are concerned. It is important to know whether focusing on L2 prosody could have a better impact on learners than prioritising segmentals. The objective is therefore to assist L2 teachers in setting up teaching priorities and help non-native speakers be more intelligible so as to enhance communication. That is why part of the theoretical section of this thesis addresses the issue of EFL teaching in France, as well as the acquisition process of the English language.

Without overestimating the importance of prosody in comparison with that of segmentals, as warned by Horgues (2010), the present thesis is based on the recurrent claim that L2 prosody should be regarded as crucial to intelligibility, comprehensibility, and foreign-accentedness. Through the elaboration of the experiment, it was expected that a prosody-centred teaching approach would have a more beneficial effect on French EFL learners' production and perception skills than a segment-centred teaching approach. If confirmed, L2 pronunciation teaching methods may have to focus on prosodic features before individual sounds, so that learners may attain more accuracy in their L2 pronunciation and listening capacities. As is fully explained in the experimental section, however, neither teaching approach enabled the French learners to improve their oral skills more than the other, suggesting that both should equally be emphasised from the outset of teaching. The great interdependence of the two aspects help explain the results, supporting the idea that both L2 segmentals and suprasegmentals should ideally be taught on an equal level, contrary to what is often effectively done.

The thesis is structured as follows.

Section 2 sets up the theoretical framework for the analysis of our research question. It focuses on the acquisition process of oral English. After studying the acquisition of a mother tongue, particularly English as a first language, an overview of L2 acquisition studies and processes provides further insight into the source of non-native speakers' difficulties with a second or foreign language. The section also looks at the field of teaching; more specifically, we look at the comparison between the place of segments and the place of prosody in the teaching of English as a foreign language, particularly in France. This constitutes a starting point for the subsequent descriptions of the English and French phonological systems and the introduction of the central question of the thesis.

The objective of *Section 3* is to describe and analyse the phonological systems of English and French in order to understand the difficulties that French learners encounter with oral English, as well as to guide the development of our experimental materials. The section first defines some key terms that are frequently used in the field of phonology, and then presents the main differences between the French and the English phonological systems. This includes differences at the phonemic and phonetic levels –

the consonants and vowels of the two languages, their abstract representations (phonemes), and their concrete realisations (phones) –, but also differences at the suprasegmental level, which concerns the stress systems, the rhythmic structures, and intonation. The review of the divergences between the two languages under study then leads to a presentation of the main difficulties as typically encountered by French learners of English as a foreign language. In the light of our central hypothesis, the objective is to understand the role of prosody and to determine whether prosodic errors are more detrimental to communication than segmental errors. The list of difficulties and errors also constitutes a basis for the development of our experiment.

Section 4 is centred on the experimental part of our research. After presenting the ultimate objective, the section begins with the description of a pilot study that was conducted prior to the present doctoral study and which was subsequently elaborated into a more reliable full-scale experiment. Next, this experiment is presented in more detail, including the overall procedure, the informants, and the development of the different types of treatments that the experimental groups underwent during the experiment, based on the theoretical knowledge established in the two preceding sections. The section then provides details on the conception, analyses, and results of the L2 learners' production tests and perception tests, as well as a discussion on the lack of better impact of either type of training.

The conclusion provides a general discussion on the outcome of the experiment, for both production and perception by the French speakers, and reflects on perspectives for an improvement of our experimental protocol and future research.

2. THE ACQUISITION PROCESS OF ORAL ENGLISH

In this section, we discuss the acquisition process of oral language in order to understand how and why non-natives face difficulty in acquiring the phonetics and phonology of a foreign or second language. First, we focus on native speakers and how they acquire the features of their L1 so as to understand the difficulties encountered by non-native speakers through the influence of their L1, particularly its prosody which is acquired very early (2.1). Then, we focus on non-native speakers' acquisition of L2 segmental and suprasegmental features (2.2). The objective is to highlight the role of the acquisition of prosody in comparison with that of segments, as well as to bring support to our central hypothesis concerning the alleged superior importance of prosodic features in language learning and teaching. Based on the mechanisms of L1 acquisition and how segments and suprasegments are acquired, the question of whether it is possible to attain native-like pronunciation is addressed. Finally, we focus on L2 teachers' teaching practices and the (non-)integration of the existing empirical results into the field of didactics and teaching by French teachers of English as a foreign language (2.3). That serves as an introduction of the experimental study in Section 4; it is indeed closely connected to didactics, as the final objective of working on L2 acquisition should be to contribute to the development of teaching methods.

2.1. First language acquisition

2.1.1. Early language perception: from suprasegments to segments

Language is one of the first things that any person experiences and acquires in life. The mother tongue (L1) thus serves as a constant reference in understanding processes, communicative situations with other native or non-native speakers, as well as in the acquisition of other languages. This subsection deals with the acquisition process of the mother tongue at the early language perception stages. The various steps in the perceptual development are given in a chronological order starting from the beginning of life, and are based on the abundant literature on the matter. The objective is not to dwell on how the mother tongue is acquired and thoroughly list the extant studies, but to clarify the order of acquisition of L1 segmental and suprasegmental aspects, and thereby illustrate the major importance of prosody so as to understand the acquisition process of an L2 better.

Language perception starts very early in life, not only when one is born, but before birth. According to Kjellin (1999: 378), "the anatomical development of the auditory system is completed by about the 25th to 27th week of gestation". It has therefore been suggested that hearing begins from the 25th week of gestation, and it is during late gestation that the human foetus is the most influenced by its sound environment (Mattock, Amitay, & Moore, 2010). The experiment by Querleu et al. (1988) indeed suggests that foetal hearing begins in the last trimester of pregnancy. According to the authors of the study, even though the sounds emitted from the mother are attenuated by up to 30 decibels, the foetus is able to perceive 30% of them. Furthermore, the study claims that intonation, by contrast, is perfectly transmitted, and there is evidence that the foetus begins acquiring features from the voice and sound patterns at that stage, and continues after birth. For Kaplan and Kaplan (1971), however, it is hard to define clear universal stages for early language perception. The previous studies may constitute generalities, but language development depends on individual infants. From birth, the overall pattern that seems to create a consensus is that the acquisition of the L1 suprasegmental system occurs before that of segmental aspects as far as reception is concerned. Newborns first react to intonation, stress, and duration, and it is only at the

end of the first year of life that segmentals become more important (Kaplan & Kaplan, idem).

The term *motherese* refers to the language that parents use to speak to their children from birth. Usually, it contains exaggerated prosody (Kim, Gold, & Scassellati, 2008) and it is the child's first principal experience with language and interactions. That is why the child is soon accustomed to the prosodic structure of the L1. Kim, Gold, and Scassellati's experiment shows that infants receive cues about the given vs. new information contrast even before they develop "a concept of states of knowledge between distinct individuals". Speer and Ito (2008: 91) confirm the infant's early preference to the L1 prosody:

> Infants acquire language from input that is almost entirely auditory, and have been shown to prefer the sound of their native language over others as early as 3 days of age, an effect attributed to their ability to recognize its prosodic form.

Other studies reveal that infants of a few days of age are receptive to suprasegmental cues of the mother tongue. Christophe, Mehler, and Sebastian-Galles (2001) examined the perceptual abilities of French infants with an average age of 2.6 days, testing the prosodic segmentation hypothesis through a discrimination task of Spanish items; the authors conclude that phonological phrase boundaries may be available early in the acquisition process, as the participants managed to discriminate non-L1 items. Although the acquisition of segmentals gains in importance after a few months of age and at the early stages of L1 production, infants are also receptive to segmental cues early, and are even able to discriminate non-native contrasts (e.g., Eilers, Gavin, & Oller, 1982; Eimas, Siqueland, Jusczyk, & Vigorito, 1971). Jusczyk (1992: 20) suggests that they are capable of recognising segmental features such as consonantal voicing (i.e., voiced vs. voiceless contrasts such as *ba – pa*) as early as one month of age: "infants have the capacity to do some preliminary grouping of speech sounds into different perceptual categories". Phonological categories based on the L1 phonological system are thus already developing at that stage even at the segmental level. According to Johnson and Reimers (2010), previous studies have supported the idea that young infants before the

age of 5 or 6 months are capable of perceiving phonetic contrasts other than the voicing of onset plosive consonants, including the discrimination among different places of articulation of plosive consonants such as the *ba – ga* contrast (Moffit, 1971).

The fact that infants are receptive to both segmental and suprasegmental cues of their L1 linguistic environment supports the idea that the role and influence of the L1 are considerable and are bound to lead to interference in the future acquisition of an L2 – that is, excluding the particular case of children who are brought up in bilingual environments, not considered in the present work which focuses on foreign language acquisition. Some experiments, using head-orientation response processes, have pointed to infants' early ability to discriminate between their L1 and other languages (Johnson and Reimers, 2010). As far as rhythm is concerned, Nazzi, Bertoncini, and Mehler (1998) conducted experiments on the capacity of 5-day-old French newborns to discriminate among low-pass-filtered sentences (i.e., reducing the segmental information) in languages that typically belong to different rhythmic categories from French (i.e., stress-timed rhythm and mora-timed rhythm; cf. Section 3 for more details). It was found that infants can discriminate between two rhythmically different languages (e.g., stress-timed English vs. mora-timed Japanese), but they cannot if the languages belong to the same class (e.g., English and Dutch, which are both stress-timed). As a result, it appears that L1 prosodic cues are received by newborns in continuity with intra-uterine processes.

During the second half of the first year of life, infants become sensitive to more segmental aspects of the L1, which include the phonotactics (Cebrian, 2002). Hirsh-Pasek et al. (1987) and Jusczyk et al. (1992), cited in Christophe, Gout, Peperkamp, and Morgan (2003), also found that young infants (4.5 months old) are receptive to prosodic boundaries, that is, the chunking of speech into prosodic units and the resulting pauses, pitch declinations, and lengthening phenomena. In Jusczyk, Cutler, and Redanz (1993) and Jusczyk et al. (1993), the reactions of American infants to phonotactically and prosodically different languages from their L1 were analysed. The authors first found that 9-month-olds listened significantly longer to words with typically English sound patterns than to words with typically Dutch patterns, although the same was not true with 6-month-olds. While this seems to be further evidence of a preference to the L1

prosody at an early age, no preferences were observed when the words were low-pass filtered, which may suggest that infants were reacting to phonetic and phonotactic properties rather than prosodic cues, or that the two Germanic languages share too many prosodic characteristics for infants to discriminate them. Nevertheless, the studies also revealed that both 6-month-olds and 9-month-olds react to L2 words that contain fundamental prosodic differences, as they listened significantly longer to Norwegian words than to English ones. A preference to the L1 prosodic features is therefore still observed in very young infants, and Levitt (1993) specifies that infants' sensitivity to prosody, which begins at birth, may even show some regression from 9 or 10 months of age. Best, Levitt, and McRoberts (1991) bring further evidence of the early preference to the L1 prosody, and particularly intonation. They investigated the ability of 2- to 4-month-olds, 6- to 8-month-olds, and 10- to 12-month-olds to discriminate between English and Spanish questions and statements; the results showed that only the 6- to 8-month-old infants were able to discriminate the prosodic contrasts in both languages, unlike the older infants. This indicates that infants are receptive to L1 intonation as early as 6 months of age.

Based on all the observations that newborns and infants are capable of discriminating between their L1 and other languages provided that they contain certain differences at the segmental and/or suprasegmental levels, they have been referred to as *universal learners*. Furthermore, Johnson and Reimers (2010: 136) claim that infants can understand “many more words than those they can produce more or less accurately”. However, the ability to discriminate non-native sounds begins to decline from 6 months of age (e.g., Best & McRoberts, 1989; Werker, Gilbert, Humphrey, & Tees, 1981), due to the enormous influence of the surrounding linguistic environment which mostly consists of the L1. Similarly, Werker (1995) specifies that speech perception capacities fully match the properties of the L1 structure by the end of the first year. Overall, L1 perception is continuous during the first three years of life (Speer & Ito, 2008). Figure 1 below summarises the evolution of language perception capacities, based on the various studies and findings from the above-mentioned literature; the acquired feature is aligned with the age of the foetus or infant:

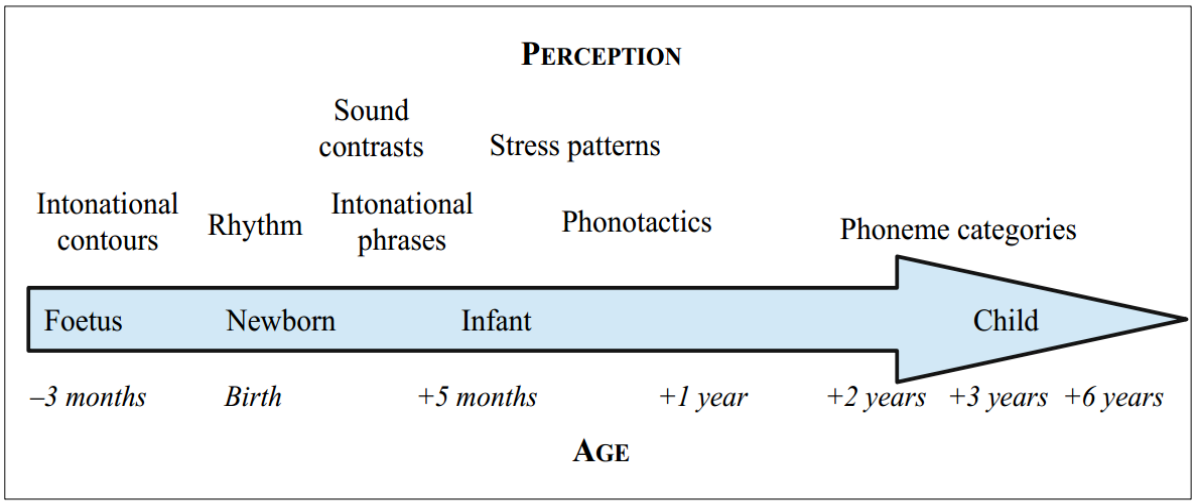

Figure 1. Timeline of L1 perception development

The timeline representing the foetus and infant's development of L1 prosody and segments perception is presented in the form of a continuum, because the acquisition of any phonological feature greatly depends on the individual children (also see Mattock, Amitay, & Moore, 2010). Generalities are still observable; overall, prosodic cues appear to be perceived at a very early stage, even intra-uterine, whereas segmental cues gain in importance later on in the child's development.

During the first years of life, the child is confronted with abundant phonological information (i.e., segmental and suprasegmental cues), and that is accelerated by the continual oral interaction with native adults and possibly motherese, which is why prosody considerably contributes to the structuring of the L1 phonology acquisition (Speer & Ito, 2008). Through an imitation process, language perception development is bound to have an influence on children's early speech productions.

2.1.2. The various stages of production

A timeline of L1 production development

Children begin to speak around the age of 18 to 24 months (e.g., Kaplan & Kaplan, 1971), and they have acquired many of the syntactic and phonological components of the mother tongue by the age of three. Until the first words are produced, the child goes through various stages during which sounds can be heard.

Kaplan and Kaplan presented a chronology of early vocalisation, which is said to be divided into several steps that may overlap and occur at slightly different ages, depending on individual children. Although the first known form of vocalisation is basic *crying*, starting from birth, what the authors refer to as *pseudo-cry* and *non-cry vocalisations* appear at three weeks and contain a wider array of temporal and frequency patterns. Then, the latter two types are extended and gradually differentiated to become *babbling* and *intonated vocalisations*; more speech-like characteristics are produced, with more vowel-like and consonant-like sounds and seemingly adult intonational patterns. Abercrombie (1967) claims that during the babbling stage, the child runs through the whole gamut of human speech-producing movements. This lasts until the end of the first year of life, and it is completed with a tendency to imitate adult speech. The end of the first year, particularly from nine months, also marks the end of the "pre-linguistic period"; the *first words* and *patterned speech* can be heard, with fewer phonetic forms as the L1 gains in importance and influence. In Crystal's (1970: 80) words, they are due to the imitation of adult speech and called "primitive lexical items".

The main issue that has been raised is the question of the continuity or discontinuity between the end of the pre-linguistic stage and the beginning of true speech (Jonhson & Reimers, 2010; Levitt & Utman, 1991). Jakobson (1968), for one, is in favour of the discontinuity approach; babbling and early speech should be distinguished, given the gap that exists between them. Indeed, while early speech is phonemically poor, babbling contains a large amount of sounds, which is why babbling is not related to language acquisition in the author's view. The author also argues that the infant goes through a silent period in the transition from babbling to speech, during which no sounds are produced.

Production of L1 segmentals

In the acquisition of English as a first language, Cruttenden (2008) notes that however complicated the vowel system is, it is acquired long before the consonant system. The former is usually acquired by the age of three, whereas the latter is acquired by the age of five. In this respect, the author points out that children need little guidance for vowel production, in comparison with the amount of help that is required for consonant

production. In a longitudinal study, Levitt and Utman (1991) analysed the vowel formant values in utterances by one French infant and one American infant, at four different times from five months of age to one year and two months of age. On the one hand, both infants showed initial similarities in their consonantal inventories and improvement in producing F1 and F2 values of the target L1 vowels. On the other hand, the babbling of the two infants showed differences, and particularly shifts in their phonemic inventories which were due to the impact of the surrounding L1. Furthermore, still in keeping with the L1 system and its influence, the English-speaking infant produced more closed syllables than the French-speaking infant. Consequently, it seems that L1 vowels – or L1 vowel-like sounds – can be heard even in the pre-linguistic stage of language production.

Cruttenden (2008) gives an account of the acquisition order of L1 English consonantal features and the difficulty that they may pose to infants. He claims that the first consonants that are acquired are plosives and nasals in syllable-initial positions, as they are frequently heard in babbling and in the child's first words (i.e., from nine months of age). More specifically, early babbling contains labials and velars, although the latter will be less frequent and often replaced by alveolars in late babbling and first words. As regards their realisations, over-aspirating or under-aspirating of plosives is common (e.g., some word-initial voiceless plosives will sound as if followed by a full glottal fricative [h]). The approximants /l/, /j/, and /w/ are then acquired; [j] is sometimes used in some contexts (i.e., in syllable-initial position) instead of /l/, the semi-vowel [w], or the vowel [ʊ], frequently replace the English post-alveolar approximant /r/ – the acquisition of which occurs by the age of five years –, and /l/ is said to appear by the age of three and a half years. Fricative consonants, by contrast, are believed to be more problematic in L1 acquisition and are first produced later, both in initial position and medial or final position.

As is claimed by Johnson and Reimers (2010: 3):

> What happens when children are confronted with target forms that they are not able to reproduce accurately is that they have a choice of not producing anything at all or changing the forms into those that they can manage in production.

Target words are often simplified or modified in order to match the child's production capacity, which is still limited and not yet adult-like in the first years of life. Even though each child can use different strategies, there are several categories of modification that emerge in children's speech: reduplication, which Johnson and Reimers describe as one of the most fundamental steps in linguistic development and consists in doubling a syllable (e.g., French *dodo* for *dormir*); segmental deletion, which especially concerns consonants in word-final positions (e.g., [bʊ] instead of /bʊk/ for *book*); consonant modification, including voicing changes (e.g., [bɪk] instead of /bɪg/ for *big*) and de-affrication (e.g., [ʃɪp] instead of /tʃɪp/ for *chip*). Finally, consonant clusters are also a source of difficulty up to a certain age.

Production of L1 suprasegmentals

Like the production of segmentals, significant traces of suprasegmental features are found in infants' early vocalisations and first productions even in the pre-linguistic stage of language acquisition. With the example of the acquisition of L1 intonation, Cruttenden (2008: 291) notes that the distinction between fall and rise is present, and he further specifies:

> Many babies are excellent mimics of intonation and may produce English-sounding intonation patterns on nonsense syllables (often called “jargon intonation”) in the late stage of their pre-linguistic babbling.

When vocalisation occurs but no true target sounds – vowel-like or consonant-like – are produced, an intonational contour can still be heard, because it forms the overall melodic pattern of the infant's oral production. That is why intonation is “the earliest kind of linguistic structuring in the vocalization of the child” (Crystal, 1973: 16).

Whalen, Levitt, and Wang (1991) examined the intonational patterns in the babbling of French-learning and English-learning infants, aged from five months to one year and one month; both groups of infants showed evidence of rising and falling intonations; the authors explained this difference with the consideration of the aspects of the target languages. Moreover, in their acoustic analyses of the utterances of a French infant and an American infant at four different times from five months of age to one year and two months of age, Levitt and Utman (1991) found that the French infant produced more regularly timed non-final syllables and more final syllable lengthening than the English infant, as an adult French speaker would do. These findings suggest that infants' early productions are influenced by the prosody of the L1, including not only intonational contours, but also the rhythmic structure, and even intonational phrases – that is, through prosodic phrasal grouping (Speer & Ito, 2008). Looking at the development of children's L1 production capacities at the suprasegmental level, Snow's (1994) longitudinal study focuses on the multi-word declarative sentences of 16- to 25-month-old children, particularly the realisation of falling intonational contours and phrase-final syllable lengthening. He observes that children are capable of using fundamental frequency, that is, change in the pitch contour, and lengthening of the final stressed vowel to signal the end of an intonational phrase by the age of two years. He also found that the more words children's utterances contain, the more consistent prosodic phrasing becomes in L1 production, which also marks the beginning of the acquisition of syntax.

During the acquisition process of L1 prosodic features, infants face some difficulties that lead to modifications to match their own production capacities at that stage, as is the case with the acquisition of L1 segmental features. Concerning lexical stress acquisition and early production, Cruttenden (2008: 249) considers it not to be so problematic:

> This area appears in general not to be a problem for native learners and, because of the complexities involved, it must be assumed that the accentual patterns of words are learnt individually as they are heard (unlike most foreign learners, young children hear rather than see such new words).

Nevertheless, Johnson and Reimers (2010) mention the frequent weak syllable deletion phenomenon. Indeed, while they retain the strong syllable of a polysyllabic word, children tend to omit the preceding weak syllable; thus, the word *banana* /bəˈnɑːnə/ is pronounced [ˈnɑːnə], and the word *elastic* /ɪˈlæstɪk/ is pronounced [ˈlætɪ].The authors specify that this process is found across languages, including both English and French. When the child begins to produce multi-word sentences, the rhythm is not yet adult-like, although there is little empirical evidence for that observation:

> […] some children often start off by using the strong forms of function words. They also tend towards a constant length for each syllable […] or, in more traditional terms, they have a syllable-timed rhythm (Cruttenden, 2008: 269).

Levitt's (1993) experiment on French- and English-learning infants on their early speech perception capacities but also their production of fundamental frequency and rhythmic properties leads to the conclusion that the acquisition of the L1 suprasegmental features, through an imitation process of adult native speech, occurs before they completely master the L1 segmental characteristics – which can be achieved up to the age of five years. When children's production of segments is not yet adult-like, their production of the L1 prosody already is, usually around the age of two or two and a half in the case of English-speaking children (Crystal, 1970). Thus, they are believed to have completed the acquisition of suprasegmentals before that of the sound structure of their L1 even during the babbling stage (Watson, Grabe, & Post, 1998; Whalen, Levitt, & Wang, 1991), so that it seems that prosody may be the basis for the acquisition of other linguistic aspects, including phonological and syntactic. Consequently, if this is how the L1 acquisition process occurs, then it makes sense to assume a similar pattern for L2 acquisition, highlighting the learning of prosody. The question will be addressed in the experimental section of the present thesis.

2.1.3. The role of L1 prosodic features

From the earliest stages of language acquisition, including perception and production, prosody has a major role to play, just as it does in communication in general (see Section 3), all the more so as the segmental features of the target language are only acquired later.

In adults, L1 prosodic features are necessary to speech production, comprehension, intelligibility, and other linguistic aspects such as syntax and grammar. In their experiment, Cutler and Clifton (1984) measured the reaction time of native English speakers when they listened to disyllabic words in which the lexically stressed syllables had been switched with the unstressed syllables (e.g., *can'teen* was pronounced *'canteen*). The authors' goal was to observe the degree of difficulty for the listeners to recognise the target words with these incorrect stress patterns. The results revealed no effect on intelligibility if the stress had been shifted from right to left – which corresponded to the common 10 stress pattern in English –, but there was an impact on intelligibility when the stress had been moved from left to right – corresponding to the less frequent 01 stress pattern –, and it was even more considerable in the case of a change of vowel quality (e.g., *'wallet* /ˈwɒlɪt/ pronounced [wɒˈlet]). These findings suggest that when prosody has an impact on segmental features, deviations can also have a significant impact on intelligibility. In the same respect, Nakatani and Schaffer (1978) study the role of prosody in the proper comprehension of a message through its grouping function. Native listeners heard nonsense utterances that prosodically mimicked an adjective + noun sequence (e.g., *ma mama* produced with the same prosodic pattern as *new result*). Listeners managed to accurately divide the phrases into words (i.e., *ma* plus *mama*, corresponding to *new* plus *result*), suggesting that prosodic features such as the stress pattern, the rhythm, and the pitch in the phrases were used as tools for parsing and facilitated speech comprehension.

In the case of young children acquiring an L1, the importance of suprasegmentals is also significant, even at the early stages of language acquisition. According to Darwin (1975), prosody plays a dynamic role in speech perception, because it helps the infant direct his or her attention to a particular speaker, as well as to the most informative parts

of the speech that he or she hears. Speer and Ito (2008) also claim that children amply use prosody as an organisational device in L1 comprehension and production, hence a mapping between prosody and other linguistic aspects. While the main role of prosody is the segmentation of the speech stream into sentences and the signalling of the linguistically relevant units, it has also been suggested that children acquiring an L1 use prosody to discover the syntax of the target language (Crystal, 1970; Gerken, 1996). Indeed, albeit not perfect, the relation between prosody and syntax is important and may be established by children in their first years of life. Similarly, Crystal (idem: 79) argues that suprasegmental aspects are necessary to "understand the earliest stages of the development of grammatical competence", even though prosody has often been claimed to have a mere affective or attitudinal function, rather than a grammatical one, in early L1 perception and production.

As a conclusion, the prosody of the mother tongue plays a crucial role both at the perception level and the production level, from the earliest stages of language acquisition to everyday communication situations. It is one of the first linguistic aspects that are acquired, which is why it has an influence on the acquisition of other aspects of language.

2.1.4. Conclusion: from L1 to L2 acquisition

Whether during the early language perception stages starting from intra-uterine life, or in the first vocalisations such as babbling, human beings are first and foremost influenced by the prosody of the mother tongue (Konopczynski, 1990). The acquisition of the L1 stress patterns, melody, or rhythmic structure systematically occurs before the acquisition of segmental features, syntax, or grammar, making the L1 prosody the most firmly settled linguistic element in human speech (Alazard, Astésano, Billières, & Espesser, 2011).

As Werker (1995) points out, infants are universal listeners, but also universal speakers because they are capable of perceiving and producing all the sounds that can be found in any language, even in their early non-speech productions (Kaplan & Kaplan, 1971). Johnson and Reimers (2010: 45) thus remark: "any normally developing child is capable of mastering any one of the thousands of languages of the world equally

well, within a relatively short period of time, without any instruction". In fact, the language-universal ability disappears quite soon after birth, as the influence of the L1 phonology becomes pervasive (Albright & Hayes, 2011). Hence, infants' capacity to discriminate among languages is especially present during the first six months of life, when they begin to develop phonological categories, whereas their production abilities can still cover non-L1 forms up to the age of four years (Jusczyk, 1992). Consequently, as the child grows up, the sensitivity to L2 forms gradually declines, as is noted by Mattock, Amitay, and Moore (2010: 297):

> Adults' sensitivity, contrary to that of infants, is practised, fine-tuned, and optimized for perceiving only the acoustic differences between speech sounds that are significant for making distinctions between words in their native language.

In light of the acquisition process of the L1, the main issue concerning L2 acquisition is that the very possibility to achieve native-likeness in another language can be put into question. Brown (2000: 4-5) points out:

> Whereas children consistently achieve native competence across the full range of subtle and complex phonological properties of their language, second language learners often have extraordinary difficulty mastering the pronunciation and intonation patterns of their L2.

The frequent L2 perception and production difficulties and errors may be explained, and the teaching methods may be adapted to match the L1 acquisition process. Now that the mechanisms of the acquisition of L1 segments and suprasegments have been described, the next subsection focuses on the acquisition of an L2 and then addresses the question of whether it is at all possible to attain native-like pronunciation.

2.2. Second and foreign language acquisition

2.2.1. Language acquisition: interlanguage, interference, and errors

In cross-linguistic studies, various terms such as *interlanguage* and *interference* are frequently used. Corder (1967), followed by Selinker (1972), proposed the term interlanguage in the study of the acquisition of a second language (i.e., the language that a non-native speaker, in an immersed environment, uses in a country where the L2 is the principal language) or a foreign language (i.e., the language that a non-native speaker learns, usually at school, in his or her own country where the L2 is not the official language). This notion does not quite refer to a mixture of L1 features and L2 features, as it is a transitional phase in the L2 acquisition process. It can be defined as a linguistic system "based on the observable output which results from a learner's attempted production of a [target language] norm" (Selinker, idem: 214). In other words, it is an "ever-evolving" natural language system that a non-native learner mentally creates, and it is composed of L1 forms, L2 forms, and "universals" that are neither L1 nor L2 forms (Vergun, 2006: 11).

The phenomenon known as interference refers to the influence of the L1 on the production and the perception of the L2. When the influence of the L1 on an L2 production results in a correct target form, that is called *positive transfer*, or *facilitation*. The opposite pattern, that is, when an L2 form should not be substituted by an L1 form for accuracy purposes, is a *negative transfer*. The idea of *fossilisation* refers to the process from which an L1-influenced target form becomes unlikely to be mentally corrected by a learner, what Selinker (1972: 215) defines as follows:

> The linguistic items, rules, and subsystems which speakers of a particular [language] will tend to keep in their [interlanguage] relative to a particular [target language], no matter what the age of the learner or amount of explanation and instruction he receives in the [target language].

When analysing a learner's L2 productions and negative transfer instances, one may look at the specific deviations from the L1 "norm". In such cases, the recurrent inaccurate forms are called *errors*. According to Corder (1967), this term, denoting the

"systematic errors of the learner from which we are able to reconstruct his knowledge of the language", should be differentiated from *mistakes*, which are "errors of performance". Such "deviations" from the so-called L1 "norm", however, must be distinguished from the dialectal or inter-speaker divergences that are found at the segmental and prosodic levels within a language; in English, for example, the word *schedule* is pronounced /ˈʃedju:l/ by some speakers, and /ˈskedju:l/ by others, and the place of the lexical stress changes in the words *cigarette* and *alumin(i)um*, from British English to American English. Accordingly, a researcher or a teacher should not regard an L2 production as incorrect on the mere grounds that it differs from one specific variety – unless it is precisely the objective of the study or lesson that he or she is carrying out.

As is pointed out in Brown (2000: 5):

> Although researchers generally agree that the learner's existing linguistic knowledge exerts some influence on the [L2] acquisition process, there is considerable debate as to precisely what role the native language plays.

We previously noticed that the early acquisition of the phonological system of the mother tongue has a great influence on children's – and adults' – capacity to accurately perceive and produce an L2, which begins to decline as early as the first years of life. Eckman and Iverson (2013) studied the production of the English /s/–/ʃ/ contrast by native speakers of Korean and Japanese, and found that the different ways in which those two phonemes function in the learners' L1s lead to different consequences in L2 acquisition patterns and errors. By contrast, Archibald (1994) investigated the pronunciation of L2 English lexical stress by Hungarian, Polish, and Spanish speakers; the study suggested that incorrect stress placement was due to the fact that the learners' interlanguages consist of principles of Universal Grammar, as well as L1 resetting to match L2 properties, and L1 transfers.

2.2.2. The acquisition of L2 segmentals

From birth, the mother tongue is all pervasive in the child's life, since it is constantly heard and used as a communication tool. As a result, the acquisition of an L2 – second language or foreign language – is bound to be influenced by the L1 (although there is no definite consensus as to the degree of this influence; see Santiago, 2014). That is noticeable in the realisations of segmentals, because different languages frequently have different phonemic inventories. Baker and Trofimovich (2005) studied the realisations of English vowels by non-native speakers to demonstrate that the age of acquisition has a major importance in the accurate realisations of L2 phonemes. Their results showed that the later the L2 is acquired, the more the L1 influences the target vowel realisations (cf. next subsection and the Critical Period hypothesis). Based on the numerous studies and observations that non-native speakers face difficulties with the pronunciation of target sounds, various models and theories have been developed in order to explain the L2 segmental acquisition processes and the reasons for the difficulties.

According to Brown (2000), the earliest prevailing theoretical framework of L2 acquisition was the Contrastive Analysis framework, with the works of Lado (1957), Lehn and Slager (1959), and Stockwell and Bowen (1965), which focused on the influence of the L1 in the L2 segmental acquisition. However, the author points out the following limitations of this early approach:

> [This approach] incorrectly predicted that an L2 learner would have the same degree of difficulty with any and all of the L2 sounds not present in the L1 inventory, when, in fact, learners' performance on different L2 segments in experimental conditions ranges from native-like levels of accuracy to chance performance […]. This approach also failed to explain why learners with different L1s would substitute different L1 sounds for a given L2 sound (e.g., Japanese speakers substitute [s] for [θ] but Russian speakers substitute [t], despite the fact that these L1s contain both /s/ and /t/ […]. (8)

Lado (1957) proposed the Contrastive Analysis Hypothesis (CA) to account for the segmental production errors by L2 learners. The theory relies on the degree of cross-linguistic similarities. It claims that elements in the L2 that are similar to elements in the mother tongue will be simple for the learner to acquire, resulting in a (near-)authentic production, whereas L2 elements that have no similarities with any L1 elements will be more difficult to acquire, triggering L1 negative transfers. According to Flege (1992), however, the major drawback of the CA hypothesis is the failure to predict what the "difficult" and "simple" L2 sounds are, together with the absence of an explaining factor – that is, whether perception or production is the principal source for the difficulties.

Flege (1984) tested native English speakers' ability to identify foreign speakers in various speech samples, including syllables, read speech, and spontaneous speech. The results indicated that 65 to 95% of the English listeners, whether they were phonetically trained or not, were able to recognise French speakers' L2 productions even from the shortest speech samples. The author concludes that "listeners develop very detailed phonetic category prototypes against which to evaluate speech sounds occurring in their native language" (692). Even though L2 learners sometimes develop new phonemic categories in their interlanguage during the acquisition process, it seems that they are still not quite accurate and therefore they are easily identified as non-native by native speakers. Flege (1992: 566) thus observes that L2 learners "decompose" a target L2 word into the phonemes of the L1: "many aspects of L2 production can be understood in terms of how L2 sounds are categorized". That is why he proposed the Speech Learning Model (SLM). Albeit somewhat similar to the above-mentioned CA hypothesis, the SLM mostly concerns vowel realisations and it also insists on the link between perception and production; an L2 sound is only accurately produced if accurately perceived. The principle of the SLM is described as follows:

> […] certain "new" L2 sounds that differ substantially from any vowel in the L1 will cease being identified with a sound(s) in the L1 inventory. "Similar" sounds that more closely resemble a sound in the L1 inventory, on the other

> hand, will continue to be identified with an L1 sound (i.e., be "equated"). (572)

L2 sounds are equated with L1 sounds on the basis of similarity, in keeping with what the author referred to as the Equivalence Classification Hypothesis (Flege, 1987). Indeed, an L2 sound can either be classified as "new" or "similar", based on "the perceived phonetic distance between sounds in the L2 and those in the L1" (573). If the same IPA symbol is used for two different phones in two languages, then it is a hint that the L2 sound will be classified as "similar"; one can mention the example of the phoneme /e/ in English and French, corresponding to different phonetic realisations in the two languages (see Section 3 for more details). Flege, Schirru, and MacKay (2003) explain the two mechanisms through which L1 sounds interact – or not – with L2 sounds: first, phonetic category assimilation implies that an L2 sound is identified as an L1 sound, which blocks the formation of a new category; second, phonetic category dissimilation is when a new category is created for an L2 sound. Kuhl's (1991) Perceptual Magnet Effect (PME), or Native Language Magnet Model (NLM), further explains the assimilation processes of L2 sounds in learners' interlanguage. It postulates that acoustic vowel prototypes based on L1 sounds are developed early by children and later interfere with learners' ability to perceive L2 sounds accurately. L1 sounds, mostly vowels, thus influence the acquisition of L2 sounds and act as perceptual magnets that pull L2 sounds towards existing L1 prototypes.

In order to explain how L2 segments are perceived by learners, Best (1995: 193) developed the idea of a Perceptual Assimilation Model (PAM):

> The fundamental premise of the perceptual assimilation model of cross-language speech perception is that non-native segments, nonetheless, tend to be perceived according to their similarities to, and discrepancies from, the native segmental constellations that are in closest proximity to them in native phonological space.

In the same manner as the above-mentioned models, the PAM insists on the influence of the L1 in the acquisition of L2 sounds and their different categorisations depending on

the similarity between the target sounds and the existing L1 sound categories. Similarly to the description of Flege's Equivalence Classification hypothesis, the perception of L2 sounds can lead to three assimilation patterns: the L2 sound can be "categorised" if it is perceived as identical to an L1 sound; the L2 sound is "uncategorised" if it can be assimilated to two or more L1 phonemes; finally, a "non-assimilable non-speech sound" is when no similarity with any L1 phoneme is perceived. Best, McRoberts, and Goodell (2001) conducted two experiments with English speakers' perception of foreign contrasts, and they found that non-native consonants are perceived and assimilated according to their similarities and differences with native contrasts, confirming the premises of the PAM.

Although there exist several models accounting for L2 segmental acquisition, Best et al. (idem: 776) notice that they "all presume that adults' discrimination of non-native speech contrasts is systematically related to their having acquired a native speech system". Cebrian (2002: 4) also remarks:

> Both [Best's PAM and Flege's SLM] generate predictions of relative perceptual ability on a range of the possible perceptual relations between native and non-native sounds. The models differ in that the former supports a gestural basis for perception whereas the latter favours an auditory or psychoacoustic basis.

Because of the effect of L1 phonetic categories on the perception and production of L2 segments, the general question that the theories and models seem to raise concerns L2 learners' possibility to accurately realise target sounds.

2.2.3. Is native-likeness attainable?

The critical period hypothesis

The fact that the L1 is acquired very early and develops quite rapidly – as many linguistic elements are acquired within the first year of life – has led to the belief that learners may never be able to perceive and produce L2 sounds as accurately as native speakers are, particularly if they sound similar to L1 sounds, because they will usually

be assimilated – or equated – with already existing L1 phonetic categories (Major & Kim, 1999). Hence, a foreign accent will be heard and prevent learners – especially late learners – from sounding native (Flege, 1992). The observation that the ability of children or early learners to acquire foreign languages differs from adults' has led researchers to develop the hypothesis that there is a critical period for the acquisition of an L2 (Flege, 1981, 1992).

Penfield and Roberts (1959) emphasised the importance of the age factor in language acquisition. Lenneberg (1967) thus proposed the idea that a critical period for language acquisition appears at the beginning of puberty. The hypothesis premise is that beyond this limit, it becomes impossible for an L2 learner to attain native-likeness in any language. The reason is believed to be the loss of plasticity of the brain, also referred to as cerebral lateralisation. Despite the numerous studies on the issue, it is not known when the critical period exactly occurs (Horgues, 2010); while it has often been claimed to be around the age of 6, some have argued that it occurs by the age of 12 (Flege, 1992).

No consensus is to be found on the critical age from which it is claimed to be impossible to attain native-likeness in a language. Furthermore, the very existence of such a critical period is far from being uncontroversial. Still, although it is not necessary to list all the existing literature on the subject, it is worth mentioning the hypothesis, because it further supports the idea that the influence of the L1 is a major impediment to the proper acquisition of an L2, and it helps explain many L2 perception and production errors.

On native-likeness

Although aiming at a native-like pronunciation is not necessary for non-native speakers to understand L2 speech and be understood by native speakers or other non-native speakers of a language properly, the question of the possibility for late learners to attain native-likeness or near-native-likeness should be raised. The critical period hypothesis has led researchers to investigate whether L2 learners are at all capable of pronouncing L2 speech accurately; if the existence of a critical period is confirmed, they should not be.

In Flege, Bohn, and Jang's (1997) experiment, the productions of L2 English vowels by several speakers with various L1 backgrounds – including German, Mandarin, Spanish, and Korean – were analysed and compared with control productions by native speakers. The findings revealed that experience plays a role on adults' production and perception of L2 vowels; the non-natives who had lived in an English-speaking country for longer were more accurate in their productions of L2 vowels, as well as in their identifications of L2 phonemic contrasts than the non-natives who had less experience in the countries. The results suggest that L2 phonemic realisations can gain in accuracy through experience, although the study did not involve learners of English as a foreign language, that is, who were learning English in their own countries and therefore had limited L2 exposure. The fact that the participants resided in an English-speaking country and were immersed in the target language may explain why better L2 accuracy seems achievable, particularly because it is comparable to language acquisition by infants.

Bongaerts, Van Summeren, Planken, and Schils (1997) compared the L2 productions of a group of Dutch speakers who had a high level of proficiency in English with control recordings by native speakers. Linguistically-inexperienced native English listeners rated all the productions. The findings suggest that achieving authentic pronunciation skills is not impossible, in so far as some of the non-natives' recordings obtained the same scores as the native recordings. According to Kjellin (1999), the attainability of a native-like accent in L2 can be summarised with the adage *Practice makes perfect*, even though some people speak English daily and yet their pronunciation does not improve. Indeed, the author emphasises the efficacy of practice in L2 acquisition, and claims that learners can produce a target form accurately provided that they are allowed to hear it several times beforehand and then to practise it. Birdsong (2003) tested the possibility that a late L2 learner may be capable of attaining the same linguistic skills as a native speaker. He conducted an experiment on a group of English-speaking late learners of French as a second language, who had lived in France for at least five years. Through a reading task, the participants were rated by native French speakers who also taught French at university. It appeared that 2 out of the 22 late learners managed to produce French in a similar way as French natives.

The above-mentioned studies do not exclude the possibility that native-likeness is attainable by late learners. The manner in which the L2 is acquired may also have an impact; learning a second language in a country where the target language is predominant is bound to result in differences in L2 accuracy in comparison with learners who learn the L2 as a foreign language in their own country, with usually a few hours of exposure per week.

The issue of native-likeness attainability of French learners of English as a foreign language is all the more relevant to our study as it has not yet been analysed. The substantial differences between English and French at the prosodic level present a major challenge for the learners. Moyer's (1999) study shows that training in L2 suprasegmentals leads to more native-like ratings. Similarly, Birdsong (2003) claims that segmental accuracy is far from sufficient to secure suprasegmental accuracy, even though the latter greatly contributes to native-like pronunciation.

2.2.4. The acquisition of L2 suprasegmentals

In the study of linguistics and second/foreign language acquisition, the segmental features of languages have often been the principal interest (Gut, 2009). As is noted in Vaissière and Boula de Mareuil (2004: 3), "prosody has long been neglected or dismissed, perhaps owing to experimental difficulties, linked to appropriate equipment problems". Mehler, Bertoncini, Dupoux, and Pallier (1996: 343) look at the example of the study of speech perception and also remark:

> Traditionally, there has been a phonemistic or phonemo-centric bias to the study of speech perception. Linguists, phoneticians, psycholinguists and most students of language have assumed that if one understands how phonemes (or the distinctive features that make up the phonemes) are perceived then one understands automatically how speech is perceived.

In fact, the various theories and models that intend to explain how L2 phonological features are acquired by non-native learners, including Flege's SLM and Best's PAM, are mostly based on the acquisition of phonemes and phones, sometimes even

exclusively focusing on vowel sounds. Therefore, there is a lack of theoretical and empirical research on the acquisition of L2 prosodic features, in spite of a growing body of research on prosody for some years.

Mennen (2006) reports the conduction of a survey of important international journals in the field of second language acquisition over the preceding 25 years. Out of all the studies that are mentioned in the literature, "it was found that as few as 9 studies investigated intonation and tone. Only four of these studies were concerned with perception of intonation, the other five were production studies" (4). Similarly, Rasier and Hiligsmann (2007: 41) observe that "much research on the acquisition of phonological skills in a second/foreign language has hitherto been concerned with the phonemes of the target language, disregarding suprasegmentals", and Trofimovich and Baker (2006: 2) further point out: "given the important role of prosody (hereafter, suprasegmentals) in language learning and use, the scarcity of research investigating second language (L2) acquisition of suprasegmentals is striking". Nevertheless, a number of studies have investigated the acquisition of L2 suprasegmental features at the perception and production levels, and even though a considerable number concern English speakers or learners, very few of them are interested in French speakers learning English as a foreign language.

Some studies have attempted to explain the difficulty that non-native speakers encounter with the acquisition of the rhythmic properties of a target language at the production level. Rasier and Hiligsmann (2007) conducted an experiment on Dutch speakers and French speakers acquiring the language of the other linguistic group. Provided that the L1 is prosodically different from the L2, the results of the study suggest that acquiring the prosody of a language with *plastic* accentuation, like Dutch or English in which accent placement is bound to the informative value of the utterance, is more difficult than acquiring the prosody of a language with *non-plastic* accentuation like French, in which phrase accents are more fixed (see Section 3 for more details on the plastic vs. non-plastic accentuation dichotomy). In fact, the fixed quality of phrase accent in French seems to facilitate its production by non-native speakers whose L1 uses more prosodic cues to convey information, like English. By contrast, the accurate production of the prosody of Germanic languages such as Dutch or English is more

problematic for French speakers, who have to assimilate the various functions of the L2 prosodic system. The study by Nava and Zubizarreta (2009) on the acquisition of nuclear accent by Spanish learners of English reaches a similar conclusion, in that learners whose L1 belongs to a different prosodic category from the L2 face the difficulty of shifting from one prosodic pattern to another. In this particular case, Spanish speakers had to move from a syllable-timed rhythm to a stress-timed rhythm.

At the level of L2 perception, previous studies have suggested that French speakers suffer from "stress deafness" – which hypothesis is referred to as the Stress Deafness Model (Peperkamp & Dupoux, 2002). As will be further explained in Section 3, stress in French is a property of the phrase, rather than the word as in English, and its acoustic cues differ in the two languages because French prosody is primarily characterised by the lengthening of the final syllable of a phonological phrase. That is why French speakers encounter difficulties in the accurate perception – and production – of English lexical stress. Montero (2007) studied the effects of three acoustic dimensions – fundamental frequency (F0), duration, and intensity – on stress perception by French and Spanish learners of English, and native English speakers. While both F0 and intensity were found to be used by all speakers in stress perception, duration had the smallest effect, and French speakers presented different degrees of sensitivity to the three acoustic cues from the other two linguistic groups. The author concludes that French speakers are receptive to F0, intensity, and duration variations, which seems to invalidate the Stress Deafness Model. Frost (2011) similarly suggests that French speakers and English speakers use the acoustic properties of F0, duration, and amplitude differently in stress perception, while maintaining that French speakers may not use pitch clues as effectively as English speakers.

Looking at the studies on the acquisition of L2 segmentals on the one hand, and those on the acquisition of L2 suprasegmentals on the other hand, it appears that non-native speakers – no matter what their L1 background is – face difficulties with both aspects at the perception and the production levels. A parallel between the degrees of difficulty of the two phonological aspects should be drawn in order to determine whether one of them plays a more important role in communication, and to adapt teaching and learning techniques.

Evidence of the role of prosody

According to Konopczynski (1999), the natural acquisition of an L2 should begin with the exposure to the prosodic elements. In the comparison between the place of suprasegmentals and the place of segmentals in the acquisition and learning of a second or foreign language, it has frequently been postulated that accuracy in L2 prosody has a more positive impact on intelligibility, comprehensibility, and foreign-accentedness than an accurate realisation of individual sounds. Accordingly, segmental errors may not be as much of a hindrance to communication as prosodic errors. However, there exist very few empirical data to support the claim (Derwing & Munro, 2005; Hahn, 2004; Tajima, Port, & Dalby, 1997; Thomson & Derwing, 2014).

Hahn (2004) investigated the extent to which the realisation of English lexical stress affects the intelligibility of non-native speech. Native English speakers' reactions were measured when they listened to non-native English speech in which three stress realisation patterns could be found: correctly placed primary stress, incorrectly placed primary stress, and missing primary stress. The results showed that an L2 production containing an accurate realisation of English primary stress is significantly better evaluated and enables native listeners to recall more content than L2 speech with wrongly placed or missing word stress. Lexical stress is therefore an important suprasegmental feature that facilitates L2 intelligibility. “Listener friendliness” also greatly depends on other prosodic aspects, as is explained in Thorén (2008) who argues in favour of a prosody-centred approach to language acquisition, with the example of Swedish learning. Similarly, Lepage and Busa (2014) aimed at determining which features have the biggest impact on intelligibility in Canadian French speakers' English productions; once again, wrongly placed lexical stress was found to be a hindrance to intelligibility, but incorrect vowel reduction was found to have a more significant impact. Anderson-Hsieh, Johnson, and Koehler (1992) compared the contributions of prosody, segmentals, and syllable structure to intelligibility in the L2 speech of different speakers, belonging to 11 language groups. No matter what the participants' L1 backgrounds were, suprasegmental errors at the level of stress, rhythm, and intonation all affected native speakers' judgements more than segmental errors. Kamiyama and Shinohara (2010) focused on the importance of intonation in L2 speech through a

recognition task of segmental contrasts; Japanese speakers' perception of minimal pairs in French proved to be facilitated by tonal prominence and intonational contours, which suggests that prosody has an impact on L2 phonetics. Some studies have thus shown that L2 prosody realisation has a major role to play in communication. Alazard et al. (2011) go further and claim that early training in L2 prosody helps improve both learners' pronunciation skills and reading fluency, based on Fodor's (2002) Implicit Prosody hypothesis which postulates that a reader assigns a prosodic pattern to a written text in silent reading. Two groups of English learners of French were tested before and after they received two different classes; one focused on reading comprehension, and the other focused on phonetic correction and prosody. Only the latter group showed improvement in their reading abilities. Our experiment, which is described in Section 4, followed a similar protocol.

Inaccurate realisation of L2 prosodic features can not only influence L2 segments, but also create a negative impact in foreign-accentedness. Although it is not as much of an impediment to comprehension, a foreign accent risks aggravating the lack of intelligibility and triggering mental fatigue in the listener's mind. Jilka (2000) insists on the need to analyse the degree of importance of L2 prosody in the perception of a foreign accent:

> Strictly speaking, the conducted perception tests only show that prosody is relevant to the perception of foreign accent, but not how important it is in relation to segmental foreign accent, i.e., how big its contribution is to an overall effect of foreign accent. (161)

Suprasegmental deviations are also harmful to foreign-accentedness, which is why the author concludes:

> It is very likely that the influence of segmental foreign accent is even greater in everyday speech production despite possible effects of accumulating tonal deviations that become evident over longer stretches of speech. (176)

By contrast, Horgues's (2010) experimental study illustrates the stronger effect of L2 prosody in the detection of a foreign accent. A group of French EFL learners participated in read speech and spontaneous speech production tasks, which were then evaluated for foreign-accentedness by a group of native English speakers from various English-speaking countries, using a 5-point scale – ranging from 1 *very heavy foreign accent* to 5 *no foreign accent*. The L2 productions had previously been filtered so that only the prosodic cues were preserved. The results indicated that the native speakers were able to identify a foreign accent from the mere prosodic cues. Furthermore, most of the time the native listeners were able to detect the French origin of the L2 speakers. This study gives support to the claim that prosody has a strong – stronger even – impact on foreign-accentedness, in comparison with segmentals. Nevertheless, the study was based on a small number of participants.

L2 segments vs. prosody: comparative studies

The experiment conducted by Derwing, Munro, and Wiebe (1998) is often mentioned in studies that aim at comparing the impact of prosody with that of segmentals in L2 speech and L2 teaching. Three balanced groups of learners of English as a second language, from different L1 backgrounds, were treated differently; for 12 weeks, one group received classroom instructions based on English segmentals, another group received a "global" approach mostly based on prosody, and the third group was an uninstructed control group. The participants took read speech and spontaneous speech production tests before and after the 12 weeks. Their productions were blindly evaluated by native English speakers for comprehensibility and accentedness. While both the "segmental" group and the "global" group showed improvement in their reading skills, only the "global" group improved in their extemporaneous speech abilities as far as comprehensibility and fluency are concerned. Neither group improved in accentedness. The control group did not improve at all, which at the same time seemed to prove the efficacy of the experimental training. The follow-up analysis of the data conducted by Derwing and Rossiter (2003) revealed that the treated groups indeed learnt what they were taught, in that the segmental group significantly improved in their segmental realisations and the global group improved in their prosodic realisations. As a

conclusion, the longitudinal study brings evidence of the importance of prosody in the acquisition of L2 English phonology, while supporting the idea that segmentals should not be neglected.

Ueno (1998) similarly compared two groups of Japanese learners of English as a foreign language; a "segmental" group received classes on L2 segmentals, and the other group studied L2 prosodic features, so as to determine which teaching approach would help learners improve their production and perception skills more efficiently. The differences between the effects of the two approaches failed to reach significance, suggesting that neither prosodic teaching, nor segmental teaching had a stronger impact on learners' perception and production of English, not to mention the strong interdependence of the two aspects. Akita's (2005) comparative study of Japanese EFL learners' skills came to the same conclusion as far as L2 perception is concerned; after a four-month treatment based on either prosody or segmentals, neither experimental group showed significant improvement in their L2 perception abilities, which were tested through a dictation task. By contrast, the reading skills of the "prosodic" group improved significantly more than those of the segmental group, and it was found that the former even improved in phoneme distinction, whereas the latter did not despite the content of their training. However, the study did not test the learners' spontaneous speech skills, and only a small number of native speakers evaluated the productions. Missaglia's (1999) experiment, which involved Italian learners of German, also revealed that prosody-centred training helps L2 learners improve their pronunciation skills more than segment-centred training.

Yates (2003) claims that any teaching approach to oral language should prioritise L2 suprasegmentals rather than segmentals, because it contributes to the facilitation of native speakers' comprehension of non-native speech and reduces foreign-accentedness. In order to support the claim, the author divided ESL learners into two groups; for 12 weeks, one group practised the repetition of segmentals through minimal pairs, and the other practised imitating a television show, focusing on suprasegmentals (i.e., the approach is referred to as the "linguistic mimicry" approach). All the participants recorded extemporaneous speech in pre-tests and post-tests, and the productions were rated by 30 native speakers for comprehensibility and accent, using a 5-point scale

similarly to other above-mentioned studies. Overall, both groups improved in comprehensibility and accentedness, and the author points out the better effectiveness of the "linguistic mimicry" approach, not only because of its focus on suprasegmentals, but also because of the fact that it does not exclude the repetition of segmentals and places learners in real-life situations.

A number of experimental studies have attempted to show the contribution of prosody to L2 acquisition and learning in comparison with segmental aspects, while pointing to the importance of including both aspects in teaching approaches given their interdependence. None of those studies, however, has involved French learners of English as a foreign language, which is the contribution of our study.

2.2.5. Towards a stronger importance of prosody?

Prosody has aroused growing interest in linguistics and acquisition studies over the last few decades, and its importance is increasingly acknowledged. Many studies have brought support to the claim that prosody in L2 learning has a stronger importance than segmental features because it may increase L2 speech intelligibility and comprehensibility. Accordingly, the teaching and learning of a foreign language should give the priority to the prosodic features, as native speakers are often believed to attach less importance to segmental deviations, as least as far as French EFL learners are concerned (see Section 3). Furthermore, looking at the acquisition process of the mother tongue, it has been shown that L1 suprasegmental features are acquired long before segmental features, which is why they are bound to have a negative influence in the attempt to acquire the prosodic features of another language.

The previous work on the comparison between prosody and segmentals in L2 acquisition does not contain a comparative experiment on the specific case of French learners of English as a foreign language; the case of second language acquisition must be treated separately because the learner is not exposed to the target language in the same manner as a learner of a foreign language. In the latter case, the learner's principal contact with the L2 is through education; in France, English is one of the compulsory subjects that are taught to pupils – either from primary school, or from secondary school – in weekly classes that usually do not exceed three or four hours per week.

Consequently, taking into consideration the role of prosody relative to the role of segmentals in L2 acquisition is an important step in setting up priorities in the teaching of English.

2.3. L2 teaching and learning

2.3.1. Acquisition and learning

The terms *acquisition* and *learning* are frequently used interchangeably in the literature even though they can be regarded as two different concepts. The former word generally refers to an unconscious process, and is thus usually the only term used when studying L1 acquisition, whereas the latter word can be defined as a conscious process in which the learner actively takes part, and it should especially be distinguished from acquisition in L2 contexts. In this respect, Krashen (1981) further defined the dichotomy between second language acquisition and second language learning, which are two different ways of developing L2 proficiency. According to his definitions, as part of the Acquisition Learning hypothesis, L2 acquisition is, on the one hand, subconscious and implicit, quite similarly to the L1 acquisition process, and leads to the spontaneous use of the L2 and a "feel" for correctness. On the other hand, L2 learning is conscious and explicit, resulting from formal instruction, and leads to knowing the rules of a language, or "knowing about" a language, and being able to speak about the language. These definitions, however, do not have unanimous support (Zafar, 2009).

Within the framework of Krashen's Acquisition Learning hypothesis, the author developed the Monitor model, which is based on the hypothesis that the learnt L2 system, which has a role of "monitor" or "editor" of speech, is less important than the acquired L2 system, which is responsible for the initiation of speech. The monitor is therefore a control system which influences the output of the acquisition system and is activated by the fulfilment of three conditions: that the learner has sufficient time; that the learner focuses on form and correctness; that the learner knows the rules. In Krashen's words, the L2 learners who use the monitor all the time are "over-users", those who use it appropriately are "optimal users", and those who have not learnt or do not use conscious knowledge are "under-users".

Krashen also developed three attendant hypotheses, even though they have been criticised (Zafar, 2009). The Input hypothesis, emphasising acquisition rather than learning, is an attempt at explaining how the learner acquires the L2 through the determining role of input, which should only be one step beyond the learner's current knowledge; according to the hypothesis, language comprehension is more important than language production. The Natural Order hypothesis concerns the acquisition order of L2 grammatical structures and its predictability, even though academic syllabi should not be based on that. Finally, the Affective Filter hypothesis concerns the role of non-linguistic, affective variables in L2 acquisition, such as motivation, self-confidence, and anxiety, and their impact on the L2 learner's success or failure; those affective variables can act as a filter that will block the necessary input in acquisition.

2.3.2. A review of L2 teaching approaches

The various observations in the previous subsections on the oral language acquisition process point to a consensus that the prosody of the mother tongue is acquired before segmental features are, both at the early stages of language perception – even intra-uterine – and language production – including babbling. Moreover, a number of linguists have argued in favour of an equally pivotal role of suprasegmentals in L2 acquisition and learning; accordingly, L2 teaching should primarily focus on these features rather than segmentals, and some empirical evidence has even confirmed this idea. However, that does not necessarily mean that teaching methods and practices are consistent with the numerous claims and findings by researchers in phonetics, phonology, and language acquisition.

Over the years, pronunciation teaching has not consistently had an important place if compared with the teaching of other aspects, such as grammar and vocabulary. During the 20th century, there were several teaching approaches in which pronunciation was considered irrelevant, such as the early Grammar-Translation Method, which emphasised grammar and text comprehension (Celce-Murcia, Brinton, & Goodwin, 1996; Morley, 1994), or the Cognitive Approach of the late 1960s and early 1970s, at a time when new research postulated the existence of a critical period making it

impossible for learners to achieve a native-like pronunciation (Saalfeld, 2011). By contrast, pronunciation gained in importance in alternative teaching methods, as early as the first half of the 20th century with the Direct Method, emphasising the teaching of phonetics, and the Active Method, widely based on the practice of L2 speaking. From the 1940s onwards, works by Pike (1945), Abercrombie (1964), Kingdon (1958), and O'Connor and Arnold (1973) were pivotal in the expansion of structuralism, which initiated the development of new teaching methods emphasising the structural analysis of English prosody, rather than its communicative value. Thus, in the 1940s-1950s, the Oral Approach (from the United Kingdom) and the Audio-Lingual Approach (from the United States) included pronunciation as a very important teaching component (Morley, 1994), and particularly insisted on the mastery of native-like pronunciation especially at the phonemic level (Saito & Lyster, 2011). At the same time, the teaching of prosody was given the priority with the attendant development of the Verbo-Tonal Method and the work of Guberina (1965). This approach recommended that the teaching of written language should be introduced only after several hours of oral language teaching; the objective was to improve learners' L2 perception and production abilities by prioritising rhythm and intonation even before segmental aspects. In the early 1970s, at a time when pronunciation teaching became marginalised, the Silent Way Approach was developed by Gattegno (1976); it started from the idea that pronunciation could be emphasised while teachers should remain as silent as possible in the classroom, so that learners can practise speaking by themselves even if their exposure to L2 vocabulary was still limited (also see Herry-Bénit, 2008). Some years later, Alliaume (1989) insisted on the crucial role of prosody in L2 teaching and recommended that it should be prioritised over grammar, because he claimed that the integration of L1 prosody prevented learners from acquiring an L2, including its grammar. The author created *I-lang*, which was a method aiming at "re-conditioning" the learners to the L2 prosody, given its pivotal role. The late 1970s in general also marked the beginning of the Communicative Approach, the emphasis on speech intelligibility rather than native-likeness, and the equal priority given to all four language skills – reading, writing, speaking, listening –, which coincided with early studies that revealed the importance of suprasegmentals in speech (Phan & Sonca, 2012). As such, Fraser (2011: 17) notes: "It is important to

emphasise that pronunciation teaching is currently undergoing a revival after several decades of neglect". In 2001, the Common European Framework of Reference for Languages[1] (abbreviated CEF or CEFR) was introduced. Its goal was to define European standards regarding pupils' linguistic skills to be achieved. Six levels, accompanied with precise descriptions of skills, were established – A1, A2, B1, B2, C1, C2 – ranging from "basic user" to "proficient user". All phonological skills, both segmental and suprasegmental, are included as components to be equally taught. In France, the CEF was officially adopted in 2005 (Calciu, 2009).

Despite the numerous teaching approaches and methods recommended by official academic authorities, it is still "up to teachers to incorporate pronunciation training into their lessons", and "[…] even when included in course books, pronunciation is marginalized and treated superficially" (Gilner, 2008: 94). Using the example of ESL pronunciation teaching in Australia, MacDonald (2002) points out that teachers are often reluctant to teach it, and therefore avoid it unless necessary to help a student; interviews with eight teachers revealed that they either do not like teaching it, or admit to teaching it badly. Most of the time, however, it is the suprasegmental features of the target language that are particularly overlooked, whereas segmental features are taught (Capliez, 2015), both in didactic theory and classroom practice (Alazard, 2011; Phan & Sonca, 2012). Brown (1995: 174) thus remarks that "minimal pairs immediately spring to most teachers' (and students') minds when the topic of pronunciation is raised". McNerney and Mendelsohn's (1992: 185) confirm that prosodic features are usually treated as "peripheral frills" by teachers:

> Discussion with [ESL teachers] and an examination of some traditional pronunciation texts quickly reveal that the norm has been to devote the majority of time and effort to segmentals (individual sounds), and usually vowels.

As a possible reason for the oft-mentioned negligence of prosody in L2 teaching, Taylor (1993) suggests that the existing accounts of English intonation and stress system are

1 Available online: http://www.coe.int/t/dg4/linguistic/source/framework_en.pdf

excessively complicated and detailed, and are therefore not accessible to the average teacher or the average student.

The neglect of prosody is also apparent from the textbooks that were used in the analysis described below. Burgess and Spencer (2000: 197) notes that it is "interesting as many pronunciation materials have tended to focus primarily on segmental features". In order to observe how L2 prosodic features have been integrated into English classes in France, we examined eight EFL textbooks used in French secondary schools, and usually designed by French scholars in English (Capliez, 2015). Three of them dated from 1996 to 1999, that is, before the creation of the CEF; the other five dated from 2003 to 2009:

- *Live* ("*4ème*", i.e., 3rd year of secondary education) 1996;
- *The New Apple Pie* ("*3ème*", i.e., 4th year of secondary education) 1997;
- *Action* ("*4ème*", i.e., 3rd year of secondary education) 1999;
- *New Live* ("*3ème*", i.e., 4th year of secondary education) 2003;
- *New Spring* ("*5ème*", i.e., 2nd year of secondary education) 2007;
- *Good News* ("*5ème*", i.e., 2nd year of secondary education) 2007;
- *New Spring* ("*4ème*", i.e., 3rd year of secondary education) 2008;
- *Enjoy English* ("*3ème*", i.e., 4th year of secondary education) 2009.

In our analysis, we looked at the table of contents, chapters, lessons, and exercises in each of these books. A striking difference between the older books (1996, 1997) and the others is that their tables of contents do not contain any mention of spoken language, be it phonetic or phonological components, or even "pronunciation". This observation can be extended to the whole books; only the phonemic transcriptions of some words, with the place of the lexical stresses, are given inside. By contrast, in the tables of contents of all the other books, one can find such categories as "Rhythm 'n sounds" (in *New Live – 3ème*), "Phonetics" (in *New Spring – 4ème*), and "Phonological skills" (in *Enjoy English – 3ème*), which confirms that the oral component of EFL teaching has been incorporated in teaching methods. All of these textbooks present a wide range of English phonological aspects, from intonation to vowel realisations, through metalinguistic explanations in French and many exercises such as listening

comprehension drills. Thus, the recommendations of the CEF and official instructions by the Ministry of National Education seem to have been taken into account, as no aspect of English phonology is left out, nor is spoken English given less importance than other aspects such as grammar or written comprehension.

Although there is a fair balance between the teaching of segments and the teaching of prosody in French EFL schoolbooks, the personal choices of teachers remain influential, because an EFL teacher is effectively free to select some components and reject others (Calciu, 2009; Moedjito, 2008; Puren, 2004). Although not referring to EFL teaching in France, Akita (2005) observes that phonological training is usually left out of the classes, despite the acknowledged importance of oral teaching and skills, because teachers prefer to practise listening comprehension and exclude theory, that is, phonological features – or at least prosodic features. This is indeed confirmed in the following analysis.

To complement our analysis of school textbooks, we gave some questionnaires to some French EFL teachers, which would allow us to evaluate teachers' actual practices in classrooms as far as the place of English prosody is concerned (see Capliez, 2015). The full version of the questionnaire is given in Appendix A. The teachers' familiarity with and use of English prosodic features were evaluated through a number of questions enquiring about the aspect(s) of the English language and oral language that they prioritise, the reasons for these choices, and the aspects that they may admit to not mastering so well. Although the method of asking teachers about their own teaching practices may be somewhat biased, it does provide insight into what EFL teachers effectively teach, as well as what they believe to be more important to the teaching and learning of English – whether in accordance with (inter)national recommendations and scientific research or not – and what they feel about the extent of their own knowledge of the English phonological system. The questionnaires were anonymous; 19 teachers from 14 different secondary schools in the North region of France accepted to contribute to the survey, and their teaching experience ranged from 2 years to 26 years. For some of the questions, several answers could be ticked.

First and foremost, the phonological components of English, both at the segmental and suprasegmental levels, turn out to be more neglected than the other aspects such as

grammar and vocabulary. In Question 4, enquiring about the component that the teachers admit to prioritising – bearing in mind that several answers could be ticked by the teachers –, *grammar* and *vocabulary* were chosen more often than *pronunciation* (9 times, 7 times, and 6 times, respectively). *Listening comprehension* was chosen as the most essential element (11 times). In Question 5, out of 7 answers, only 3 teachers considered pronunciation to be less important than the other aspects. Question 6 revealed that the teachers often correct pupils' pronunciation; 9 claimed to do it *systematically*, 7 said *often*, 4 said *occasionally*, and one said *rarely*.

The major tendency that stood out in the questionnaires concerned the place of prosodic features in comparison with the place of individual sounds in the teachers' practices. Questions 7, 8, and 9 revealed that a majority of EFL teachers indeed admit overlooking prosody, favouring segmentals when teaching L2 pronunciation. As for the other teachers' responses on the phonological feature(s) that they admit to neglecting (Questions 7 and 8), *rhythm* was the most selected feature – chosen 11 times –, then *tones* (i.e., intonational contours) – chosen 7 times –, and finally *nuclear accents* – chosen 5 times. The features *lexical stresses*, *consonants*, and *vowels* were chosen only once each. As regards the question on the teachers' lack of mastery of some English phonological features (Question 9), 14 teachers decided to choose an answer among the list, and 12 of them selected a prosodic feature: 3 for *lexical stresses*, 4 for *intonation*, and 5 for *rhythm*. Two teachers selected a segmental feature (i.e., consonants). Two of the teachers who were contacted for the survey did not wish to answer the last questions on the exclusion of some components in their teaching practices and their own lack of knowledge on certain linguistic aspects.

In a similar investigation of 32 teachers' practices through subjective questionnaires, Burgess and Spencer (2000) found that suprasegmentals (stress, rhythm, and intonation) were the most difficult aspects to learn for non-native speakers, but also the most difficult to teach. In our questionnaires presented above, some of the teachers also commented on the difficulty to teach those aspects, while others considered that they did not have so much importance (Question 8); one teacher stated that prosody is better acquired through natural exposure than through theoretical lessons or explicit metalinguistic teaching. In a similar investigation, Moedjito (2008) relied on

questionnaires to and interviews with 37 Indonesian EFL teachers and found that segmentals features are rated more important in pronunciation teaching than suprasegmental features.

All these findings, albeit based on subjective comments and limited samples, seem to suggest that there is still a gap between research in acquisition and didactics, and the proper integration of the growing body of knowledge into teaching methods. The reason for that may lie in language teachers' own training throughout their studies. In France, although the students aspiring to become EFL teachers are theoretically free in their academic choices, most of them study the English language in a Bachelor's degree programme (i.e., *Licence "Langues, Littératures et Civilisations Étrangères"*) which includes linguistic subjects, as well as literature, translation, and history. However, the independence of universities results in a large variety of curricula, depending on the university and the lecturers' and professors' specialisations. While English linguistics and phonetics are typically included in all academic curricula, there is a great amount of variance in the quantity and quality of phonetics and phonology classes; for example, they are present during all six academic semesters of the Bachelor's programme in some universities, but only two semesters in other universities (Capliez, 2015). More importantly, the inter-university variance is found in the contents of different curricula, resulting in some EFL students having a poorer knowledge of suprasegmental features than others if prosody is not sufficiently taught. In order to obtain a position as a secondary education EFL teacher in France, graduate candidates are also required to pass a selective competitive examination – either the *CAPES* (standing for *Certificat d'Aptitude au Professorat de l'Enseignement du Second degré*), or the alleged more difficult and selective *Agrégation*. Although the former examination provides many more positions and is thus the primary method of recruitment of teachers, it surprisingly does not include any phonology or phonetics sections, contrary to the latter which is especially sat by those who aim at higher education teaching.

As is pointed out by many authors, among whom Celce-Murcia, Brinton, and Goodwin (1996), Henry, Bonneau, and Colotte (2007), and Gilner (2008), EFL learners cannot achieve an accurate L2 pronunciation if teachers themselves do not master it or do not have sufficient knowledge of the phonetic and phonological systems of both the

learners' L1 and the target language. More often than not, EFL teachers in France are native French speakers, and the risk that they do not quite master the L2 phonological system and make typical segmental and suprasegmental errors is therefore latently present. However, the oft-confusing and abundant terminology in the field prevents students and (future) teachers from acquiring – thereby, applying and teaching – the concepts themselves (Huart, 1997), and that is especially true of prosodic aspects which tend to be neglected. Even at the segmental level, Hodges (2006) notes that certain French-speaking EFL teachers and professors never acquire some phonemes, and consequently pass an incorrect pronunciation on to their students. Nevertheless, the teacher's role should not be seen as the only source of non-native speakers' errors and difficulties, as is observed by Fraser (2001: 12) on the example of ESL: “the problems migrants face with oral communication are by no means all attributable to teachers’ lack of training”.

Looking at phonetics and phonology in academic curricula in English studies at different universities, the tendency is for segmental aspects to be taught from the outset of the programme, through the introduction of the IPA, phonemes, transcriptions, and graphophonemics, whereas prosodic aspects frequently appear later, through the introduction to lexical stress, then sentence stress, rhythm, and intonation (Capliez, 2015). Although this is not the systematic pattern, the overall late introduction to suprasegmentals in comparison with the place of segmentals can be questioned; does it really enable students and future teachers to assimilate the major role of prosody in communication, foreign-accentedness, intelligibility, and comprehensibility? Since the CEF and recent official recommendations grant segmental and suprasegmental aspects an equal place in EFL teaching practices and materials, teachers and students should be made aware of the role of prosody relative to that of segmentals in order to set up teaching priorities. More and more linguists claim that given the role of English prosody in communication, it should be emphasised in EFL teaching (e.g., Derwing, Munro, & Wiebe, 1998; Herry, 2001; Horgues, 2010).

2.3.3. Should prosody be prioritised?

Some linguists believe that the first step to the learning and teaching of oral English is through segmentals, as is already the case in many teaching materials and academic curricula. Pennock and Vickers (2000) express explicit reservations as to the effective teachability of prosody, given the quantity of rules and exceptions (e.g., in English lexical stress assignment), and they recommend that teachers focus on segmental phonology instead. While acknowledging the importance of prosodic features in speech comprehension, Ur (1984, cited in Yates, 2003: 13) also minimises the usefulness of instruction on prosodic aspects, because "the stress, intonation and rhythm patterns are so varied", arguing in favour of the acquisition of suprasegmentals through natural language exposure rather than explicit rules (cf. our questionnaires to French EFL teachers).

According to Jenkins (1998), the teaching of English as an international language (EIL) should focus on three major aspects that have an impact on intelligibility, among which nuclear accent is regarded as crucial, and yet it is the only suprasegmental feature that deserves explicit instruction, since the others will be acquired through L2 perception. However, there is an increasing number of researchers who claim that priority should be given to prosody. As will be observed in Section 3, segmental errors can often be disambiguated by the context, unlike suprasegmental errors. Hence, Brown (1995) believes that minimal pair drills, which is a typical teaching activity on English segmentals focusing on the different realisations of individual sounds (e.g., *sheep – ship*), is not really useful in comparison with training on suprasegmentals.

According to Herry (2001), Herry-Bénit (2012), and Huart (2002), French EFL learners should be familiarised with English prosody as early as primary school, or the very beginning of L2 learning. More broadly, linguists have argued that EFL teaching to any L1 speakers should prioritise a prosody-oriented instruction over a segmental instruction (e.g., Frodden & McNulty, 1996; Gilbert, 1984; Nakashima, 2006; Wong, 1987). The main reason for putting the teaching of prosodic aspects to the fore is summarised in Firth (1992: 174): "stress, rhythm, and intonation, for example, appear to be far more critical to successful communication than individual sounds". The author further describes the positive impact of L2 suprasegmental teaching on learners'

capacities: "[...] less advanced students appear to benefit more from work on suprasegmentals as such work greatly increases their comprehensibility even when individual segments are mispronounced" (178). McNerney and Mendelsohn (1992: 186) indeed found that prioritising prosody in L2 English teaching not only enables learners to be more comprehensible, but it is also "less frustrating for students because greater change can be effected". The example of lexical stress is mentioned by the authors, who recommend that it be taught as soon as a new polysyllabic word is learnt; for Cruttenden (2008), however, it is not so difficult for learners to acquire that aspect, because monosyllables typically represent more than 80% of the words in an English conversation. Derwing, Thomson, Foote, and Munro (2012) studied five typical difficulties that learners encounter with L2 English – including the perceptions of sentence stress, intonation, and *-teen*/*-ty* number distinctions (e.g., *eighteen* – *eighty*) – and they found a certain amount of effectiveness of the explicit instruction of such features. These findings suggest that incorporating explicit instruction on prosodic aspects may enhance learners' perceptual skills, and the doubts cast on their teachability are still to be empirically supported.

On the basis of the preceding, an important suggestion for L2 pronunciation teaching, as suggested by Stevick (1957), is, among others, to "start big". This implies that the teacher should first focus on pitch, stress, and rhythm, rather than individual sounds, while insisting that spreading work over repeated short sessions is better than fewer longer sessions. Similarly, Firth (1992) refers to the "zoom principle", according to which "global" aspects (i.e., suprasegmentals) should be taught before "local" aspects (i.e., segmentals). Furthermore, Kjellin (1999) draws a parallel with the acquisition of the L1, supporting the claim of the effect of the "start big" recommendation. As such, second and foreign language acquisition should start with the acquisition of suprasegmentals, too, and particularly through speech perception; through imitation, prosodic features are believed to be acquired after allowing at least 50 or 100 repetitions of the model.

Some authors have argued that certain prosodic features should receive more attention than others. Pickering's (2001) investigation with international teaching assistants supports the contribution of intonation to communication and insists that tone

choice should be an area of concern in L2 pronunciation teaching. In the same respect, Atoye's (2005) study suggests that pronunciation teaching should especially include the social dimension of intonation, rather than its mere phonological dimension, which confirms Taylor's (1993) suggestion to assign a major place to the functions of intonation, as well as to nuclear accent, which are often inseparable. In reflecting on L2 pronunciation teaching to late French learners, Diana (2010) defines stress patterns and rhythm as priorities, and he describes nuclear accent as the component to prioritise in intonation teaching. As far as the place of lexical stress is concerned, Field's (2005: 418-419) study reveals that "[it] should be an area of concern for pronunciation teachers, though perhaps not a top priority", and "pronunciation teaching programs should rank lexical stress at a medium level of importance". This supports Cruttenden's (2008) comments that stress is not so difficult to teach and learn, given the number of monosyllabic words in English. By contrast, Hodges's (2006) order of priorities with the teaching of L2 suprasegmental features places word stress first, followed by sentence stress and intonation, before consonants, vowels, and linking. Overall, more research is still needed in order to set up priorities within the teaching of L2 suprasegmentals, as well as that of segmentals.

2.3.4. Towards an integration of research findings into classroom practices

While the acquisition of L2 phonology and phonetics was not linguists' principal interest in the past, the effective needs of L2 teachers have been – and still seem to be – even more neglected, as is pointed out by Fraser (2001: 12):

> Academic research in the discipline of linguistics has until recently not paid much attention to the topic of second language phonology and the process of acquiring the pronunciation of a second language, and even less to the needs of teachers in understanding pronunciation and how to teach it.

Despite a growing body of research in the field of L2 pronunciation over the last years, the reality of L2 pronunciation teaching situations is often forgotten. Kelly (1969: 1) argued that "theoretical findings in the sciences on which the discipline rests" should

govern the approach to any subject. Thus, many authors including Burgess and Spencer (2000), Derwing (2010), Klein (2008), Pica (1994), and Silveira (2002), highlight the importance of an integration of phonology research into language classes and teaching materials, and they recommend a collaboration between researchers and teachers. As was stated in the previous subsection, it is necessary for L2 teachers to compare the phonologies of the L1 and the target language in order to anticipate learners' difficulties and errors (Klein, 1998), which may be different depending on their L1 backgrounds. As far as L2 prosody in particular is concerned, the observation is the same; despite an increasing interest in research on prosody and its importance in acquisition and learning, the various findings are not necessarily (well) integrated into EFL teaching methods (Herry, 2001), particularly so as some teachers still admit not having a sufficient knowledge of prosodic features, as was seen in 2.3.2 above.

According to Munro and Derwing (2006: 520), "research should help teachers set priorities for pronunciation teaching to address these students' needs as efficiently as possible". With the example of intonation, Levis (1999) notes that ESL teaching materials that address the issue of L2 suprasegmentals turn out not to be different from older materials that date back to 30 to 50 years ago, betraying an ignorance of the advances on the role of L2 prosody in communication. In the previous parts of the present section, an overview of studies showing the crucial importance of suprasegmentals in L2 acquisition was presented. Nevertheless, despite the current acknowledged difficulty for learners to acquire these aspects, "it is seldom taught systematically" (Grice & Baumann, 2007: 25). By contrast, Klein (1998: 2) observes that L2 teachers are often directly concerned with SLA research: "In general, foreign language teachers are very interested in SLA research; in fact, a great deal of SLA work is carried out by researchers who have or had practical teaching experience", although that may be true only to a certain extent.

Overall, there is a need for more experimental research into the acquisition of L2 suprasegmentals and segmentals, so as to develop teaching methods and materials. Pointing to the lack of exploration of practical L2 pronunciation teaching by researchers, Couper (2006) conducted a study on the effectiveness of pronunciation teaching; after explicit instruction to immigrants learning English as a second language,

in comparison with an uninstructed group, it was found that the participants made significantly fewer L2 production errors even in the long term. Accordingly, L2 pronunciation teaching can have a positive impact on learners' phonological competence, even though teachers may not believe so, given the lack of observed effectiveness as noted in Kjellin (1999: 374): “It is well known that classroom teaching is not always helpful to give students a high level of competence and performance in a second language”.

Leaving aside foreign-accentedness which especially risks resulting in a mental fatigue of the listener, if studies tend to bring evidence that segmental errors, such as minimal pair confusions, do not really create a hindrance to communication (see Section 3) whereas suprasegmentals are crucial to comprehension, then one may wonder why L2 prosody is still admittedly neglected by teachers and not so deeply explored in teaching materials as recommended by some researchers, and why L2 segmentals frequently constitute the first approach to L2 phonetics and phonology in French academic curricula – designed by scholars in the field –, for students who will become tomorrow's L2 teachers.

2.4. Conclusion

In this section, we have explored the roles of segmental aspects and suprasegmental aspects of language through a review of L1 acquisition and L2 acquisition and teaching. As is noted in Kjellin (1999: 374), L2 learners and teachers should “be inspired by the prosody-based, natural acquisition of a first language to improve teaching methods in second-language and foreign-language education”. However, Archibald (1994) remarks that the process of learning a prosodic system is very different for adults and children. The strong importance of L1 prosody from the outset of our contact with language is bound to have an impact on our capacity to acquire a second or foreign language, regardless of the question of a critical period for language acquisition and the attainability of native-likeness, and the impact will be particularly negative if the L1 and the L2 differ fundamentally in their phonological structures.

According to Busa (2008: 113-114), “interlanguage communication rests on the concept of mutual intelligibility, and pronunciation is one of the main factors

contributing to it". While segmental errors undoubtedly have a negative impact on communication, and both segmental and suprasegmental errors contribute to increasing foreign-accentedness and reducing comprehensibility, "it is not clear whether it is the segmental vs. suprasegmental aspects of L2 speech which are more likely to affect L2 speakers' intelligibility" (Busa, idem: 114). More and more researchers have claimed that focusing on prosodic features can help learners improve their pronunciation and lead to more comprehensible speech, rather than prioritising the realisation of segmental features as is often the case in L2 pronunciation teaching practices and materials. However, Abercrombie (1967) points out that L2 prosodic features are the most difficult to acquire, since among the earliest acquired by infants. Furthermore, the "plastic" prosody of English may be more difficult to acquire than the "non-plastic" prosody of French (Watson, Grabe, & Post, 1998; also see Section 3), which is why French speakers are easily recognisable and sometimes misunderstood when they speak English, despite an accurate production of L2 consonants and vowels. It has therefore been recommended that L2 pronunciation teaching focus on suprasegmentals rather than segmentals in order to help non-native speakers improve their production skills as well as their perception skills (Reed, 2012), although there are not sufficient quantitative data to support this recurrent claim.

If L2 pronunciation and oral English seem to be well-integrated into current school curricula and materials, through the adoption of the Communicative approach and the CEF which emphasise the equal importance of segmental and suprasegmental features, there remains a certain amount of negligence of prosodic features, as confessed by some EFL teachers. An investigation into the role of prosody in comparison with the role of segments in the acquisition and learning of L2 English phonology is required. Although previous studies have attempted to address this question, French learners of English as a foreign language are seldom concerned. That is why our experimental study presented in Section 4 focuses on EFL acquisition by French speakers, and aims at determining whether L2 prosody should indeed be prioritised over individual sounds in the learning process and teaching techniques.

The theoretical framework and the overview of previous studies reviewed in this section have set up the background for our research question and experimental study

investigating the places of segments and prosody in L2 acquisition, learning, and teaching. The next section presents the segmental and suprasegmental differences between English and French and EFL learners' predictable production errors, in order to understand how the L1 interferes in L2 acquisition and to what extent L2 prosodic inaccuracy and L2 segmental inaccuracy affect communication. This theoretical framework will assist us in the creation of test stimuli and teaching materials for our experimental study, presented in Section 4.

3. *FRENCH SPEAKERS AND ORAL ENGLISH*

The segmental and suprasegmental aspects in the acquisition of the phonology of the mother tongue as well as that of a foreign language both have an important role to play. Each language has its own phonological structure, system, and characteristics, which is why it is necessary to go beyond merely claiming that two languages (in our case, English and French) are different and to identify the principle differences which may account for the difficulties encountered by non-native speakers.

After clarifying the terminology that is frequently used in the literature (3.1), this section presents the differences between English and French at the prosodic and segmental levels (3.2). The goal of this section is not to give an exhaustive account of the two systems and of every single possible English pronunciation error by French speakers. Rather, it intends to show how the learners' mother tongue interferes in the production of the segments and prosody of the target language, and how the segmental errors and the prosodic errors differ in their impact on communication, which is itself the ultimate goal of all reasons to learn a language (3.3). This knowledge will amply guide the development of our experimental materials with the elaboration of two English teaching approaches – a segment-based approach and a prosody-based approach (cf. Section 4).

3.1. Definitions and preliminaries

3.1.1. Terminology and disambiguation

The terminology used in the fields of phonetics and phonology is both varied and confusing in the literature, which is why this section opens with some clarifications. First of all, the distinction between *segment* and *suprasegment* – and their corresponding adjectives *segmental* and *suprasegmental* – must be made clear as this work hinges on the dichotomy between these two important aspects of a spoken language.

In speech, segments are grouped in order to form syllables (Carr, 2008) which in turn serve to form words and then sentences. In other words, segments correspond to individual sounds, that is, roughly consonants and vowels (Collins & Mees, 2008) which encompasses phonemes, sounds, and their acoustical representations. As the term suggests, suprasegmental features are the features that are said to have been added to those of individual sounds; they comprise such notions as *stress*, *accent*, *rhythm*, and *intonation*. The terms suprasegment and suprasegmental are often used in the literature as synonyms for *prosody* and *prosodic*. In his glossary of phonology and phonetics, Roach (2009: 69) explains that the former term was originally used by American researchers, while the latter belonged to the British traditional description of language, although both terms are now used generally and have "practically the same meaning". The term intonation is sometimes used as a synonym for prosody or suprasegments (Di Cristo, 2004; Hirst & Di Cristo, 1998). Gilbert (2008) also points out that the term prosody is often used interchangeably with rhythm and is differentiated from intonation, or melody. In this thesis, intonation and rhythm will both be regarded as two suprasegmental features, that is, two components of prosody. In addition, intonation is itself only one component of prosody, just like stress and rhythm, while prosody/suprasegments will be used as more general terms to refer to intonation, rhythm, stress, and accent as a whole, as well as their acoustic cues such as fundamental frequency (abbreviated F0), duration, and intensity.

Although the distinction between segments and suprasegments/prosody seems clear-cut, many segmental phenomena purely result from prosodic phenomena. Brown (1995) points to some features that are often thought to be segmental but are in fact directly

linked to prosody because they are the consequence of the stress pattern of an utterance. Those phenomena include vowel reduction and the schwa /ə/. A strict opposition between the segmental features and the suprasegmental features of a language is consequently not possible, or even desirable, as the two aspects are closely intertwined and interdependent.

Another problem that can be raised as far as suprasegmental features are concerned is the fact that the terminology often depends on the linguistic school. On the one hand, for instance, according to the British school – to which phoneticians P. Roach and A. Cruttenden belong – *intonation* in the description of the English language is one suprasegmental feature that encompasses three related notions called the "three T's" (Halliday, 1967):

1) *Tonality* (also known as *phrasing*, Pierrehumbert & Hirschberg, 1990), or the chunking of speech into units, called *intonation units* or *tone-units* among other designations (Carr, 2008).
2) *Tonicity*, or the placement of the tonic accent/syllable, also called sentence stress (Schmerling, 1976), nucleus or nuclear accent/syllable (Crystal, 1969), in a unit.
3) *Tone*, that is, fall, rise, fall-rise, rise-fall, etc., referring to the pitch movement or melody.

On the other hand, the American school usually uses the word *intonation* where British linguists would simply use *tone*, and that might sometimes lead to confusion. For the American school, tone is restricted to lexical tone which some so-called *tone languages* have, such as Mandarin, in which the pitch movement (e.g., rise or fall) determines the semantic interpretation of a word (e.g., *má* "to bother" vs. *mà* "to scold" in Mandarin). We will not be concerned with lexical tones, and this thesis consistently uses the terms in the British way: the term *tone* will be used to refer to the intonational contours. The word *intonation* will accordingly refer to the notions of tonality, tonicity, and tones as a whole. We will use the term *pitch* movement to refer to an auditory or psychological sensation, the physical correlate of which is fundamental frequency; conversely, the perceptual impression related to F0 is pitch, or melody (Bolinger, 1958).

Intonation is only one component of prosody, which also encompasses stress, accent, and rhythm. While rhythm can easily be defined as a perceptual phenomenon resulting from "the regular placement of beats in speech" (Carr's glossary, 2008), the notions of *stress* and *accent* are often used interchangeably (or even confused), particularly in the description of English, because they are closely intertwined. Both can be defined as "the force of the breath with which a sound or a syllable is pronounced" (Jones, 1922: 110), with the same auditory impressions being a longer syllable, pitch prominence, and loudness. As Cutler (1984) says, stress is a property of the word, whereas accent is a property of the phrase, sentence, or utterance. As recommended by Bolinger (1958), the term *stress* in the description of English will be used to refer to *word stress*, or *lexical stress*, whereas we will mostly use *accent* to refer to what can also be called *nuclear/tonic accent*[2].

All these prosodic notions are interconnected. In the analysis of oral English, one may start from the word level with lexical stress, then go up to the level of the phrase with the multiple lexical stresses forming a specific rhythmic pattern and the attribution of an accent (e.g., nuclear syllable) on an already lexically stressed syllable, and then the level of intonation, grouping the various phrases (intonation units) and aligning a pitch movement (tone) with the start of the nuclear syllable.

3.1.2. Transcription systems

In order to transcribe speech at the segmental level, it is common practice to use the symbols of the International Phonetic Alphabet (IPA), which was created by an association of linguists founded as early as 1886 (Fougeron & Smith, 1999). Other transcription systems exist, such as SAMPA which only includes usual characters that an occidental computer keyboard possesses – this is particularly convenient with some software programmes such as *Praat*[3], where IPA symbols are not available.

The major advantage of IPA is, as its name suggests, that it is international. Thus, any language can be transcribed on a uniform basis allowing for cross-linguistic

2 That is leaving aside the second meaning of "accent", i.e. "a particular way of pronouncing" (Roach, 2009), as can be found when one refers to a "foreign accent" or "an American/Scottish accent".

3 http://www.fon.hum.uva.nl/praat/

comparisons. Furthermore, the possibility of transcribing speech phonemically (i.e., *broad* transcriptions, in slashes) but also phonetically (i.e., *narrow* transcriptions, in square brackets, with more details such as allophones) may allow for a transcription of a non-native production containing both L1 and L2 sounds. This system is therefore particularly adapted for the following subsections dealing with French speakers' production of English. Nevertheless, one must also bear in mind that IPA remains a phonological system, and as such, it fails to accurately represent the actual phonetic realisations of sounds across languages.

Transcribing the prosody of a language may seem more problematic than transcribing the sounds, in that the suprasegmental structure of a language may completely differ from another one (Hirst & Di Cristo, 1998; Vaissière, 2002). Some systems have been developed, although they have been criticised at some point, too. Since English is unquestionably one of the most taught and studied languages in the world, many prosodic transcription systems were created for it and mainly function for it. One of the most famous and used ones is ToBI[4] (standing for "Tones and Breaks Indices"), which is an autosegmental-metrical system initiated in the United States of America with the work of Pierrehumbert (1980). ToBI primarily relies on intonation, showing pitch accents, pauses, and intonational contours, but lexical stresses are not directly represented unless bearing an accent. For example, the letters L and H represent the targets of the movements in fundamental frequency – the acoustic correlate of auditory pitch –, that is, "low" and "high" as levels.

Thus, the above-mentioned dichotomy between the British tradition and the American one concerning terminology (3.1.1 above) also extends to the prosodic transcription systems. In parallel with ToBI, a more British tradition-based transcription system, initially created from IPA (Delais-Roussarie, Post, & Portes, 2006), is often referred to as the *tonetic stress marks system*, or *nuclear tone approach* (Toivanen, 2005), and therefore based on the more typically British analysis of English prosody. Even if it may be criticised for being not so precise or acoustic-based, especially as far as intonational contour alignment is concerned, the system presents the advantage of being in-text. One can directly use it within orthographic texts and segmental

4 http://www.ling.ohio-state.edu/~tobi/

transcriptions, using IPA diacritics (e.g., ˈ for primary lexical stresses and ˌ for secondary lexical stresses; ˊ ˩ ˋ ˥ for high rise, low rise, high fall, low fall, respectively), underlining (usually for nuclear accents), and | and || for minor and major boundaries. In this respect, while ToBI resorts to a "levels analysis" of intonation – the two basic levels being H and L –, this system implies a "contours analysis" instead (Cruttenden, 1997: 38). The interested reader is referred to other works dealing with the issue of transcribing prosody and models of representation of intonation (e.g., Ali, 2010; Delais-Roussarie, Post, & Portes, 2006; Hirst, Di Cristo, & Espesser, 2000).

Following Pierrehumbert's work, ToBI was developed to be adapted to other languages than English, such as German, Italian, Japanese, and Chinese (Hirst, 2004). This had the advantage of offering potentially high inter-transcriber agreement (Wightman, 2002). Nevertheless, this system is not quite as efficient and universal as IPA is for segmental transcriptions (Delais-Roussarie & Yoo, 2011; Toivanen, 2005) and it has been criticised. According to Hirst (2004), the authors of ToBI themselves did not recommend its use for languages other than English, simply because it was originally based on the analysis of American English intonation. Moreover, one of the major drawbacks is that it is hardly used – usable, even – outside specialised linguistic areas, for example for school teaching purposes. According to Delais-Roussarie and Yoo (2011), it is difficult to use it to (phonetically) transcribe the productions of children in the L1 acquisition process or L2 learners.

Despite several attempts, the very fact that there is not one convincing system of transcribing prosody universally, that is, the non-existence or possibility to use a unique prosodic transcription system for all languages, or at least for such geographically close and widely studied languages as French and English, may be a slight hint at our central hypothesis, pointing even now to considerable divergences among the prosodic structures from one language to another, hence the great necessity to become conscious of suprasegmental features when teaching, learning, listening to and speaking a foreign language.

3.2. English and French: two different phonological systems

The aim of this subsection is not to give a thorough account of English phonology, and then the same for French phonology, particularly because this has already been done in previous works; see for example Herry's (2001) or Horgues's (2010) accounts of the English and French prosodic systems. Instead, our objective here is to highlight the differences between the two systems, and to observe the major points of divergence between the two languages so as to contribute to knowing which aspects of phonology – segmental or suprasegmental – are a more significant source of difficulties and errors for French speakers who learn English as a foreign language, and whether prosodic difficulties hinder intelligibility and comprehensibility and increase foreign-accentedness more than segmental difficulties. The current description considers both segmental and suprasegmental features indiscriminately. We do not yet deal with French speakers' difficulties with oral English and their consequences on communication, as that will be the point of the next subsection (3.3).

As Jones (1922: 3) points out, “no two persons of the same nationality pronounce their own language exactly alike. The differences may arise from a variety of causes, such as locality, social surroundings, early influences, or individual peculiarities”. When describing the phonological system of such a language as English, which possesses a wide array of varieties and dialectal divergences throughout the world, one must be careful not to consider the deviations from one specific variety to be incorrect forms. Still, RP and Parisian French will be the references to the English and French phonological systems throughout the section. Although other French varieties are just as widespread, Parisian French is often considered the reference “standard” in many teaching materials and, more widely, in France, where all the participants of our research project come from. In a way, it is a counterpart of RP English in the English-speaking world.

The subsequent overview of the differences between English and French is of great use not only for the next subsection on French speakers' L2 predictable production errors and difficulties, but also for the elaboration of our experiment on the teaching of English phonology to French speakers. The stimuli created for the tests have to take into account the difficulties that French speakers in particular face with oral English. Firth

(1992) insists on the necessity to focus on the type of learner and a contrastive study of the L1 and L2 in order to understand the difficulties and set up priorities in pronunciation syllabi, and possible test contents, as is the case in our central experiment (cf. Section 4).

We will start our description with suprasegmental features of the two languages and continue with their segmental features.

3.2.1. Suprasegmental features

The suprasegmental features of English and French are quite distinct in that their stress and accent systems, rhythmic structures, and intonations differ in fundamental ways, which may become an impediment to communication and L2 acquisition and learning. In speech, stress, rhythm, and intonation are the complementary constituents of the phonological phrase.

The notion of *phonological phrase* as used in the descriptions of languages refers to a prosodic unit which minimally contains a primary accent – in English, it is referred to as the *nuclear/tonic accent*, and in French, it is called the *primary* (or *final*) *stress* (or *accent*). Delais-Roussarie et al. (2015) explain that the *accentual phrase* is one level of phonological phrase in French, because even though the language has no lexical stress, it possesses several types of sentence stresses. While an accentual phrase necessarily contains one primary stress (and optionally a secondary/initial stress, as explained below), that is, a lexical word and all the function words that this word governs (Delais-Roussarie et al., idem), an *intonational phrase* is a larger prosodic unit which can consist of one or several accentual phrases, is characterised by a strong degree of final syllable lengthening, and is usually followed by a longer pause. In the description of English prosody, the phonological phrase, also called the intonation(al) unit, or tone-unit, has a different structure; according to the British analysis, it is structured as follows: [pre-head] [head] [nucleus] [tail] (Wells, 2006). The *nucleus* is the only obligatory part; the *head* starts from the first stressed syllable (called the *onset*); the *pre-head* consists of all the unstressed syllables before the head; the *tail* is all the syllables following the nucleus. More details on the stress and accent systems of English and French, as well as their rhythmic structures and intonation systems, are presented below.

Word-level stress

One of the major differences between French prosody and English prosody lies in their respective use of stress. While lexical stress is a distinctive feature of English, it is not in French; "the notion of (lexical) stress is indeed very elusive for French natives. They only discover the existence of that unnatural and unnecessary complication when they have to learn a foreign language" (Vaissière, 2002: 6).

When learning the stress patterns of English, the non-native speaker is often confronted with numerous rules. Contrary to some *fixed stress* languages where the lexical stress automatically falls on the same syllable in a word, English is a *free stress* language, in that the place of the lexical stress varies (Cruttenden, 2008; Hirst, Di Cristo, & Espesser, 2000). Nonetheless, work by Crystal (1969), Guierre (1979), or Gussenhoven (1984, 1991) have brought to the fore the regular patterns that can be found within the lexical stress system of English. Depending on the origin, structure, or ending of a polysyllabic word, its stressed syllable can be predicted. Many publications, such as Deschamps, Fournier, Duchet, and O'Neil (2004), Fournier (2007), or Ginésy (2001), following Guierre's work on English stress, offer a recapitulation of all the rules and tendencies of lexical stress placement in English polysyllabic words, despite the existence of a number of sub-rules or exceptions. The stressed syllable (marked with the IPA diacritic ˈ) in a great many disyllabic words, for example, is often determined by their grammatical category; as a general rule, nouns and adjectives tend to have lexical stress on the first syllable – *10* pattern, or *paroxytone* –, whereas verbs tend to have lexical stress on the last syllable – *01* pattern, or *oxytone*. The rule makes it possible to distinguish between two members of such pairs as *'record* (noun) – *re'cord* (verb), *'present* (noun or adjective) – *pre'sent* (verb), and *'refuse* (noun) – *re'fuse* (verb), and among *-ate* words like *'palate* (noun), *'private* (adjective) – *cre'ate*, *nar'rate* (verbs), not to mention the segmental changes that are triggered. In the same respect, Chomsky and Halle's (1968) Compound Stress Rule states that lexical stress is assigned to the leftmost stressable vowel in compounds (e.g., *a 'blackbird*). Certain endings are also classified as *stress-imposing* because when added to words, they constrain the place of the lexical stress; such endings include *-io(n)*, *-ee(r/n)*, *-ette*, *-ic(s)*, *-aire*, *-ese*, and *-ity*. By contrast, other suffixes, including the grammatical inflections *-ed* and *-ing*, are classified as

neutral and do not change the already stressed syllable of a word (e.g., *'carry – 'carrying*, *cre'ate – cre'ated*). The reader is referred to the aforementioned works for complete reviews of English stress assignment rules.

Due to an ideal stressed/unstressed syllable alternation to form rhythm and a reluctance to have two consecutive stresses, it is common to assign a *secondary (lexical) stress* to polysyllabic words (marked with the diacritic ˌ). Thus, when an English word has three syllables and the primary (lexical) stress falls on the last syllable (e.g., words ending in *-ese*), a secondary stress will fall on the first syllable (e.g., *ˌJapa'nese*). In other words, secondary stress placement depends on the structure of the word and obeys rhythmic rules; for example, if a stress-imposing ending is added to an English polysyllabic word, that is, already bearing a primary stress, the latter may become a secondary stress if the ending constrains it to shift to another syllable (e.g., *'modify* → *ˌmodifi'cation*). Some disyllabic words can have both a primary stress and a secondary stress if they consist of a stem plus a *real prefix* (i.e., carrying a meaning of its own which modifies the meaning of the original word), such as *pre-* in the sense of "before" and *re-* in the sense of "again" (e.g., *to re-sign*, "to sign again") – as opposed to *false prefixes*, as in *to resign*, "to leave a job". From the acoustic point of view, lexical stress in English has several correlates, among which intensity (i.e., "the greater breath effort and muscular energy for articulation", Collins & Mees, 2008: 124-125), perceived as loudness at the auditory level, pitch variation, and the duration of the stressed vowel (Cruttenden, 2008). Delattre (1966a) indeed found that there is a correlation between vowel intensity variation and syllable length variation in English. This language is therefore referred to as a *stress-accent language* (Beckman, 1986).

In French, a stressed syllable is slightly more intense than an unstressed syllable. As a matter of fact, while English has been said to be a *free stress* language, French belongs to the category of *fixed stress* languages in that stress patterns are more fixed (Vaissière, 2002). However, contrary to other languages of the same type, stress assignment is a different matter in French. Mehler, Bertoncini, Dupoux, and Pallier (1996: 345) refer to it as an *oxytonic* language, because there is consensus that lexical stress is not quite a

characteristic of French prosody; the stress domain is not the word, but the prosodic phrase (Kijak, 2009), comparably to accent in the prosodic structure of English.

Phrase-level stress and final lengthening

Ploquin (2009: 94) observes that "French differs from Latin and other Romance languages in that its stress domain is the phrase rather than the word". Contrary to English where lexical stress has different functions, such as a function of discrimination between nouns and adjectives on the one hand, and verbs on the other hand, "stress"[5] in French does not carry lexical information (Peperkamp & Dupoux, 2002). It does not have a distinctive function (Jun & Fougeron, 2002) and its intensity depends on phrasing, that is, the prosodic unit to which it belongs (Dell, 1984). French has a "fixed primary accent" placed in phrase-final position (Rasier & Hiligsmann, 2007: 51) which marks the right edge of the smallest prosodic unit (i.e., the accentual phrase), the intensity of which is different from the final stress in a larger prosodic unit (i.e., the intonational phrase). Furthermore, although only the vowel in the last syllable of a phrase receives stress, Rose and Wauquier-Gravelines (2007) note that the word-final schwa /ə/ in a polysyllabic word is an exception and will not be stressed, nor will most grammatical words such as articles (Mertens, 1995). Similarly, the pronouns *je* "I" and *ce* "it", both having a schwa as their only vowel, will not be stressed, either, even in phrase-final position (Peperkamp & Dupoux, 2002) – e.g., *Qui suis-je?* /ki sɥiʒ/, "Who am I?"; *Où est-ce?* /u ɛs/, "Where is it?".

Thus, it is the very last syllable of an accentual phrase that will bear the primary stress/accent (Delais-Roussarie et al., 2015), which in fact will mostly be correlated to a lengthening of that syllable (Henry, Bonneau, & Colotte, 2007), meaning longer duration and higher intensity than the non-final syllables of the phrase (Jun & Fougeron, 2002). For Henry et al. (2007: 1595):

> The English lexical accent is strongly marked on an acoustical point of view whereas the French one is relatively weak. In fact the French accent just

5 The use of inverted commas is intentional, albeit not systematically repeated, as the term *stress* is not uncontroversial when describing the prosody of French.

> consists of a lengthening of the last syllable of the word (or the group of words). English lexical accent is characterized by a pitch modification, an increase of intensity and a lengthening of the vocalic nucleus of the stressed syllable.

Acoustically, the correlates of stress are therefore different in English and French, as duration is the principal means to mark final prominence in the latter language (Kijak, 2009).

According to Mertens (1995), final stress in French is the only type of stress that allows for syllable lengthening, particularly as it is the only compulsory one in a prosodic phrase. As is pointed out in Delais-Roussarie, Post, and Portes (2006), there are other types of stresses found in French; *pragmatic accents*, or *secondary stresses* (Delais-Roussarie et al., 2015), through which prominence can be assigned to the beginning of a phrase-initial word, convey emphasis, contrast, or a journalistic style, and more generally serve to reinforce the cohesion of an accentual phrase (Delais-Roussarie et al., idem). Vaissière (1991) notes that some studies revealed that when a phrase-initial word starts with a vowel, a phonetic glottal stop [ʔ] may be added to it, in addition to being stressed; when the phrase-initial word starts with a consonant, the consonant sound can be lengthened (Mertens, 1995). Beyssade, Hemforth, Marandin, and Portes (2010: 121-122) studied the way in which the "nuclear pitch accent" (NPA) and "intonational highlighting" (IH) are both used to set off a phrase in French. In the cases of answers to questions, particularly, the authors explain:

> NPA placement marks the part of content that is specifically asserted, which counts for the new content with respect to the working of assertion. In that respect, placement of NPA is the primary way of marking what is new in answers, and more generally in assertions. On the other hand, IH sets off a phrase for any semantic or pragmatic reason. It may be used to mark a phrase that resolves the question –thus cueing the semantic relation between questions and answers–, but also a phrase endowed with any other discourse role, in particular a role in the generation of the discourse topic.

In Dubĕda's (2002, cited in Astésano, 2001) words, phonological phrases that contain both types of stresses (initial and final) are referred to as *biaccentual* groups. However, through the study of the stress units in a corpus of spoken French, the author found that only 10% are biaccentual; in 90% of the cases, only final stress is found. Astésano's (2001) investigation of three different types of French speech genres, that is, read speech, radio news, and interview, confirms the presence of a non-emphatic initial accent, but acoustic measurements showed that initial stresses and final stresses do not have the same length, as words with initial accents have longer onsets than rhymes, and conversely for words with final accents.

Similarly to French stress at the phrase level, and in contrast to lexical stress, English nuclear/tonic accent can basically be assigned to any syllable in any word of a phonological phrase, because it enables the speaker to convey major information. Chomsky and Halle's (1968) Nuclear Stress Rule states that, in unmarked patterns, the rightmost stressable vowel will bear the nucleus, which will be the only one in the phrase. For example, in the sentence *My 'name is 'John*, the noun *name*, as a content word, will receive a lexical stress, but it is the last lexically stressed element *John* that will bear the nuclear accent. However, the rule fails to predict the place of the accent in many other common contexts (Ladd, 1983; Selkirk, 1995). Particularly, some seemingly unmarked utterances can have leftward nuclear accent assignment, as in *The 'phone's 'ringing*. In such occurrences, called *event sentences* (Wells, 2006), the phonological phrase is sometimes regarded as a whole meaningful unit in which the event is largely predictable from the subject, although exceptions exist (e.g., *Your 'uncle 'died*). Other examples of leftward nucleus placement include sentences such as *I've 'got 'books to 'read*; once again, the nucleus placement is due to the predictability (Bolinger, 1972).

The English prosodic structure makes it possible for a speaker to assign the nuclear accent to any syllable other than the leftmost or rightmost stressed one in a phonological phrase, in keeping with the message that he/she intends to convey. Bolinger's (1972) well-known work points out that it is rather challenging to set up rules and predict the location of the nucleus, unless you are a “mind-reader”. Tonicity does not depend on syntax, and even though it is true that unmarked utterances will display regular accentual patterns, assigning a nuclear syllable will completely depend on the individual

speaker, the context, and the conversation that he/she is having. The dichotomy between new information and old information in speech is therefore crucial to understand how a speaker assigns the nucleus in a phonological phrase. In fact, the very use of accent in English, as well as in other languages, is to present a piece of information as new; that is reminiscent of the aforementioned Nuclear Stress Rule, as in speech the *topic* – or *theme* – is normally placed first, and then the *focus* – or *rheme* – is put towards the end of the utterance. Thus, in a conversation where a person says to another, *Would you 'like some 'coffee?*, with the rightmost noun *coffee* bearing the nucleus on its lexically stressed syllable and conveying the principal new piece of information, the response could be *I 'hate 'coffee*, with *hate* being the nuclear syllable because *coffee* is no longer a new piece of information in the utterance (also see Herment-Dujardin, 2001). Similar instances comprise contrastive tonicity and emphasis, the principle of which is similar in English and French; as such, albeit not common in unmarked speech (see below on rhythm), even a grammatical word such as a preposition, or a secondarily stressed prefix, can bear the nuclear syllable (e.g., *'Throw the 'ball 'to me / 'not 'at me*; *I'm 'talking a,bout 'immi,gration / 'not 'emmi,gration*).

As is specified in Cutler (1984: 86), accent in English "communicates information structure […] – focus or contrast", but other devices are also used to express focus, among which clefting, pseudo-clefting, and topicalisation. The author also notes that "their use is, however, comparatively rare". As previously mentioned, the English language usually relies on the de-accenting of the rightmost lexically stressed element and nuclear accent shifting. In French, by contrast, the de-accenting of phrase-final elements is virtually impossible, and the accent assignment to the rightmost syllable occurs "[independently] of the news value of the words in the utterance" (Rasier & Hiligsmann, 2007: 51). It appears that what Cutler considers "rare" syntactic devices for expressing focus in English, is one of the preferred processes in French, just as topicalisation will particularly be expressed by dislocation (Cutler, Oahan & Donselaar, 1997); Vaissière (2002: 11) refers to "morpho-syntactically marked focus". Accordingly, while English uses contrastive tonicity to highlight the subject in a sentence such as *'I*

'did it!, French will also commonly use a cleft construction, *C'est moi qui l'ai fait!* “It is I who did it!”, not affecting normal final lengthening or secondary stress.

The different ways in which English and French use prosodic markers to convey information in speech can be defined in Vallduvi's (1991) terms; most Germanic languages, including English, are said to display *plastic accentuation*, whereas French, like most other Romance languages, have *non-plastic accentuation*. This idea summarises how flexible the prosodic structure of English is, where the prosodic structure of French is rather fixed.

Rhythmic structures

The way English stresses and accents are organised to form the rhythmic structure of the language is different from French, and these divergences are at the origin of the perceived difference in melody between the two languages.

In Cummins and Port's (1998: 145) words, “rhythm in speech is interpreted as the hierarchical organization of temporally coordinated prosodic units”. In the speech chain, grammatical words, such as pronouns, articles, prepositions, and conjunctions, are normally not stressed in default patterns – that is, excluding the above-mentioned cases of contrastive or emphatic tonicity –, because they only function as tools that contribute to the structuring of an utterance. Only content words are stressed because they convey the important meaning of a message: nouns, verbs, adjectives, and adverbs, as well as some other categories (e.g., quantifiers and question words). The typical music of oral English, and its perceived different pattern compared with French, is the result of its rhythmic structure, which is based on “the manner in which stressed and unstressed syllables succeed each other” (Abercrombie, 1967: 36). An English word contains a lexically stressed syllable, and some rules make it possible to predict where the stress will fall when the word is polysyllabic. In the case of polysyllabic grammatical words, where a stress is still necessary, only a secondary stress will be assigned. Some exceptions can be found, for example when a preposition significantly completes the meaning of a verb; in *Are you 'coming 'with us?*, the preposition is crucial to the whole meaning of the verb group *come with* as “to accompany”.

In the analysis of English rhythm, some models have emerged (e.g., Abercrombie's and Jassem's models; also see Bouzon, 2004 and Gussenhoven, 1991), trying to reveal the regularity of the units of rhythm alternating stressed and unstressed syllables; such a unit containing one lexically stressed syllable (i.e., the *ictus*) and succeeding unstressed syllables (i.e., the *remiss*) is referred to as a *foot* (Abercrombie, 1967; Halliday, 1967) and is the smallest prosodic unit. The ideal pattern of an English foot is a strict alternation between one stressed syllable and one or two unstressed syllables; that is the principle of rhythmic alternation (Liberman & Prince, 1977). Celce-Murcia, Brinton, and Goodwin (1996) note that the rhythmic beats formed by the stressed syllables of an utterance are sometimes separated by quite a number of unstressed syllables; Ladefoged (2001: 98) says in this respect: "as a general rule, English tries to avoid having stresses too close together. Very often, stresses on alternate words are dropped in sentences where they would otherwise come too near one another". This confirms that, albeit regular on the surface, the English rhythm remains fairly flexible, and stresses may be shifted to avoid stress clash and allow for a more regular pattern (Liberman & Prince, 1977). For example, in *ˌJapa'nese*, the primary stress on the last syllable and the secondary stress on the first syllable can be switched if the word is directly followed by another primary stress, so as to avoid stress class (e.g., *'Japaˌnese 'cars*).

As is noted in Hayes (1984), one striking difference between the English rhythmic structure, based on the succession of more or less regular feet, and the French rhythmic structure is the impossibility in the latter to have adjacent stresses. In keeping with what was explained above, it is larger rhythmic units, corresponding to phonological phrases as previously described, containing final syllable lengthening that characterise French rhythm (Wenk & Wioland, 1982). Furthermore, a primary accent is only placed if it prevents a succession of seven unaccented syllables (Wioland, 1985, cited in Martin, 2006). Therefore, the vowel reduction phenomenon, resulting from the unstressed quality of some syllables in a phonological unit, is more habitual in English.

Intonation

Accents and nuclear syllables in phonological phrases are closely related to and dependent on intonation; hence Halliday's "three T's" of the analysis of English intonation include tonicity. This subsection focuses on tonality, that is, the chunking of speech into units, and tones, or intonational contours, in English and French.

Regarding the chunking of speech, Cruttenden (1997) points out that intonation units are usually longer in English than in French (i.e., they are claimed to be limited to seven unstressed syllables), the latter lacking accent mobility and therefore needing more units to express focus. In this respect, the terminology is important; while an English intonation unit consists of a nuclear accent and optional word and sentence stresses, a French intonational phrase consists of one or several accentual phrases that each contain one primary stress (cf. Delais-Roussarie et al., 2015). In both French and English, short and long pauses serve to mark minor and major boundaries between units. Very often, but not exclusively, pauses coincide with punctuation; for example in English, commas are usually aligned with a minor boundary (transcribed |) and full stops correspond to major boundaries (||). Vaissière (1983) thus affirms that in the two languages, pauses within sentences are shorter than pauses between sentences, and there is lengthening of word-final syllables. The author also claims:

> In English, the acoustic correlates of word boundaries are only traces: marking of word boundaries competes with lexical stress marking, and priority is given to the latter. For example, the longest syllable in the word is generally the stressed syllable, despite a lengthening of the word-final syllable. In French, the marking of word boundaries is not in competition with stress marking: the lengthening of final syllables is "reinforced". The differences between these two originally related languages may be considered a historically different choice of which feature to assign priority: stress or boundary. (64)

In keeping with the description of French rhythm and accent system, Cruttenden (2008) also notes that the lengthening of the phrase-final syllable is an alternative to pauses.

As far as intonational contours are concerned, there are differences of intonation among different accents of an individual language such as English (Hirst, 1998). For example, the fall-rise – symbolised ↘↗ – is common in polite questions in British English, whereas it might sound "imperious" or "condescending" in American English (Grice, Ladd, & Arvaniti, 2000: 170; Ladd, 1996: 122-123). In this respect, with the example of read sentences, Brazil (1984) contends that two speakers of a language are likely to make different choices of intonation. Consequently, there is a certain amount of inter-speaker variation not only regarding nucleus placement, but when it comes to tone choices. That is also why native speakers who listen to non-native speech might perceive it differently and consider its degree of foreign-accentedness in different ways; in the experimental study described later on in the present thesis, the selection of native listeners who evaluated the L2 productions was partly based taking those factors into consideration.

On the whole, there are two basic tones: the rise (↗) and the fall (↘); in Brazil's (1984) words, the former is called the *referring* tone, and the latter is called the *proclaiming* tone. According to the British analysis of English intonation and tones, including the work of Cruttenden and Roach, several combinations are possible and result in other tones, such as the already-mentioned fall-rise (↘↗), the rise-fall (↗↘), as well as different levels for the basic tones (i.e., high rise vs. low rise, high fall vs. low fall, etc.). The book by Wells (2006) provides a complete review of the tones and their meanings. By and large, the proclaiming fall will, as its name suggests, serve to assert something and it therefore characterises certainty in one's utterance, and sometimes seriousness. By contrast, the rise will mean uncertainty and incompleteness, but also friendliness. That is why a standard declarative sentence often involves a fall, although in practice a rise will often be heard in everyday conversations in order to sound friendly or not to shock the interlocutor. In the case of questions, the default pattern for *wh-* questions – also called open-ended questions – is a falling contour, whereas *yes-no* questions – also called closed-ended questions – are realised with a rising contour (e.g., Ballier, Delais-Roussarie, Herment, & Tortel, 2014).

French intonational contours differ from those of English, although not quite enormously; generally speaking, the rise and the fall are the two basic tones. Similarly to English, Marandin et al. (2004: 1) explain that a French declarative sentence will have a falling contour, since it is assertive in the sense that it "denotes a proposition whose uttering commits the speaker for current purposes and compels the addressee to accept it". The fall signals that the speaker does not anticipate any revision from themselves or the addressee, the utterance being taken for granted (Marandin et al., idem). On the contrary, the non-falling contour implies that the speaker "anticipates a revision" of the utterance (idem: 17). As a result, French questions, especially closed-ended questions, will usually have a rising contour, although falls will also be used (Ballier et al., 2014).

Delattre (1961) compared the intonational contours of French and English by analysing spontaneous speech from two female native speakers. His analyses confirm the meaning of finality of falls in both languages but reveal that the final fall systematically starts with the last stressed syllable in English, unlike French where the contour can be spread over more syllables or words, even outside the primary/final accent. The major difference between English and French intonational contours lies in the presence of a *continuation rise* which is particularly pervasive in the description of French intonation. Portes, Bertrand, and Espesser (2007: 160) account for the continuation in French by ascribing it a "discourse value"; it is a subtype of rising contour which links together different parts of speech, that phenomenon being also referred to as "clause chaining". There are two types of continuation rises: the non-final minor continuation rise (i.e., followed by |), which links smaller units, and the final – or focal/major – continuation rise (i.e., followed by ||), "giving the instruction to suspend the interpretation until the following phrase at least is completed" (Portes et al., idem: 161). In a way, the latter type is sometimes reminiscent of the use of the fall-rise – or in some cases, the rise – in English, which signals, too, that "the speaker has not reached the end of what he or she wants to say" and that "the clause, phrase or word that bears it is part of a larger structure" (Wells, 2006: 27). This is a similar example for French and English:

(1) English:

A: *Did you like the film?* ↗

B: *Yes ...* ↘↗ (or ↗)

(2) French:

A: *Tu as aimé le film?* ↗

B: *Oui ...* ↗

In these two examples, the rise or fall-rise on the words *yes* and *oui* are implicational in the sense that the speaker's opinion about the film is not so explicit, and he or she probably intends to add something (i.e., *Yes, but ...*), although he or she might not dare to.

Delattre (1966b) observes that the contrast between minor continuation and major continuation in French is much clearer than in English, where it is still difficult to observe. He gives the following example in order to highlight the specific functions of continuation rises:

(1) Il a demandé || qui parlait | à Marie.

(2) Il a demandé | qui parlait || à Marie.

In (1), the meaning is "he asked who was talking to Marie". In (2), the meaning is "he asked Marie who was talking", and a change in word order is possible and would preclude ambiguity (*Il a demandé à Marie qui parlait*); in ambiguous cases such as this one, due to the more flexible syntactic structure of French, the different continuation rises, together with proper grouping, allow the addressee to understand the message properly. Nonetheless, Horgues (2010) notes that even though the minor/major continuation rise dichotomy is necessary and useful for such syntactic disambiguation, it is not quite certain that it will be of particular efficacy in rapid spontaneous conversation.

As a conclusion, the principal uses of falls and rises are similar in English and French, particularly regarding declarative sentences and questions. Even so, contours in French tend to be spanned over more syllables than in English; according to Kimayama and Shinohara (2010), the fall of a French affirmative sentence will normally extend to

the last three syllables. In English, the change in pitch coincides with the nuclear syllable even if the very last syllable of the unit is the accented one (Delattre, 1961). Moreover, although a rise will serve to mark continuation in both languages, it is also used in English to mark a stressed syllable, and in French to mark the beginning of a word (Vaissière, 1991). On the whole, those differences are due to the numerous divergences in the stress, accent, and rhythmic systems of English and French, hence the strong interdependence of all prosodic features of a language. The creation of the experimental materials of our central study, presented in Section 4, was based on the various divergences between English and French suprasegmental structures, which have also illustrated our claim on the major role of prosody in L2 acquisition.

3.2.2. Syllable- and stress-timing theory

The rhythm of English relies on the occurrence of regular rhythmic beats, perceived by the lexical stresses in a prosodic unit. As is pointed out in Finch and Ortiz Lara (1982: 113), sentences such as *'First 'Mike 'took 'John's 'book 'back*, where all the words are lexically stressed, are possible, but "this pattern constitutes the exception rather than the norm". The definition of the English foot, previously given, indicates that an alternation between a stressed syllable and an unstressed syllable is the ideal rhythmic pattern, which is not the case in French, the accentual pattern of which is different and does not rely on lexical stresses; instead, it should be studied from the level of the phrase, not the word. Such inter-language variations led researchers to develop a rhythmic classification of languages, independently of their linguistic families. Pike (1945), and then Abercrombie (1967) and Halliday (1967), developed the idea of a dichotomy between *stress-timed* languages and *syllable-timed* languages (also see Ramus, 1999a). According to Lloyd James (1940), stress-timing was originally referred to as *morse-code rhythm*, whereas syllable-timing was metaphorically called *machine-gun rhythm.* This classification includes a third type of rhythm, called *mora-timed*, as is the case for Japanese, but this is not relevant to our purposes and comparison of French and English.

On the one hand, stress-timing refers to the principle according to which the rhythm of a language is formed by the regular occurrence of stresses. In Auer's (1993) words, stress-timed languages tend to keep the duration of the foot constant, and non-stressed

syllables are reduced. On the other hand, syllable-timing implies that the syllables in an utterance form the rhythm and syllable duration is kept constant; such features are responsible for the fact that assimilation of place of articulation is not as frequent – although existent – in syllable-timed languages (Auer, idem). An example of regressive assimilation in English is the change from an alveolar nasal [n] to a bilabial nasal [m] under the influence of the following bilabial plosive [p] in the word *input*, which is sometimes incorrectly spelt **imput* by some people.

Typically, English is the example given for the stress-timed rhythm category. Similarly, French has often been cited as a typical syllable-timed language, albeit not uncontroversially in that its phonemic inventory contains a schwa – typical of vowel reduction – which occurs in non-accented position (Auer, idem). The distinction between stress-timing and syllable-timing does not only imply that stresses or syllables occur at regular intervals. The principle of *isochrony* is closely associated with that of rhythmic categories, because it adds a specific element to the basic definitions. For Bouzon and Hirst (2004: 1), isochrony is "the organisation of speech into portions perceived as being of equal or equivalent duration". Thus, in stress-timed languages, the feet, consisting of a stressed syllable and unstressed syllables as previously explained, are said to have equal duration, making the stresses occur at regular interval. As for syllable-timed languages, the syllables are believed to have a relatively equal duration in a prosodic unit. Bouzon and Hirst specify that there are two possible interpretations of the isochrony hypothesis; the strict isochrony interpretation states that the elements of the unit have *exactly* the same duration, and weak isochrony implies that there is only a *tendency* to equal duration, or simply *perceived* isochrony. The issue is also mentioned in Ramus (1999b), who notes that in all cases, the isochrony hypothesis has never been empirically validated. The weak isochrony hypothesis suggests that it is difficult to affirm that stress intervals or syllables have strictly the same duration in, respectively, stress-timed languages and syllable-timed languages. Over the last decades, numerous experiments were conducted in order to bring evidence of isochrony, and more generally of the strict distinction between stress-timing and syllable-timing. Overall, the validity of the isochrony principle has largely been put into question, and the various findings of previous studies range from total validation to total rejection (Jassem, Hill,

& Witten, 1984). Roach (1982), for one, conducted an experiment on six different languages, among which three were typically associated with syllable-timing (including French), and three stress-timing (including English). Based on the measurement of time intervals, the basic idea that syllable length is more variable in stress-timed languages and regular stress beats do not occur in syllable-timed languages was not confirmed. Roach concludes that the rhythmic classification of the studied languages finds no support and that the whole principle is auditory and subjective more than acoustic. Similarly, Wenk and Wioland (1982) examined French rhythm and found no isochrony in syllables, putting into question the idea that French belongs to the category of syllable-timed languages. The measurements by Ramus, Nespor, and Mehler (1999), by contrast, seem to support the principle of discrimination of languages according to their rhythmic classes.

Bertran (1999) raises the problem that among the numerous experiments in the literature, there is a regrettable lack of coherence as regards the corpus that is used; some studies analysed spontaneous speech, while some others studied read speech. In his experiment, he measured the absolute duration of feet in several languages, and found that French syllabic duration was not uniform, nor did English rhythm fit either of the two rhythmic classes. The author concludes:

> On the basis of the data presented, it follows that languages considered stress-timed, and others considered syllable-timed give a rather similar response to the three tests, with results that openly contradict the typological models they are supposed to represent. There is no compensation at all to balance the duration of the units composed of different numbers of elements. On the contrary, the rhythmic units not only demonstrate a strong temporal inequality, but even certain parallels with their morphological inequality, a phenomenon which is the antithesis of both rhythmic types. (125)

Through measurements of the duration of vowels and the intervals between them, rather than measurements of inter-stress intervals or syllable durations, Grabe and Low (2002)

only found weak support to the stress-timing vs. syllable-timing dichotomy, and particularly a significant amount of overlap between the rhythmic classes.

Following the various unsuccessful attempts at bringing firm support to the stress-timing and syllable-timing theory, even less to the isochrony principle, several linguists have argued that it is neither possible, nor necessary to make languages fit into one of the rhythmic categories. Although further research is still required, Ladefoged (2001) suggests that it may be better to classify languages according to their having variable word stress (e.g., English), fixed word stress (e.g., Polish), or fixed phrase stress (e.g., French). Dauer (1983) compared data in several languages, including English (but not French); while her study constitutes further evidence that inter-stress intervals in English are not isochronous, in the same manner as many other so-called syllable-timed languages, the author notes that the regular occurrence of stresses appears to be language-universal and that syllable structure, relative vocalic reduction, and the phonetic realisation of stress are responsible for the perception of stress-timed and syllable-timed rhythm. As a result, she established a universal scale, ranging from *maximally stress-timed* to *maximally syllable-timed*, and languages should be placed along this continuum, with no strict categorical separation between stress-timing and syllable-timing.

All in all, isochrony appears to be more apparent than real, given the lack of acoustic evidence and despite the auditory impression (Roach, 1982). Although it has been studied on numerous occasions and still is popular in recent studies, the rhythmic classification finds no strong support, and no consensus exists. Nevertheless, the stress-timing vs. syllable-timing dichotomy allows for a better understanding of how English and French differ; as far as the acquisition of oral English by French speakers is concerned, the stress-timing and (weak) isochrony phenomena (even if only perceptual or subjective) constitute a relevant insight into the major differences between the French and English phonological systems and the difficulties that French EFL learners encounter. In order to improve their L2 production and perception abilities, learners may benefit from being made aware of the existence of the dichotomy and should bear it in mind when learning and producing the target language.

3.2.3. Segmental features

This subsection draws a (non-exhaustive) parallel between the phonemic inventories of English and French, but also the phonetic realisations of some sounds, because the mere reliance on IPA symbols, which are based on phonological representations rather than phonetic realisations, may be misleading in analysing cross-language differences. This knowledge guides the development of our experimental materials, detailed in Section 4.

Vowel sounds

When analysing the vowel inventories of two languages, differences are first observed at the phonemic and articulatory levels. In the case of English and French, the primary difference is the presence of the lax vs. tense distinction in the former language, and its absence in the latter. In fact, English contains *lax vowels* – sometimes wrongly referred to as short vowels – and *tense vowels* – informally referred to as long vowels. While lax and tense vowels both contain *monophthongs*, sometimes called *pure vowels*, tense vowels also comprise *diphthongs*. Very often, an orthographic vowel has both a corresponding lax value and tense value; for example, the basic lax value of the letter <a> is /æ/, and its basic tense value is /eɪ/. In some varieties of English, particularly RP, an *r*-coloured version of a vowel occurs when the lax or tense vowel is followed by <r>; for example, in the case of <a>, the r-coloured lax value is /ɑ:/, and its r-coloured tense value is /eə/. As regards the French vowel inventory, there is no such lax/tense distinction, as the language only contains stable vowels. The two figures below represent the vowel charts of English (Figure 2) and French (Figure 3):

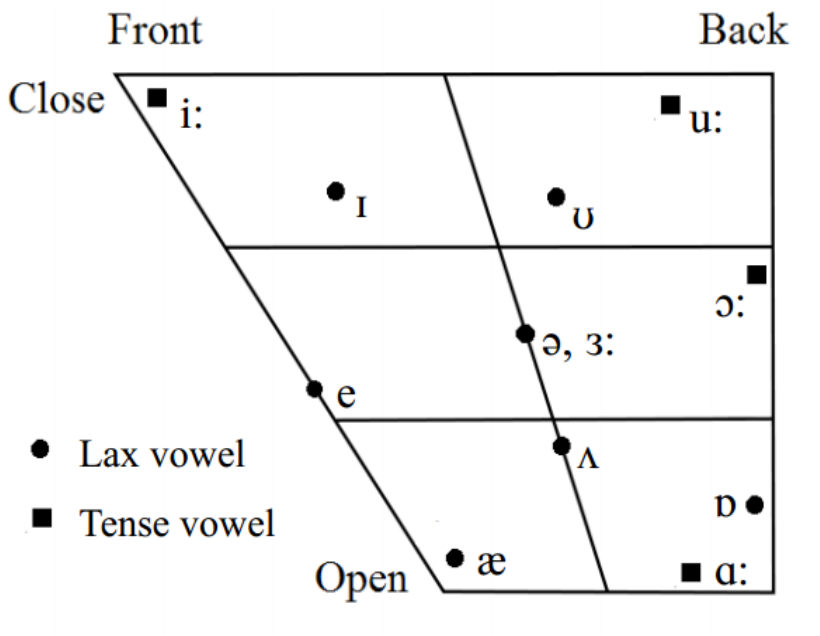

Figure 2. English monophthongs[6]

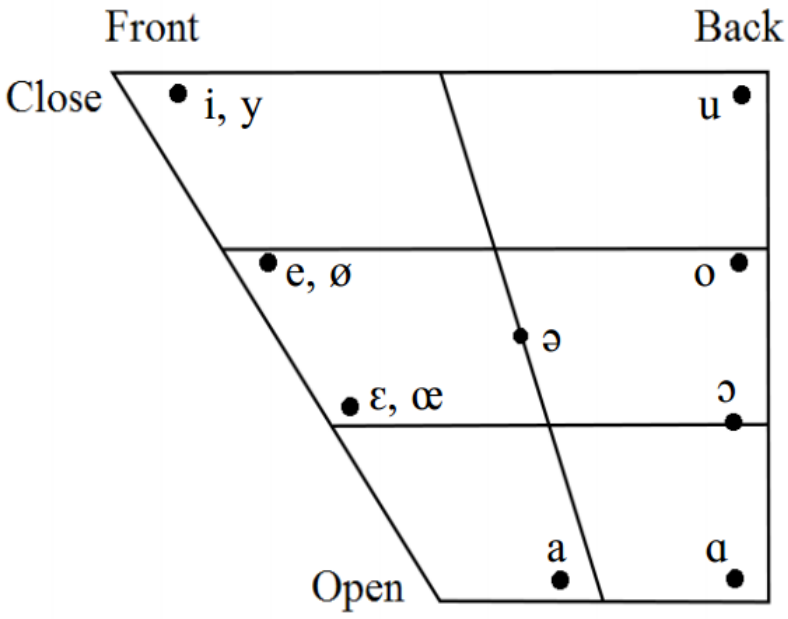

Figure 3. French oral vowels[7]

Figure 2 presents the English lax and tense monophthongs. There are seven lax vowels and five tense vowels; at the phonemic level, the diacritic /:/ indicates the tense value

6 Created from Roach (2009).
7 Created from Deschamps et al. (2004) and Fougeron and Smith (1999).

(although, phonetically, such a vowel is not systematically longer), and therefore a movement which is not represented in the figure. The English language also has diphthongs which are categorised as tense vowels; they consist of a glide from one vowel sound to another, so as to form a new individual sound. The category comprises the following five basic phonemes, called *closing diphthongs* because there is a glide towards the closer/higher vowels /ɪ/ and /ʊ/ (Deschamps et al., 2004): /aɪ, aʊ, eɪ, əʊ, ɔɪ/. In some varieties of English including RP, three *centring diphthongs* – called so because there is a glide towards the central vowel /ə/ – are also found: /ɪə, eə, ʊə/. However, those sounds, normally occurring in non-rhotic contexts when an orthographic <r> follows, are absent from many other English varieties such as General American (GA), and are even prone to changes within British varieties; for example, /eə/ tends to be pronounced like a monophthong [e:] (Cruttenden, 2008). In the same light, some tense monophthongs are frequently produced as diphthongs, particularly /i:/ becomes [ɪi], and /u:/ becomes [ʊu] (Roach, 2009: 20). That is why it is important to bear in mind both the existence of many different accents of English, and the constant evolution of the language when analysing its phonological system.

As is shown in Figure 3, French has twelve vowels. Georgeton et al.'s (2012) analyses confirm the relative stability of French oral vowels, characterising all of them as tense. Like English, changes have occurred over the years; the phoneme /ɑ/, usually contrasted with /a/ (e.g., *pâte* /pɑt/ "pasta" vs. *patte* /pat/ "paw"), tends to disappear, and already has in some varieties of French. The figure also shows that some vowels have exactly the same place of articulation (i.e., aperture: close vs. open, and tongue retraction: front vs. back), and only differ in manner of articulation (i.e., lip rounding: rounded vs. unrounded); two members of such pairs are separated by a comma in the chart, and the vowel on the left is unrounded, whereas the one on the right is rounded. Contrasted with some oral vowels presented above, French also has four nasal vowels which differ from their oral counterparts in the way air is expelled from the body: /ɑ̃, ɔ̃,

ɛ̃, œ̃/, although /œ̃/ tends to disappear and is replaced by /ɛ̃/ in some varieties of French from France (Durand & Lynche, 2004).

The comparison of English and French shows that the two vowel inventories have little in common, especially because, as is pointed out in Delais-Roussarie, Post, and Portes (2006), vowel "length" (i.e., the lax/tense opposition) is not phonemic in French. Similarly, while nasal vowels are phonemic in French, they only occur phonetically in some varieties of English. Despite the use of the same orthographic letters, there is no correspondence of the vowel sounds between the two languages. Furthermore, the diphthongs, which are characteristic of English, are absent in French. The only equivalent that one may find – although inaccurate when realised in L2 speech – is a sequence of a vowel sound followed by a semi-vowel – i.e., [j] or [w] –, respectively approaching the English closing diphthongs ending in /ɪ/ and /ʊ/ (Herry-Bénit, 2011). However, as will be explained in the next subsection on interference and L2 production errors, those approximations differ acoustically. By contrast, the vowel charts of the two languages often present the same phonemes. Vaissière (2011: 58) points out:

> When the IPA was created, an acoustic analysis of the vowels could not be performed: acoustic phonetics really began with the invention of the sound spectrograph in the 1940s, and it developed from the early 1950s onwards.

The fact that a unique phoneme is used in the descriptions of different languages does not mean that the two sounds are produced in the same manner, or are acoustically the same, because IPA symbols are far from phonetic realisations. Looking at the acoustic characteristics of vowels makes it possible to understand how two similar yet different sounds are phonetically produced in different languages, even though a unique phoneme is used at the phonological level. Thus, the vowel charts of English and French occasionally present the same IPA symbols, but their mere positions in the charts differ because they do not correspond to the same phonetic realisations; that is the case of the phonemes /i/, /u/, /ɔ/, /ɑ/, and more noticeably /e/. For the first four of them, we can mention their displaying features of diphthongs in English, not in French, as was said

above. All these phonemes thus show the limitations of IPA. If we look at the formant values of vowel sounds in English and French as obtained from analyses of native speakers' read and spontaneous speech by Cruttenden (2008) and Wells (1962) for English, and Georgeton et al. (2012), Gendrot and Adda-Decker (2005), and Meunier (2007) for French, we obtain the following comparative table:

VOWEL	FORMANT	ENGLISH	FRENCH
i	F1	280-320 (300)	280-350 (308)
	F2	2200-2700 (2300)	2050-2585 (2064)
u	F1	300-330 (300)	290-400 (315)
	F2	940-1400 (940)	764-1150 (764)
ɔ	F1	430-450 (450)	530-630 (531)
	F2	640-800 (740)	998-1350 (998)
e	F1	560-650 (570)	350-423 (365)
	F2	1800-2300 (1970)	1961-2553 (1961)

Table 1. Formant values of some English and French vowels (in Hertz)

In this table, the F1 and F2 values in Hertz (Hz) were provided in the aforementioned works as corresponding to the phonetic realisations of /i, u, ɔ, e/ in the two languages, even though once again IPA symbols should not be regarded as phonetic equivalences. The values in brackets are general means, from Wells (1962) for English and Tubach (1989, cited in Meunier, 2007) for French. Although the formant frequency ranges and means of some sounds are quite similar in English and French, the gap is considerable in the case of the F1 (i.e., correlated with the degree of aperture), in the realisations of [ɔ] and [e], and the F2 of the phonetic realisations of [ɔ] (i.e., correlated with tongue retraction). Also, if one looks at the formant frequencies of the French vowel sound [ɛ] – F1 = 526-660 Hz (mean = 530), F2 = 1718-2306 Hz (mean = 1718) –, it appears that the actual sound is closer to the acoustic characteristics of the English sound as represented by [e] than the French sound usually transcribed [e] is, and that difference also shows in Figures 2 and 3 above, with the positions of the corresponding symbols betraying the very limitations of the IPA symbols.

As a consequence, the study of the phonemic inventories of English and French is not sufficient, nor is it totally reliable, to account for differences and similarities. In the same way, even though English vowels are sometimes categorised as short (for lax) and long (for tense), the dichotomy between the two types of vowels does not acoustically rely on duration (Durand, 2005). In fact, a lax vowel is frequently longer than a tense vowel, depending on the phenomenon of *pre-fortis clipping* – *fortis* referring to voiceless consonants, in that more force is necessary to produce them, as opposed to *lenis*, that is, voiced consonants. English vowel length is therefore variable, which is why the use of the diacritic /:/ in phonemic transcriptions of tense vowels should not systematically occur in phonetic transcriptions based on acoustic measurements. Instead, the diacritic is either removed, or replaced by [ˈ] in the case of tense monophthongs, or the diacritic [˘] is added above the phonetic symbol in the case of lax monophthongs and diphthongs (Roach, 2009), because the physical duration of the vowel will depend on what immediately follows it; if it is followed by a fortis consonant, the vowel will be considerably shorter than if it is followed by a lenis, itself being slightly shorter than if the vowel is in final position. As a result, the vowel [eɪ] is phonetically longest in the word *May* [meɪː], shorter in *made* [meɪˈd], and even shorter in *mate* [mĕɪt]. According to Tajima, Port, and Dalby (1997), this vowel length effect, while quite large in English, is present but smaller in French, where, once again, vowel length is not phonemic.

Consonant sounds

Similarly to the vocalic systems of the languages, English and French have different consonant inventories, both at the phonemic and phonetic levels. RP English, like GA English and other accents, contains a total of 22 consonants – /p, b, t, d, k, g, f, v, θ, ð, s, z, ʃ, ʒ, h, m, n, ŋ, l, r, tʃ, dʒ/ – and two semi-consonants (or semi-vowels) – /w, j/. A third semi-consonant /ʍ/, sometimes transcribed with two phonemes /hw/, is occasionally found in GA and other English accents, and so is the glottal plosive [ʔ]

although not phonemically. The French phonemic inventory contains 15 consonants in common with English (i.e., /p, b, t, d, k, g, f, v, s, z, ʃ, ʒ, m, n, l/), to which can be added the velar nasal /ŋ/ particularly used in English loanwords for the sequence <ng>, the two previously mentioned semi-consonants, and the affricates /tʃ, dʒ/ although used in foreign loanwords, too, and often considered to be mere sequences of two phonemes. The dental fricatives /θ, ð/, the glottal fricative /h/, and the post-alveolar approximant [ɹ] – a retroflex approximant [ɻ] in some English accents such as GA – are absent. Other consonants are also found, such as the palatal nasal /ɲ/, the uvular fricative [ʁ], and the semi-consonant /ɥ/.

As is the case with vocalic phonemes, the English /r/ and the French /r/ – as this unique phoneme is often used – are totally different consonants despite the IPA symbol, and neither should phonetically be transcribed by the symbol [r], which in fact refers to an alveolar trill as used in Spanish (e.g., *r̲adio*, *per̲ro*). The phonemic symbol /r/ in both languages is used for obvious simplicity reasons, as it only requires a standard occidental keyboard to type it, rather than a special character. The English consonant is realised as a post-alveolar approximant phonetically transcribed [ɹ], or sometimes a retroflex approximant [ɻ], and has some allophones used in different environments, such as the devoiced version [ɹ̥] when it is preceded by a voiceless plosive. By contrast, the French counterpart is realised as a uvular fricative [ʁ], also wrongly transcribed [ʀ] again for simplicity reasons, but the latter phone is a uvular trill, which is no longer a common sound in French from France.

Typically, /h/, /θ/, and /ð/ are not part of French phonemics. However, [h] may be heard in French interjections (e.g., sighing and exclaiming) or breathy speech (e.g., panting) (De Launay, 1993), and the dental fricatives may be heard from a speaker suffering from a lisp, in which case they respectively replace the alveolar – or dental – fricatives /s/ and /z/. In that case, however, listeners do not quite hear the phonemes /θ,

ð/, but inaccurate and unintentional realisations of /s, z/. On the contrary, the French nasal /ɲ/, normally correlated with the sequence <gn>, is found in words like *agneau* and *règne* and is non-existent in English; it is similar to the sequence /n/ + /j/, which is why a similar occurrence can be heard in the English word *new* /nju:/. The semi-vowel /ɥ/, found in the French words *nuit* /nɥi/ and *pluie* /plɥi/, has no English counterpart, all the more so as it has a direct link with the vowel /y/, also absent from most English accents, unlike the semi-vowels /w/ and /j/, linked with /u/ and /i/ respectively.

In the list of the consonant sounds that are common in English and French, some differ in their phonetic realisations. For example, it has often been claimed that, while English speakers will tend to pronounce the fricatives /s, z/ and the plosives /t, d/ as alveolar consonants, French speakers will usually realise them as dentals (Cruttenden, 2008; Mortreux, 2008), which can be indicated by the diacritic [̪] placed underneath the IPA symbol in phonetic transcriptions. A second example of phonetic divergence is the allophones of /l/; as for the English allophones of /r/, /l/ is devoiced when preceded by a voiceless plosive (e.g., *please* [ˈpl̥i:z]), but not in French. More importantly, there is an allophonic contrast between *dark /l/* and *clear /l/*, found in English, the former being a velarised version of the consonant and phonetically transcribed [ɬ]. In RP English, the distribution of [ɬ] is complementary with that of the clear version [l], as it only occurs in word-final position or when followed by a consonant (e.g., *lull* [ˈlʌɬ], *belt* [ˈbeɬt] vs. *light* [ˈlaɪt], *play* [ˈpl̥eɪ]). In some accents of English such as GA, it also occurs in word-initial position when followed by a vowel, whereas in other accents such as Irish English, it is absent. Another English allophonic contrast which is absent from French is described as the *aspiration* phenomenon. When the voiceless plosives /p, t, k/ are in syllable-initial position and followed by a stressed vowel, they are said to be aspirated, because the release of the air triggered by any plosive consonant is

particularly strong in this environment, and therefore results in a perceptible [h] sound. In such words, the phenomenon is phonetically transcribed with the heightened symbol [ʰ]: *pre'pare* [pɻɪˈpʰeə], *'character* [ˈkʰæɹɪktə]. Moreover, aspiration does not occur when the voiceless plosive is immediately preceded by the fricative [s] (e.g., *spare* [ˈspeə], stay [ˈsteɪ]).

At the crossroads between the study of vowels and consonants, as well as segmentals and suprasegmentals, the presence of syllabic consonants in English should be mentioned. In fact, some unstressed syllables in word-final position will often trigger the presence of a syllabic consonant, particularly involving /l/ and /n/ – sometimes /m/. For example, in the words *'people* and *'action*, the unstressed quality of the second syllables results in the presence of syllabic /l̩/ (e.g., /ˈpi:pl̩/) and /n̩/ (e.g., /ˈækʃn̩/). A standard schwa /ə/ or a heightened one /ᵊ/ are occasionally used instead of the diacritic, all of them used both in phonemic and phonetic transcriptions.

3.2.4. Summary: on the role of prosody

When comparing the phonological structures of English and French, some similarities in their phonemic inventories are observable, as well as a number of differences, particularly in the phonetic realisations of some sounds. At the suprasegmental level, the divergences are all the more visible as the two systems function differently and are typically described as belonging to different categories, including the free stress vs. fixed stress typology, the plastic vs. non-plastic language typology, and the stress-timing vs. syllable-timing dichotomy. Thus, stress domain, phrase accent placement and function, and rhythm are all examples of how different English and French are.

Although some features were previously presented as segmental, it is in fact the prosody of the language that helps explain some phenomena. The example of the schwa /ə/ shows a direct link between segmentals and prosody, because it is characteristic of unstressed syllables and consequent vowel reduction. The above-mentioned syllabic consonants, which tend to replace the schwa in natural speech, are

an equally representative instance. Moreover, prosodic features play a major role in lexical recognition (Cutler et al., 1997; Grice & Baumann, 2007), as was previously explained with the crucial role of lexical stress in distinguishing between verbs and nouns or adjective in English, especially when there is no segmental clue (e.g., *an 'increase* vs. *to in'crease*), or when the meanings are totally different (e.g., *'refuse* "rubbish/garbage" vs. *re'fuse* "to decline to accept"). In the same light, the disambiguating role of prosody is noteworthy in minimal pair instances such as *I 'have one* and *I 'have 'won*, where, once again, stress and accent placement can help the hearer understand the message properly, given the similitude of the two utterances at the segmental level. Prosody conveys important information that segmentals do not, such as the speaker's attitude and feelings. Thus, even if a speaker says *I love it*, the prosody can transform the meaning into its opposite (i.e., *I hate it*). Furthermore, it is through prosody that any conversation makes sense, as the place of the nuclear accent is decisive to understand if a speaker and a hearer consider a piece of information as part of their common background knowledge or as new.

Prosody also has a significant role in syntactic issues. The chunking of speech (e.g., phonological phrases, or accentual phrases and intonational phrases as previously defined), through the placement of minor and major boundaries together with proper intonational contours (e.g., continuation rises in French, rise or fall-rise in English), not only serve to make speech clearer and act as oral punctuation, but they also have a disambiguating effect in many contexts. In addition to the examples given previously (cf. in French: *Il a demandé | qui parlait || à Marie* vs. *Il a demandé || qui parlait | à Marie*), the title of the famous English book *Eats shoots and leaves* (Truss, 2006) is an illustration of that; orally, intonational choices can change the meaning of the phrase: *'Eats | 'shoots | and 'leaves* is a succession of three verbs conjugated in the third singular person of the present tense, referring to the same omitted subject, whereas *'Eats 'shoots and 'leaves* only contains one conjugated verb (i.e., *eats*) with its two complements in the plural (i.e., *a shoot* and *a leaf*).

Based on the account of the similarities and differences between English and French, and taking into consideration the role of prosody, a certain amount of L1

interference when native speakers of one language are acquiring the other as an L2 can be predicted, and one may wonder whether the impact of such L1 influence in communication situations will be stronger if due to suprasegmental errors or segmental errors.

3.3. Interference, errors, and the impact on communication

French speakers who speak L2 English are well-known for their recognisable heavy foreign accent, which can sometimes lead to clichés or stereotypes. Our review of the differences between the English phonological system and the French system has shown that the two languages differ in many ways regarding their phonemic inventories and their prosodic structures, which makes it possible to predict some instances of L1 transfer.

The present subsection lists the major difficulties that French speakers encounter with oral English. Through a few supportive L2 read-speech recordings, as well as some accounts from the existing literature on EFL acquisition, production errors at both the segmental and prosodic levels are first given and explained (3.3.1-3), and their impact on communication is then studied (3.3.4). This implies looking at the way the L1 interferes in L2 productions and to what extent it risks leading to heavier foreign accent and misunderstanding situations – not only French EFL learners with native English speakers, but also French EFL learners with EFL/ESL speakers of other L1 backgrounds. The following analysis of French EFL learners' problems with the English phonological system is also necessary for the development of the experimental section of the present thesis, for which we based the test stimuli and L2 pronunciation teaching materials on the difficulties that French speakers typically encounter with English.

3.3.1. Recordings

In order to look at French speakers' segmental and suprasegmental difficulties in English, we used some recordings by French EFL learners. Four native French speakers – two female and two male – recorded a list of English words and sentences; their only use of English was academic, and none of them specialised in English at university, contrary to the data from other studies cited below (e.g., Herry-Bénit, 2012; Mortreux,

2008). Accordingly, none of the speakers had studied English linguistics or phonology. Speaker 1 was an 18-year-old female student in final year of secondary education; Speaker 2 was a 20-year-old female student in business management; Speaker 3 was a 17-year-old male student in final year of secondary education; Speaker 4 was a 22-year-old male student in construction studies. They had continuously studied English from primary school.

Below is the list of items that the French EFL learners recorded, with the phonetic transcriptions of the words and phonemic transcriptions of the sentences, based on RP English; the underlining represents the nuclear accent and the arrows show the intonational contours:

people [ˈpʰiːpɬ]

saw [ˈsɔː]

party [ˈpʰɑːti]

thinking [ˈθɪŋkɪŋ]

either [ˈaɪðə], [ˈiːðə]

hello [heˈləʊ]

I think he lives in London now /aɪ ˈθɪŋk i ˈlɪvz ɪn ↘lʌndn̩ ˈnaʊ/

You should tell him she was asleep /ju ʃəd ˈtel ɪm ʃi wəz ə↘sliːp/

I'm afraid they hate each other /aɪm əˈfreɪd ðeɪ ↘heɪt ˌiːtʃ ˈʌðə/

I forgot to bring my books with me /aɪ fəˈgɒt tə ˈbrɪŋ maɪ ↘bʊks wɪð mi/

She must have been waiting for the bus /ʃi ˈmʌst əv bɪn ˈweɪtɪŋ fə ðə ↘bʌs/

He is leaving for Paris today /hiz ˈliːvɪŋ fə ↘pærɪs təˈdeɪ/

Would you like some Christmas pudding? /wʊd jə ˈlaɪk səm ˈkrɪsməs ↗pʊdɪŋ/

Although these recordings fail to illustrate the whole gamut of segmental and suprasegmental difficulties for French speakers, particularly because they are not spontaneous productions, they do make it possible to point out some of the major problems due to L1 interference, as read speech has the advantage of targeting precise

phenomena. One can thus observe various phenomena in English, including the aspiration of voiceless plosives, phonemes that are absent from the French inventory, silent consonants, vowel reduction, 10 lexical stress patterns, stressed/unstressed syllabic alternations, rising and falling tones, and nuclear accents falling outside the last lexical item.

The French speakers' productions were phonetically transcribed by ear. In uncertain cases, the recordings were analysed in the software programme *Praat*, which was of particular use to check the vocalic values, observe consonantal plosions, and annotate intonational contours of some productions. While transcribing segmentals in L2 context is quite feasible (although phonetically and acoustically inaccurate) given the array of IPA symbols, one must still bear in the mind the great difficulty in transcribing interlanguage prosody, as was discussed in 3.1.2. In order to allow for a clearer comparison between English and French, prosodic features were marked with a basic in-text transcription system, using the lexical stress diacritic ˈ, underlining for nuclear accent or final lengthening, and arrows for overall intonational contour movements. Albeit not acoustically accurate since lacking alignment with the transcriptions, the arrows representing tones are placed next to the transcriptions.

Speaker 1	***Speaker 2***
[piˈpœl]↗	[piˈpol]↗
[sɔw]↗	[sɔː]↗
[ˈpaṯi]↗	[pɑɹˈṯi]↗
[sinˈkɪŋ]↗	[θiŋˈgiŋg̊]↗
[heˈzœɹ]↗	[hiːˈðɜ˞]↗
[ˈhɛlow]↘	[heˈloː]↘
[aɪ ˈsiŋk ǀ i ˈlivz in lənḏən ˈnɔw]↗	[aj ˈsiŋk ǀ i ˈliːvz ǀ in ˈlɔnḏɔn naˈo]↗
[ju ˈʃulḏ ǀ ˈṯɛl ǀ ˈhim ǀ ʃi ˈwɔz ǀ ˈœsliːp]↘	[ju ˈʃulḏ ˈṯel ǀ ˈim ǀ ʃi ˈwɔz ǀ hœˈslip]↗
[aɪm əˈfɹɛḏ̚ ǀ zɛ ˈaṯ ǀ ˈitʃ ǀ oˈzœɹ]↘	[haj əˈfɹeɪḏ ǀ ze ˈhaṯ ǀ itʃ hɔˈðœ]↗
[aɪ fɔʁˈgɔṯ ṯə ˈbɹɪŋ ǀ maj ˈbʊks ǀ ˈwiz ˈmi]↘	[haj ˈfɔgɔṯ ṯu ˈbɹiŋ ǀ maj ˈbʊks ǀ wið ˈmi]↗
[ʃi ˈmœsṯ av ˈbin ǀ wɛjˈṯiŋ ǀ ˈfɔ zə bœs]↘	[ʃi ˈmœsṯ ǀ hav ˈbin ǀ weɪˈṯiŋ ǀ fɔ zə ˈbœs]↗
[ʔi iz liˈviŋ ǀ fɔ paˈwis ǀ ṯuˈdeɪ]↘	[ˈhi ˈhiz liˈviŋ ǀ fɔ ˈpʰeɹis ǀ ˈṯʰuˈde]↗
[wuld ˈju ǀ ˈlajk ǀ sɔm kɻisˈmœs ǀ pyˈdiŋ]↗	[ʍud ju ˈlajk ǀ sɔm kɻisˈmœs ǀ ˈpʰʊdiŋ]↗

Speaker 3	***Speaker 4***
[piˈpœl]↗	[ˈpipol]↘
[so]↗	[sow]↘
[pɑʁˈt̪i]↗	[ˈpɑːt̪i]↘
[sinˈkiŋg]↗	[ˈsiŋkiŋg]↘
[eˈzœʁ]↗	[ˈɪzɚ]↘
[eˈlo]↗	[eˈlow]↗
[aj ˈsink ǀ i ˈlivz ǀ in lɔnˈd̪ɔn ˈnaʊ]↘	[aɪ ˈsiŋk ǀ i ˈlivz ǀ in lɔnˈd̪ɔn ˈnaw]↘
[ju ˈʃuld̪ ǀ ˈt̪ɛl ˈʔim ǀ ˈʃi ˈwɔz ǀ ˈʔaslip]↘	[ju ˈʃuld̪ ǀ ˈt̪ɛl ˈim ǀ ˈʃi ˈwaz ǀ ˈœslɪp]↘
[am eˈfɪɛd̪ ǀ ze ˈat̪ ǀ ˈʔitʃ ǀ ʔoˈzœʁ]↘	[ajm əˈfɪɛd̪ ǀ ze ˈeɪt̪ ǀ ˈitʃ oˈzœɹ]↘
[aj foˈgɔt̪ ǀ tu ˈbʁiŋg ǀ maj ˈbuks ǀ wiz ˈmi]↗	[aj fɔˈgɔt̪ ǀ t̪u ˈbɹiŋg̊ maj ˈbʊks ǀ wif ˈmi]↘
[ʃi ˈmœst̪ av ˈbin ǀ waˈt̪iŋg̊ ǀ ˈfɔʁ zə ˈbys]↗	[ʃi ˈmœst̪ ǀ av ˈbin ǀ wɛjˈt̪iŋ ǀ ˈfɔ zə ˈbœs]↘
[ˈʔi ˈʔiz liˈviŋg̊ ǀ ˈfɔʁ paˈʁis t̪uˈdɛj]↘	[ʔi ˈʔiz liˈviŋ ǀ fɔ ˈpawis t̪uˈdeɪ]↘
[ˈwuld ˈju ˈlajk ǀ ˈsɔm ǀ kʁisˈmœs ǀ puˈdiŋg̊]↗	[ˈwud ǀ ju ˈlajk ǀ so kɻ̊isˈmœs ǀ puˈdiŋ]↘

From the analysis of those productions, we have listed a number of production errors by French EFL learners and compared them with the literature – whether based on actual data or simple predictions.

3.3.2. Prosodic errors

The word level

As was previously explained, lexical stress is an important feature of English, whereas it is not characteristic of French, in which stress is a property of the phrase rather than the word, and it typically corresponds to the rightmost syllable of a phonological phrase. Consequently, negative transfers from the L1 to the L2 can be predicted, more particularly a rightward shift of the lexical stresses in English words (Swan & Smith, 2001).

Out of the five isolated polysyllabic words that were used in the L2 productions, four have initial stress, which is a more frequent pattern than final stress in English (Cutler & Carter, 1987). However, three of the four French speakers systematically stress the final syllables of the words, resulting in a stressing of neutral suffixes and grammatical endings (e.g., *-ing* in *'thinking*), as well as the systematic insertion of a full vowel instead of a normally reduced syllable (e.g., the syllabic consonant in *'people*). This rightward stress shift and its (segmental) consequences are similarly observable in the sentences (e.g., *'Christmas*, *'other*, *'waiting*), but the opposite pattern is also found; when an English word is stressed on the final syllable, the French speakers sometimes stress the initial syllable (e.g., *'asleep* in the productions of Speakers 1, 3, and 4). Still, one may systematically find traces of stress or lengthening in all the final syllables, mostly because no accurate vowel reduction phenomenon occurs. Speaker 4 occasionally seems to assign initial stress accurately, although not systematically as is shown in his productions of the sentences (e.g., *'London*, *'other*), and a full vowel is still inserted in place of the syllabic consonant in the word *'people*. That may be due to his will to produce English properly while retaining traces of his French prosody, or to the influence of the L1 prosodic structure and secondary stress assignment to the phrase-initial syllable, which typically occurs in such read speech to convey emphasis.

On the whole, it appears that the French speakers who recorded the items – and French speakers in general – face great difficulties with lexical stress, as is also pointed out in Vaissière (2002: 6) who describes the notion as “an unnatural and unnecessary complication” for French speakers. More particularly, the analysis of the tokens suggests that there are no stress assignment rules or regularities in the L2 learners' subconscious interlanguages – at least when they have not been trained in English phonology and phonetics, as is the case here. The impression of final lexical stress is linked with the final lengthening phenomenon which is typical of the French prosodic system. By and large, the prosodic structure in the L2 productions is French-like, and even though lexically stressed syllables seem to have been found, one has to look at the phrase level and whole rhythmic patterns in order to observe and understand how the L1 interferes in the L2 productions.

The phrase level

L2 learners of English are often said to face difficulties with the target prosodic characteristics, such as nuclear accent placement (Gut, 2009). As is shown in the transcriptions of the French EFL learners' L2 productions, the chunking of speech into units is made according to the French prosodic system, that is, with more smaller units (i.e., accentual phrases) than in English. This is bound to lead to more prosodic errors involving stresses, accents, and rhythm. Indeed, while an English prosodic phrase should contain stressed and unstressed syllables (optionally), and one major nuclear accent (compulsorily), as is the case in the stimulus sentences presented above, the French speakers almost systematically assign a stress or accent to any syllable immediately preceding a minor boundary (|), as in their L1 (or at least they lengthen that syllable) even though the very final one in the major phonological phrase (i.e., the intonational phrase) will be the longest. Vaissière (1991) explains that the lengthened last syllable of the last word is superimposed with a rise or a peak in fundamental frequency, and were it continuous speech, the other stresses would not even be perceived in French.

In the recordings, the French speakers' stressing of normally unstressed items is another example of how the relative syllable-timed nature of French rhythm influences L2 productions. Even though not systematically (cf. Speaker 4's de-stressing of grammatical words in *I think he lives in London now*), all four speakers stress some grammatical words (e.g., the preposition *for* in *waiting for the bus*), and once again, no vowel reduction occurs at any time as full vowels are systematically realised (as confirmed in Swan & Smith, 2001), despite the fact that de-stressing of grammatical words does exist in French. Jones (1922: 109) notices:

> French persons usually fail to reproduce correctly the English rhythm. The point which they should notice specially is that the vowels of unstressed words such as *the*, *of*, *to* are generally extremely short; they are apt to make these syllables just as long as other syllables.

Similarly, Horgues (2010) found that French speakers' realisation of all unstressed syllables in English are relatively longer than native speakers', making them relatively equal in duration, compared with other syllables. Such a negligence of weak forms and unstressed vowel quality results in a syllable-timed rhythm, as is noted in Taylor's (1981) examination of 50 non-native speakers' English productions, and confirmed by the French learners' productions above where the overall rhythm is never as smooth as it should be, due to the French-like prosodic patterns. The almost robotic quality of the resulting L2 speech is particularly noticeable in Speaker 3's productions (e.g., *You should tell him she was asleep*; *He is leaving for Paris today*), with numerous accentual phrases and a frequent use of word-initial glottal stops reinforcing the impression.

Eckman (2008) mentions the fact that marked structures of a target language are usually more difficult to acquire for a non-native speaker than the corresponding unmarked structures. As far as nuclear accent placement is concerned, all four speakers – as could be predicted – systematically assign an accent to the last syllable of the major phonological phrase, regardless of the main vowel, the word, and its grammatical category (e.g., *I forgot to bring my books with me*). Herry-Bénit (2012) studied the productions of a group of 20 French EFL learners and also found a tendency to place accents at the end of phrases. The only occurrence of a stressed/accented penultimate syllable is found in the sentence *You should tell him she was asleep*, and it is especially visible in Speakers 1, 3, and 4. Once again, stressing the first syllable of a phrase-initial word is possible in French speech, usually to convey emphasis as was explained in 3.2.1 above, and a glottal stop can be used to reinforce the initial vowel (e.g., Speaker 3). The French learners' L2 productions are indeed read speech, which is more liable to such devices and styles as emphasis due to its overall slower quality than conversational speech, and the word *asleep* stands as its own accentual phrase in all four speakers. However, it must be noted that the L2 productions still present systematic traces of lengthening of the phrase-final syllables.

Intonation contours

Due to the similarities between English and French intonational contours and meanings, producing English tones is not as problematic for French speakers as rhythm and

accents are, and transfers from L1 to L2 in this domain are often positive, rather than negative (Swan & Smith, 2001). Regarding the location of pauses, Cruttenden (2008) notes that the correlation between punctuation and intonation, although not quite systematically, reduces the risk of errors for L2 learners. Nevertheless, the presence of continuation rises accompanying minor and major boundaries in French intonation triggers interference of L1 features in L2 productions (Horgues, 2010). In the French EFL learners' recordings, the use of minor boundaries (|) involves minor continuation rises immediately preceding them, as is the default pattern in French phonological phrases, and it is responsible for the multiple occurrence of accentual phrases and initial and final stresses.

Despite the realisation of continuation rises, the analysis of the recordings reveals that the intonational contours in the French speakers' L2 productions have a global direction – rising or falling – indicated by an arrow. Considering general tone meanings in the two languages, French speakers should be able to produce a falling tone and a rising tone when required (Cruttenden, 2008). For example, Speaker 1's realisation of the closed-ended interrogative seems to be accurate. However, the use of rises and falls is not particularly coherent elsewhere, as the declarative sentences and the interrogative sentence alike can have both contours, independently of the speaker. In Ballier et al. (2014), inversions between a native speaker's tone choices and a non-native speaker's in questions are observed depending on the proficiency level of the learner, and that might cause an impact on the rhythmic structure.

While the default tone of isolated words should be a fall – with the possible exception of the exclamation *hello* –, most of the L2 productions have a rise; their read speech nature, however, may help explain it, because each item is produced as part of a list. That is also true of the sentences; in L2 spontaneous speech particularly – and sometimes L1 speech –, one may observe what Cruttenden (2008) calls “checking rise”. This rise is not directly linked with meaning or sentence type, but instead corresponds to the speaker's underlying need for confirmation. The phenomenon is mentioned in Huart's (2002) description of learners' productions, especially when they have to speak to a teacher, suggesting that this systematic rise implicitly means “have I answered correctly?”. Accordingly, one must not consider French speakers to be unable to realise

English tones properly, but external factors must be taken into account, particularly so as intonation is the major tool to convey one's contextual feelings and emotions.

3.3.3. Segmental errors

Misproduction of vowels

Because of the absence of some English phonemes in the French inventory, EFL learners are bound to misproduce L2 vowels at some point in the acquisition process. One notices the following substitutions: the use of French [ɛ] as a substitute for English /e/ (e.g., *hello*), [a] for /æ/ (e.g., *have*), [ɔ] for /ɒ/, [œ] for /ʌ/ (e.g., *must*), [i] for /ɪ/ (e.g., *think*), [u] for /ʊ/ (e.g., *books*), and even [œ] or [ø] for /ə/ (e.g., *asleep*). In those cases, the L1 sound and the L2 sound share some characteristics, although once again IPA symbols are far from accurately representing phonetic realisations. The various segmental acquisition models, such as Flege's Speech Learning Model presented in 2.2.2, may help explain the substitution processes.

In some other cases, the substitutes show no specific resemblance with the target sounds, and can be ascribed to the influence of spelling. For example, [y] is sometimes used instead of /ʌ/ (e.g., *bus*) because it is the standard pronunciation of the letter <u> in French spelling, [o] is used in Speaker 3's production of *f<u>o</u>rgot* and Speaker 1's pronunciation of *<u>o</u>ther* as it is the normal value of the letter <o>. Furthermore, the most frequent substitutions have had a historical impact on the current pronunciation of some English loanwords in the French language, such as *club* /klœb/, chewing-gum /ʃwiŋ gɔm/, and even *people* /pipœl/ or /pipɔl/ which is now used in French with the meaning of “celebrity”. Some substitutions with an L1 phoneme could have led to more phonetic accuracy, and yet do not frequently occur. An example is the English phoneme /ʌ/, which is usually substituted by the French vowel [œ] even though [a] is much closer to the target sound (Cruttenden, 2008; Herry-Bénit, 2011). Not only do their positions in the vowel charts confirm that claim, but the general formant values of the sounds

represented by these IPA symbols are further evidence (from Wells, 1962 and Georgeton et al., 2012):

English [ʌ]: F1 = 720 Hz, F2 = 1240 Hz

French [œ]: F1 = 436-647 Hz, F2 = 1643-1690 Hz

French [a]: F1 = 685-830 Hz, F2 = 1438-1677

The F1 value ranges show that the formant frequency of the English vowel sound [ʌ] is comprised in the value of the French vowel [a], whereas it is not in the value of [œ]. Regarding the F2 value, once again [a] is much closer to the target English sound than [œ] is.

The neutralisation of the lax/tense vowel distinction is another consequence of L1 transfer from French to English which could be predicted as there is no such dichotomy in the former language. The most typical example is the French sound [i] which is used as a substitute for both the English lax vowel /ɪ/ and the tense vowel /i:/ (e.g., Mortreux, 2008; Swan & Smith, 2001), making it impossible to distinguish between *live* and *leave* when isolated (e.g., Speaker 4's pronunciation of *leaves* and *living*). In the same respect, [o] is a substitute for /əʊ/ (e.g., Speaker 3's *hello*) or /ɔ:/ (e.g., Speaker 3's *saw*). Thus, French vowel sounds systematically replace English ones, be they lax or tense. However, some L2 sounds are also found in the speakers' interlanguages even if they are not part of the L1 phonemic inventory, such as the tense vowel /ɑ:/ (e.g., Speaker 4's *party*) and the lax vowel /ʊ/ (e.g, Speaker 2's *books*). That may be due to the learners' years of English learning at the time of recording, and it reveals the learners' capacity to produce target sounds accurately.

In the case of diphthongs, several patterns can be considered. First, the influence of spelling is an important factor in the production of L2 sounds, as can be observed in Speaker 1's and Speaker 3's realisations of the English diphthong /eɪ/ as one vowel [a] in the word *hate*, because of the value of the letter <a> in French graphophonemics. Second, English diphthongs are sometimes neutralised, as is the case with other tense

vowels; /eɪ/ is produced [ɛ] or [e] in Speaker 1's and Speaker 4's *afraid* and Speaker 2's and Speaker 3's *today*. Finally, if the learner's interlanguage phonology has integrated the fact that a diphthong consists of a glide from one sound to another, they tend to pronounce two distinct sounds. The most frequent instance is the substitution of the second element of closing diphthongs with the semi-vowels /j/ and /w/ (Herry-Bénit, 2011); /aɪ/ and /eɪ/ are pronounced [aj] and [ɛj], respectively (e.g., Speaker 1's *my*, *like*, and *waiting*), and /əʊ/ (or /oʊ/ in some English accents) and /aʊ/ become [ɔw] – or [ow] – and [aw] (e.g., Speaker 4's *hello* and *now*). Speaker 1's pronunciation of *now* as [now] can be explained by the fact that many French learners only know the secondary value /əʊ/ of the digraph <ow>, which is more in keeping with the spelling (e.g., <o>).

Pronouncing a vowel followed by a semi-vowel is not the only substituting pattern for English diphthongs. If the learner considers them to consist of two sounds, he or she might give equal length to the two elements (Swan & Smith, 2001), causing the second element to be a full vowel – sometimes stressed even. Speaker 2's realisation of the diphthong in *now* is made up of the two distinct vowels [a] and [o], and the latter sound corresponding to the final syllable of the phrase, it is accented and lengthened even though only the first element of an English diphthong is normally stressed. It should finally be noted that some French speakers add nasalisation to the first vowel of a diphthong when it is surrounded by [n], pronouncing *now* as [nɛ̃w]. Contrary to English, nasal vowels are phonemic in French, hence Cruttenden's (2008: 119) recommendation: “French learners should be careful not to use undue nasalization in words of French origin which suggest modern French forms, e.g. branch, plant, etc.”. However, the author brings no evidence of the extent to which nasalisation can affect communication.

Omission and intrusion of the glottal fricative /h/

As can be observed from the French learners' productions, a glottal stop [ʔ] is sometimes added at the beginning of words with initial vowels. Jones (1922: 33), however, notes:

> This fault must be avoided at all costs. It is a mistake which will effectually spoil what is otherwise a good pronunciation, and it is one which often necessitates a great deal of practice to correct. It must be remembered that there is no break whatever in English between consecutive words which are closely connected by the sense.

Indeed, glottal plosives trigger problems with linking, making speech more robotic, and therefore less natural if not intended for emphasis (e.g., Speaker 3's sentences). On the contrary, many French EFL learners have another tendency which consists in adding a glottal fricative [h] in similar contexts, that is, just before the initial vowel of a word. This widespread phenomenon, which has been called *intrusive H*, is found in Speaker 1's pronunciation of *either*, as well as in a number of productions by Speaker 2 (e.g., *asleep*). This [h] intrusion can even occur with a normally unstressed item, such as the conjugated auxiliary *be* in Speaker 2's *he is leaving*, although it might have been reduced to [z] alone. Furthermore, one can notice the unexpected extension of the phenomenon to the voiced semi-vowel /w/ in Speaker 2's pronunciation of *would* with a voiceless [ʍ]; this sound, sometimes transcribed [hw] and usually corresponding to the spelling <wh> in English accents, contains a trace of an intrusive [h] sound. Nevertheless, the example is not frequently mentioned in the literature.

Given the absence of the glottal fricative /h/ in the French phonemic inventory, intrusive [h] seems to be the result of a pronunciation effort from a non-native speaker. However, while there is consensus on the existence of the phenomenon, it is also agreed upon that French speakers regularly omit the [h] sound when there is actually one in an English word (e.g., Avery & Ehrlich, 1992; De Launay, 1993; Hodges, 2006). Hodges gives the example of the sentence *I'm happy to see you*, which is likely to be pronounced [ham api tu si ju]. In the recordings, [h] omission is confirmed and is pervasive in all three speakers' productions (e.g., *hate*). Despite the presence of the letter <h> in both languages, the obvious reason is the silent quality of the consonant in French.

Phonemic and phonetic misproductions of consonants

As is the case with misproductions of English vowels by French speakers, inaccurate realisations of L2 consonants are often due to the influence of spelling. For example, the substitutions of /tʃ/ and /dʒ/ with [ʃ] and [ʒ], respectively, in such words as *church* and *Jack* are caused by the values of the letters <ch> and <j> which are not affricates in French – except for English loanwords such as *jeans*. In the recordings, the French learners' pronunciation of [l] in *should* and *would*, where it should be silent, are two other examples. The other errors are located both at the phonological level and the phonetic level, and are usually due to L1 transfer, although it may occur that an L2 phoneme is realised accurately.

Most of the inaccurate productions of English consonants can be predicted from the study of the phonemic inventories of the two languages. One of the most famous examples is the English approximant [ɹ], which French speakers frequently replace with their own sound corresponding to <r>: [ʁ]. That is particularly noticeable in Speaker 3's productions (e.g., *either*, *bring*). By contrast, some speakers manage to pronounce the target sound accurately (e.g., Speaker 2's *bring*), including the naturally occurring [ɹ] devoicing process before the voiceless plosive [k] (e.g., Speaker 4's *Christmas*). The third case is the use of another approximant, that is, the semi-vowel [w], as can be found in Speaker 1's and Speaker 4's pronunciation of *Paris*. Finally, the total omission of the sound is also noteworthy in Speaker 1's *for*, even though that cannot quite be characterised as a production error; indeed, it is the standard pronunciation in non-rhotic accents of English and it even occurs in many other accents, especially as the word in question is a preposition that is often reduced to [fə].

The difficulty in pronouncing the English dental fricatives /θ/ and /ð/ (i.e., corresponding to the sequence <th>), which are absent from French phonemics, is often mentioned in the SLA literature. They are usually replaced by other sounds that share some of their characteristic features, such as voiceless [s], [f], [t] for /θ/ and voiced [z], [v], [d] for /ð/ (Swan & Smith, 2001). O'Connor (2002: 5) notices that "[t] is a good

substitute because it preserves the mellowness, or lack of stridency, of /θ/, while [s] preserves the continuancy of /θ/". This explanation can be extended to the voiced counterparts of those sounds – that is, [d] and [z] as substitutes for /ð/. The claim is supported by the fact that the plosives /t, d/ are the normal realisations of <th> in some English accents, such as Irish English. However, most of the time French speakers from France will substitute the English dental fricatives /θ, ð/ with [s, z]; such occurrences are systematic in the productions by the four French EFL learners who were recorded (e.g., *think*, *either*). By contrast, some of the speakers occasionally manage to realise the correct L2 sound (e.g., Speaker 2's *other*, *with*), although not consistently, and Speaker 4's pronunciation of *with* contains the voiceless labio-dental fricative [f], which is reminiscent of some other native English accents (e.g., from London). For Cruttenden (2008: 196), "the difficulty of /θ, ð/ [for foreign learners] lies not so much in their articulation"; as was explained in 3.2.3, a French speaker with a lisp will naturally produce those sounds, and that may precisely be the reason why French learners seem not to dare to produce them accurately (i.e., when the target English accent contains these phonemes). Thus, timidity or the feeling of embarrassment are various factors that must be considered when studying production errors by non-native speakers (cf. Krashen's Monitor Model and acquisition hypotheses, presented in 2.3.1).

The phonemic errors mentioned so far are not the only ones to be found in non-native speech, because the differences between English and French consonants also concern the phonetic realisations of common phonemes. As was explained in 3.2.3 above, some consonants will typically be produced as alveolars in English and dentals in French (Mortreux, 2008) – although the opposite patterns remain possible. Cruttenden (2008) claims that many languages realise /s, z/ nearer to the teeth than English, especially if they have no dental fricatives /θ, ð/ like French. Dentalisation also applies to the plosive consonants /t, d/ and the nasal /n/. In the L2 recordings, it occurs in the productions by all four French learners. Similarly, the velarisation of the lateral approximant /l/, which is in complementary distribution with clear [l] in RP English and

systematic in certain English accents, never occurs in the French speakers' L2 productions, where only clear [l] is heard (Swan & Smith, 2001). Finally, as could be predicted, the aspiration of English syllable-initial voiceless plosives does not typically occur in French speakers' L2 speech (Avery & Ehrlich, 1992), even though one occurrence is found with Speaker 2's plosive in *Paris*.

3.3.4. Is the impact of prosodic errors stronger?

The previous subsections have listed the typical production errors made by French speakers in English, and the phonemic and phonetic divergences in the two languages have served as a partial explanation. Another possible origin of production errors is explored below, and more importantly the impact of segmental errors on communication is compared with the impact of prosodic errors. Even though misproductions at both levels might cause a negative impact on foreign-accentedness and comprehension by native listeners or other non-native listeners, the degrees of harm may not be equal. This parallel is a necessary step towards the understanding of the role of prosody in English acquisition and learning and the answer to the general question of the place of prosody in comparison with that of segments.

The origin of L2 production errors

As is pointed out in Abercrombie (1967: 20), the fact that all human beings possess the same speech organs must lead us to conclude that the "unpronounceable sounds" of foreign languages are nothing but "myths". When the phonological system of the L1 is fully developed, it becomes difficult for non-native speakers to produce an L2, but also to perceive it (Moyer, 2007)[8]. That is why the issue of the relationship between perception and production has often been raised, with the assumption that L2 production errors are rooted in L2 perception difficulties (Derwing & Munro, 2005; Gray, 2001). The example of French learners of English is of particular interest as the phonological systems of the two languages present a number of differences, particularly at the prosodic level. Going back to the example of lexical stress as previously explained, it is

8 See Section 2.

plausible that French speakers are not even conscious of its existence in the L2, all the more so as many people (including L2 learners and teachers) tend to associate pronunciation with segmentals only. Kijak's (2009) study reveals that French speakers' L2 production of lexical stress is indeed not better than their L2 perception of the phenomenon, suggesting a close relationship between the two abilities.

While non-native speakers experiment real difficulties in perceiving then producing L2 features that are absent from their L1, one must not preclude the major role of orthography that we have previously mentioned. Many L2 learners have mostly been exposed to written language from the outset of learning, which is why the influence of spelling is the principal cause of segmental errors, in turn causing prosodic errors (cf. vowel reduction and syllabic consonants). If punctuation is considered to be a potential source of misuse of pauses and intonational contours, spelling is another cause of prosodic errors through word order and the resulting tonic patterns. Hodges (2006: 4) explains: “French EFL students of novice proficiency often see words with the same spelling in their native language and assume that the pronunciation, stresses and even meaning are the same”. That is reinforced by a certain amount of orthographic similarity between English and French; due to the history of the countries, the two languages share many vocabulary items (Avery & Ehrlich, 1992). Therefore, misproductions are frequent and inevitable, especially at the segmental level, if letters or combinations of letters have different values in French and English, such as the values of the sequence <ou>, or the occurrence of silent letters (Swan & Smith, 2001).

The impact of segmental errors

The omission of a sound or the substitution of a phoneme for another primarily cause confusion between two members of a *minimal pair* – that is, when two words (or phrases) only differ in a single element such as a phoneme (e.g., *pit – bit*). When explaining the pronunciation of the English glottal fricative /h/ to French speakers, a teacher can thus give the examples of the minimal pairs *heart* /hɑ:t/ – *art* /ɑ:t/ or *hat* /hæt/ – *at* /æt/, in which only one phoneme makes a distinction possible between the two items. Other phonemic errors causing an L2 word to be understood for another

include the inaccurate use of a unique French vowel for two distinct ones in English; *leave* and *live*, for example, are both frequently produced as [liv], just as [o] replaces both /əʊ/ and /ɔ:/, making *law* and *low* sound alike. French learners thus tend to have difficulty in distinguishing – perceiving and producing – the words *ship*, *sheep*, *chip*, and *cheap* properly. Furthermore, segmental misproductions at the phonetic level equally lead to word confusion, as with the example of initial plosive aspiration. As is explained in Roach (2009), studies have revealed that if the voiceless plosives /p, t, k/ are not aspirated when the context requires it, then they might be perceived as their voiced counterparts /b, d, g/, respectively, by native speakers, even though a slightly unnatural quality in the perceived sounds may be noticed. Consonant voicing alone is not the feature that will allow for distinction, and the lack of aspiration will cause confusion in such minimal pairs as *pie – buy*, *tie – die*, and *cot – got*. Another example of phonetic error that leads to confusion is given in Cruttenden (2008) and concerns the dentalised articulation of English alveolars, particularly /t, d/, because there is a danger of confusion with /θ, ð/.

Looking at minimal pairs in which a unique phoneme is the distinctive element in the two words, we observe that the number of combinations is somewhat limited, because many pairs do not exist or are extremely rare occurrences (e.g., *measure – mesher*, Brown, 1995). Based on their analysis of the frequency of some minimal pair members, Levis and Cortes (2008: 202) note:

> […] half of the minimal pairs examined had at least one member that was extremely unlikely to occur in spoken corpora. That is, 13 of the 26 pairs examined included a member that was rare, and so very unlikely to be familiar to learners of English. This suggests that many minimal pairs in the textbooks probably fail a very basic test of usefulness.

Brown (1995) draws a similar conclusion, reminding the reader that there exist only seven pairs of words that contain the /ʊ/ – /u:/ distinction (e.g., *pull – pool*). The notion

of *functional load* has been introduced to illustrate the potential importance of some minimal pairs through their cumulative frequency (Brown, 1988), and thus to set up an order of importance – useful in understanding the impact of errors on communication, but also in setting L2 teaching priorities. The contrast between /i:/ and /ɪ/ (e.g., *feel – fill*), according to Cruttenden (2008), has a much higher functional load than the contrast between /u:/ and /ʊ/ (e.g., *fool – full*); in fact, "whereas the /ʊ/ words *would, could, should, look* may be considered frequent, the corresponding /u:/ words *wooed, cooed, shoed/shooed, Luke* are so infrequent as to be considered almost contrived" (Brown, 1988: 601). Accordingly, substituting [f, v] for /θ, ð/ should not pose a problem because the sounds bear low functional load in English, contrary to /s, z/, carrying higher functional load (Brown, 1974). In the analysis of contrasts, Brown (1988: 596) points out that "the fact that certain RP contrasts are not found in other accents (e.g. *balm* and *bomb* are distinct for RP speakers, but are homophones in GA) may be taken as an indication of lack of importance of that RP contrast". All those observations suggest that focusing on such phonemic contrasts may not be as important as some teaching materials and teachers sometimes highlight, hence the necessity to compare the impact of prosody and that of segmentals in L2 teaching methods. The development of stimuli and teaching materials in the scope of our experimental study is based on all those elements, as is detailed in Section 4.

Although a word can often be misunderstood for another if an L2 speaker inaccurately realises the segmentals, the general impact of minimal pair confusions on communication can be put into question. If isolated, a word containing a segmental error that creates confusion in a minimal pair can indeed cause misunderstanding. However, the situation is different in conversational speech, all the more so as it is most unlikely that a speaker would utter a rare word such as *wooed* with no apparent reason. In the following example of misproduction, the risk of misunderstanding is obvious: *I ate my father – I hate my father.* Here, the realisation or omission of /h/ is crucial to the meaning of the sentence. Nevertheless, the situation and the context will systematically play an enormous disambiguating role. If a speaker says *I sink he left*, the hearer is

likely to understand that the intended word was *think*, not *sink*. Moreover, as is pointed out in Brown (1988), the rarity of some words belonging to a minimal pair (e.g., *wooed*, *cooed*) makes misunderstanding improbable, and that is reinforced by the fact that two words of a minimal pair are often grammatically different, or differently used. For example, the common misproductions of the words *leave* and *live*, even though they are both verbs, have a lesser impact as the surrounding items will be different (i.e., *leave a place, leave for a place* vs. *live in a place, live for someone or something*). Similarly, the above-mentioned confusion between the noun *hat* and the preposition *at* should be inconspicuous, given the different grammatical categories of those words.

For all that, it is not warranted to claim that segmental errors and minimal pair confusions are no impediment to communication. Although it is true that most occurrences of minimal pair confusions are unlikely to lead to actual misunderstanding or misinterpretations because of the disambiguating role of context, the native hearer's mental corrections of the non-native speaker's misproductions might negatively affect communication and lead to some degree of fatigue or annoyance. More particularly, all the above-mentioned segmental errors will increase foreign-accentedness. Jilka (2000: 9) defines *foreign accent* as "a deviation from the generally accepted norm of pronunciation of a language that is reminiscent of another language, i.e. the speaker's native language"; that is why one must not mistake foreign-accentedness for dialectal divergences, some of which have previously been mentioned. Therefore, even if a French speaker's pronunciation of *the* as [zə], or [zø], should be understood by an English speaker, the foreign accent is even more noticeable. In the same respect, producing a French uvular fricative [ʁ] whenever <r> occurs is a characteristic of marked foreign accent "although it is not a question of loss of intelligibility through phonemic confusion" (Cruttenden, 2008: 223).

To summarise, as suggested by the title of Brown's (1995) article "Minimal pairs: minimal importance?", the impact of segmental errors on communication – that is, causing misunderstanding, a decrease in intelligibility, and an increase in foreign-accentedness –, albeit present, is not so problematic. Disambiguating elements, such as the grammatical functions of words, facilitate communication. Finally, the risk of

confusion between two resembling words or phrases is further lessened by suprasegmental factors, such as the disambiguating role of intonation and the chunking of speech (Cutler, 1982). The experimental study that we conducted, presented in Section 4, precisely tests the effect of segmental deviations with the effect of prosodic deviations in French speakers' L2 speech as perceived by native speakers.

The impact of prosodic errors

A great many segmental errors as made by French learners of English can be detected as such, and therefore be mentally corrected by the hearer through grammatical cues, the whole conversation, or the situation. By contrast, one major problem with prosodic errors is that they may not be detected, causing a hindrance to communication and the proper transmission of the speaker's message. For example, if a non-native speaker misuses an intonational contour for an utterance, the native hearer might get the impression that the speaker is rude or unfriendly even if it is not the case; the message is completely misinterpreted. Cutler (1980: 77) mentions the danger of the inconspicuousness of focus assignment errors and intonation errors, which "can quite cancel out the meaning of the sentence" while causing the hearer to "understand the utterance differently from the speaker's intention".

Similarly to segmental errors, prosodic misproductions might lead to misunderstanding and misinterpretation. Failure to unstress syllables in an utterance, for example, may cause a word to be wrongly perceived as stressed (Frodden & McNulty, 1996), and this particular error is quite likely to occur in French EFL learners' productions. For Kjellin (1999: 385), it can cause "disturbing delays in the perception processes". Huart (2002) studies the following ambiguous example: *I think that man is in danger*. Depending on the stress pattern of the sentence, particularly the stressing of the word *that*, the meaning totally changes. If *that* is stressed, then it is a demonstrative referring to a specific man in the situation. However, if it is unstressed and reduced, then it is a conjunction that can be omitted, and *man* has the much broader sense of "mankind". With some examples, the resulting utterances can even lead to amusing situations; changing the stress pattern in the sentence *The 'dog 'turned on his 'brother* (i.e., *to turn on somebody* meaning "to attack somebody", with *on* being a preposition)

to *The 'dog ˌturned 'on his 'brother* (i.e., *to turn somebody on* meaning "to sexually excite somebody", with *on* being an adverb), which could be uttered by French speakers who tend to stress even prepositions, might bring about a smile on the hearer's face. Consequently, minimal pairs, mentioned in the previous subsection as typically affected by segmental errors, also concern the suprasegmental level, because some words or phrases may only differ in their stress pattern, with no phonemic differences (e.g., *for'going – 'foregoing*). Once again, however, such occurrences are rare (Cutler, 1980), and like segmental errors, prosodic minimal pairs often negligibly affect understanding or interpretation.

In addition to intonation and stress errors, inaccurate tonicity in English can have a significant impact on the understanding of a speaker's original message. Cutler (1980) mentions the cases of misapplied contrastive accent and erroneous emphasis, which lead to important changes in focus. Wong (1987: 29) also explains: "non-native speakers sometimes unwittingly draw abnormal attention to what they say, even being mistakenly perceived to be insistent". Since a French speaker would be liable to assign the most prominent accent to the last syllable in the sentence *They don't want to play with <u>me</u>*, an unjustified emphasis could be perceived. Unlike segmental errors, the major problem that can be raised from such prosodic errors is that if it is not noticed and corrected by the L2 speaker, then it is hardly possible for the native hearer to detect that there is an error, and misinterpretation is unavoidable.

Considering the great divergences between English and French at the prosodic level, suprasegmental errors are bound to increase the perception of a foreign accent, even if it may be thought to be caused by the pronunciation of L2 phonemes only. In fact, Jenner (1976: 166) postulates that rhythm, intonation, and voice quality are "the primary defining constituents of foreign accents". Moreover, the negative impact of intonation errors may even lead to "ill-founded stereotypes about national or linguistic groups" (Mennen, 2006: 1-2), as "people are often judged on the way they pronounce a second language" (Vergun, 2006: 2). Thus, segmental inaccuracy is not the sole aspect responsible for an increased foreign accent, and looking at some occurrences, it often appears that prosodic errors are at the origin of segmental errors. The pronunciation of a word such as *chocolate* is typically problematic for French EFL learners, who usually

pronounce the syllables with a relatively equal duration and assign stress or lengthening to the last syllable *-ate*, pronounced [eɪt] instead of being reduced – that inaccurate pronunciation is further reinforced by French learners' early knowledge of the vowel value in the isolated word *hate*. If the first syllable of *chocolate* were properly stressed, the segmental errors might be inconspicuous. Accordingly, Kjellin (1999: 385) relates his experience as a teacher:

> [...] it is the present author's experience with *every* learner he has taught so far that many remaining segmental mispronunciations will even go completely undetected by the native listener, if the student pronounces the prosody correctly.

Hence, an accurate realisation of L2 prosody could alleviate the impact of segmental errors, and in addition to the above-mentioned questionable importance of segmental misproductions, the question of determining whether L2 prosody has a stronger impact than segments in communication is raised. Our experimental study on French EFL learners' oral skills, which is the pivot of the present thesis, addresses that issue.

3.4. Conclusion

In the acquisition of English as a foreign language by French speakers, both the segmental and suprasegmental differences are bound to cause perception and production difficulties. As was explored through the analysis of recordings by four French EFL learners and the various observations made in the literature, interference of the L1 is frequent in L2 read speech and spontaneous speech productions, and as a consequence, errors are produced, causing more or less harmful misinterpretations, misunderstanding, and an increase in the degree of foreign accent. Other extra-linguistic factors, including the learner's embarrassment and motivation, must equally be considered as a source for production inaccuracy, even though difficulties for non-native speakers are real (cf. Krashen's Monitor Model). The review of both the differences between English and French and the typical perception and production difficulties encountered by French

EFL learners has been crucial for the development of the experimental protocol, test stimuli, and teaching materials of the present thesis, as explained in Section 4.

We have raised the question of the impact of segmental errors in comparison with that of prosodic errors on communication situation, as addressed in the experimental study that we develop in this thesis. As a matter of fact, there is a strong interdependence between suprasegmentals and segmentals:

> At the production level it is much easier for students to produce the prosody correctly if they are made aware of this variation in segmental pronunciation, while, reciprocally, it is easier for them to get the segmental pronunciation, including reductions, correct when they manage the prosody properly. (Kjellin, 1999: 385)

As was previously explained, many L2 segmental errors are directly caused by prosodic inaccuracy. Some segmental phenomena in English, including changes in vowel quality (e.g., vocalic reduction), are the direct consequence of suprasegmental phenomena such as lexical stress assignment and stress-timing, which is why a learner should be made aware of the importance of suprasegmental aspects from the beginning of the learning process.

Abercrombie (1967: 20-21) reflects on the origins of the difficulties in the L2 learning process:

> […] everybody is capable of pronouncing anything with no difficulty – though this is true only up to a certain age. A child, provided it has sufficient incentive, can attain effortless perfection in the pronunciation of any language with which it may come into contact. When we grow older, however, and have a foreign language to learn, a level of performance comparable to that reached by the child is something for which we have to work very hard.

The early stage at which the acquisition of the mother tongue begins, even intra-uterine, in both perception and production, as was explained in Section 2, is an important

explaining factor for the difficulties that a non-native speaker encounters in the learning of a second or foreign language, and the roles that prosody and segmentals have in the L1 acquisition process seem to illustrate how a foreign or second language is acquired or should be taught and learnt.

4. EXPERIMENTS

The two preceding sections have set up a theoretical background on the English phonological system and its acquisition by French speakers. The acquisition studies (Section 2) and the contrastive analysis of the English and French systems (Section 3) have fed into the conception of our experimental study, detailed in the present section.

The first subsection (4.1) explains the experimental design, presenting the ultimate objective of this study and our general hypothesis. In 4.2, we first discuss the pilot study that we previously conducted, the methodological limitations of which have given rise to the conception of the full-scale study that forms the experimental backbone of the present thesis. Then, based on the theoretical framework and knowledge provided in Sections 2 and 3, we present the details of the revised experiment, the pre-test/treatment/post-test protocol, the informants, and the two different treatments (the *Segment-based teaching approach* and the *Prosody-based teaching approach*). Subsection 4.3 focuses on the production tests that the participants took, the stimuli of the tests, the method, and the results, followed by a discussion. Subsection 4.4 similarly presents the protocol, results, and discussion of the perception tests of the study. Finally, a general discussion is provided in 4.5.

4.1. Introduction

As explained in Section 2, L2 pronunciation teaching, especially EFL pronunciation teaching in France, tends to revolve around the segmental level and sometimes overlooks prosodic aspects completely. However, some experimental studies, as well as the analyses presented in Section 3, reveal that segmental deviations may not affect communication and intelligibility as much as is often thought, although they do increase foreign-accentedness, even when purely phonetic errors are made. Suprasegmental errors, by contrast, affect communication negatively, and contrary to many segmental errors, the context can hardly ever play a disambiguating role. That is why a number of linguists have claimed that it is the suprasegmental features that should be given the priority in L2 learning and teaching methods, given their crucial importance to intelligibility, comprehensibility, and foreign-accentedness, and some studies even supported the claim. To date, no experiment has been conducted to compare a segment-based teaching approach and a prosody-based teaching approach and their effects on the L2 production and perception abilities of French learners of English as a foreign language.

Our aim is to experimentally evaluate the effect of prosody-centred teaching in comparison with the effect of segment-centred teaching to French EFL learners, who are known for facing difficulty in attaining a proper mastery of the English language. Our central research question can be summarised as follows:

Does L2 prosodic learning have a greater impact on French EFL learners' speaking and listening skills than L2 segmental learning?

While we do not argue in favour of a separation of L2 suprasegmental and L2 segmental teaching, which is irrelevant and counterproductive, we intend to determine whether native English speakers attach more importance to prosodic accuracy than segmental accuracy, and whether prosodic errors have a more negative impact on communication than segmental errors. The hypothesis that L2 prosody should be prioritised has been put forward over the last decades by different linguists exploring various languages and types of speakers (Celce-Murcia et al., 1996; Derwing et al., 1998; Frodden & McNulty,

1996; Herry, 2001; Horgues, 2010; etc.). If confirmed, EFL teaching materials and methods should centre on prosodic features, rather than individual sounds as is often the case, and teachers should accordingly be made aware of the primary importance of these aspects of English before being able to pass the correct habits on to their pupils. Frodden and McNulty (1996: 103) go further and claim:

> Another reason for focusing on the suprasegmental aspects of English is the fact that it not only enhances students' intelligibility, but also makes native speakers of the language more intelligible to them. Work on the rhythm of English will teach them to chunk utterances by paying attention to pauses and to stressed words, because those are the ones that carry the meaning of the utterances.

Training learners in L2 prosody may be more beneficial to both their speaking and listening abilities in English than training them in L2 segments only.

In the following subsection, we first present the pilot experiment that served as a basis for our central experiment, before explaining the choices and method of the revised study.

4.2. Experimental protocol

4.2.1. Pilot study

Participants and procedure

Before conducting the central full-scale study, described in the next subsection, we elaborated a pilot experiment (see Capliez, 2011a). This pilot study was based on the recurrent claim that L2 prosodic training should have a more beneficial effect on learners' oral skills than segmental training, which is why a pre-test/treatment/post-test design similar to the other studies discussed previously (e.g., Derwing et al., 1998) was developed to measure the impact of a teaching approach based on English segments and another one based on English prosody on the production skills of French-speaking learners of English as a foreign language. The objective was to observe whether the students that were trained on English prosodic features would show better results in a production task than the "segmental" group.

The participants selected for this pilot experiment were 10 French speakers with a mean age of 20.2 years (ranging from 18 to 23). All of them used English in a school context only and had never been to an English-speaking country for more than three days. They were not specialists of English, that is, their studies were not focused on English, which was only a compulsory subject as it always is in French secondary schools. They had never studied English phonetics, phonology, or linguistics. From all this information, two balanced groups were formed: one which would be trained on English vowels and consonants, and a second group which would focus on English stress, accent, and rhythm.

Before the training sessions began, all the participants took a production task in which they read 10 words (monosyllabic and disyllabic) and 10 sentences which had previously been created taking into account the typical segmental and prosodic difficulties that French speakers encounter with English pronunciation (cf. Section 3). For instance, the sentence *I'd like to speak to the manager* illustrated the tense value /aɪ/ of the vowel <i> in *like* due to the VC*e*# sequence (i.e., vowel + consonant + <e> in final position), and the stress-timed rhythm with an alternation between stressed and unstressed syllables – the final one being the nuclear syllable *man-*.

After the initial recordings, the segmental group practised the realisation of English phonemes that are usually difficult for French learners (/θ/, /ð/, /r/, and /h/ for consonants; lax vs. tense values for vowels and the main contexts in which they are found: vowel + consonant #, vowel + consonant cluster, vowel + consonant + <e>). The prosodic group practised lexical stress realisation and placement, nuclear accent placement, and rhythm – particularly identifying which elements to stress/unstress in an utterance. The training sessions did not include the items of the pre-test. At the end of each training session, the participants took the same test as the pre-test, with the items randomised differently from the pre-test session.

The productions in the pre- and post-tests were recorded for later analysis using a computer and the software *Audacity*[9]; in total, there were 400 files ([10 words + 10 sentences] x 10 speakers x 2 sessions). All the recordings were then evaluated by three listener-judges: an Englishwoman, an American woman, and a (non-native) specialist in English phonology. They were asked to score the "global quality of the speaker's pronunciation" in each of the recordings, using a scale from 1 (= very bad) to 7 (= native-like). These evaluations were blind, as the evaluators did not know the aim of the experiment, nor the number of speakers, and all the productions by the French learners – pre-tests and post-tests – had previously been randomised.

Results and limitations

The within-groups analyses of the production tests taken by the 10 participants revealed that both groups significantly improved their speaking (i.e., reading) abilities after their training. However, it is the learners from the S-group – who were trained on English segmentals – who showed a significantly greater difference from the pre-test session to the post-test session. As a result, it appeared that the segment-based training had a better effect on the French learners' speaking skills than the prosody-based training. Nevertheless, the outcome of this pre-study may be questioned for various reasons, which are listed below.

This pilot study suffers from a number of serious limitations. First, the very small number of participants in the study (N = 10), and therefore the number of participants

9 http://audacity.sourceforge.net/?lang=fr

per experimental group (n = 5), motions to caution to draw any firm conclusions. Even though working with such a small number of learners had the advantage of giving them more personal attention through individual and possibly more adapted training, it still raised the issue of external validity, that is, generalisability to a wider population of EFL learners. To strengthen the external validity of the new experiment described in the next subsection, we have decided to increase the number of participants considerably (N = 36).

Second, the lengths of the two training conditions were insufficient. The pilot experiment particularly aimed at testing the effect of one specific pronunciation lesson; however, the impact and efficacy of such short and single training on a learner's long or short term interlanguage phonology may be rather modest. A longer training session thus seems necessary to increase the impact of teaching, as in previous experiments.

Third, as far as the stimuli are concerned, we used both words and sentences in the reading task, but the use of monosyllabic words is not so convincing, nor is that of disyllabic words with a 01 lexical stress pattern (i.e., stress on the final syllable), particularly so because there is a stronger tendency in English to 10 patterns (Cutler & Carter, 1987). Such isolated words, acting as their own prosodic phrases, do not quite show evidence of prosodic difficulty for French speakers, whose mother tongue already tends to stress/lengthen the very last syllable of a phonological phrase (see Section 3). Consequently, the segmental group might have been favoured in the tests, since the focus of their training was the individual sound. In the new experiment, we have therefore revised all the stimuli, strengthening the balance between segmental and suprasegmental features (for example, excluding isolated words with a 01 stress pattern).

A fourth possible objection to the protocol of the pilot experiment is that although the two groups took a pre-test which served as a baseline to show the subsequent difference in performance after the training, the experiment did not have a control group receiving no training at all. Moreover, no independent proficiency test in English language had previously been taken by the participants (in addition to the more subjective questionnaires that they had filled in). Both shortcomings have been remedied in our revised experiment.

The outcome of the pilot experiment may also have been influenced by the fact that the listeners who scored the productions had different linguistic backgrounds, different experiences with the study of English phonology and with evaluation in general, and different contacts with the French-speaking world. One rater was a linguistically-untrained Englishwoman, the second rater was an American woman who taught English to French learners, and the third rater was a non-native EFL teacher specialised in English phonology and phonetics. Although an inter-rater reliability test showed that their agreement on the ratings was sufficiently high (Cronbach's alpha > 0.8), a more homogeneous group of listeners – all from the same country, for example – might have rendered the results more convincing. In addition, the results would be even more convincing with more evaluators, and with yet even more precise instructions and criteria than merely rating the L2 performances on a scale. In the revised experiment, we have therefore increased the number of evaluators (10 in total) and given them more precise scoring instructions.

Finally, our pilot study only tested the learners' read production, to keep matters manageable. Even though laboratory speech enables a researcher to control for the phonological features that the speaker will produce, it is, on the other hand, harder to generalise the results to natural, spontaneous speech, where prosodic features have a major role to play. Within the time constraints set by the context of the pilot experiment and the challenge of finding participants and evaluators, the results have not only revealed a certain tendency, but the pilot study has been useful for the development of a full-scale study, described next.

4.2.2. Revised study: participants and method

Based on the results and insights provided by the pilot study, we have set up a revised pre-test/treatment/post-test experiment to measure the impact of L2 prosody-centred training compared to that of L2 segment-centred training in the evaluation of the successful acquisition of English as a foreign language by French speakers, as evaluated by native speakers. This design is similar to that used in the pilot study and some other studies such as Derwing et al. (1998), Missaglia (1999), or Akita (2005). Generally speaking, having a pre-test reinforces internal validity (see Dimitrov & Rumrill, 2003)

and enhances the power of the study. For this full-scale study, unlike the aforementioned pilot experiment, the participants' production abilities (read speech and spontaneous speech) and perception abilities were tested.

The major revisions from the pilot test include the following. First, there was a considerable change in the selection process of the French learners (see next subsection). Second, we included two production tests and two perception tests (listening comprehension) in the experiment, with more varied tasks in both parts. Third, three balanced, heterogeneous groups were formed: the Segmental group (S-group), the Prosodic group (P-group), and a Control group (C-group). As in the pilot experiment, all the participants took post-tests (the same as the pre-tests) after they had received their training (or none, in the case of the control group). Finally, the selection process of evaluators for the L2 productions was more accurate.

Participants and groups

The participants of the study were native French-speaking learners of English as a foreign language. They were non-beginner first-year university students. Even if using beginner learners might be desirable at some point to assess the effect of L2 teaching methods, the problem of their ability to produce spontaneous English or even take a simple listening test is a major impediment. Each of the potential participants filled in a questionnaire (see Appendix B for full questionnaire), enquiring about their age, mother tongue, knowledge of foreign languages, knowledge of phonetics and phonology, familiarity with the English language, length of study of English, etc. In order to work with a representative group of typical French EFL learners, the requirements for selection were as follows: the participants had to be native French speakers living in a French-speaking country, with no English relatives; their amount of exposure to the English language was controlled for, as they were supposed to have studied English as a foreign language at school only, preferably after the age of 7 (cf. the Critical Period hypothesis presented in Section 2), and none of them was to have spent more than two weeks in an English-speaking country.

The selected participants were doing their current studies in the same university, and they all followed the same weekly English classes outside the scope of the experiment.

Those classes comprised grammar, written comprehension, the discovery of the Anglo-Saxon culture, translation, and oral comprehension. When asked if they thought that they had a specific English accent (American, Irish, etc.), all of them answered negatively. They also claimed never to have learnt English phonology or phonetics, IPA alphabet inclusive. For consistency purposes, their dialectal background was also controlled for; they were all from and lived in the north region of France (*Nord-Pas-de-Calais*).

In addition to the questionnaires about the participants' profiles and their experience with English, an independent English language proficiency test was organised for all of them so that heterogeneous yet balanced groups could be formed on a more objective basis. The test was *ELAO* (standing for *Efficient Language Assessment On-line*), which all the students took at their university. Like many other proficiency tests, this one assesses reading abilities, listening abilities, vocabulary, and grammar, but it does not contain any production tasks. Despite this shortcoming, the results were deemed sufficiently adequate as a basis to form groups based on the speakers' overall proficiency levels in English. The results of the tests gave the levels using the terminology of the Common European Framework of Reference for Languages in which six possible levels describe the learner's competence: A1, A2 (basic user), B1, B2 (independent user), C1, C2 (proficient user). The students with an A1 level would not be selected, nor would those with a C1 or C2 level as this higher proficiency level was considered to be less representative of an average group of French EFL learners. Two students that had initially been contracted had to be excluded from the experiment for not meeting several criteria; both of their levels of English were C1; one of them regularly spent time with native English speakers and used English in his daily personal life; the other student was not a native French speaker. Still, they pro forma participated in the experiment so as not to arouse suspicion among the students, who were unaware of the purpose of the study. However, those two students are not included in the description of the data below. In total, we had a sample of 36 French learners of English, who were equally distributed over each of the three experimental conditions (12 participants in each group).

Concerning the conditions of the experiment, three groups (k = 3) were created and received different treatments (in our case, different teaching approaches): one group was trained on English segmental features (henceforth called the Segmental group, or S-group), one group received training on English suprasegmental features (the Prosodic group, or P-group), and the Control group received no treatment (C-group). The creation of the three groups was built on the students' results in the English language proficiency tests and the questionnaires that they had filled in. Based on the close analysis of all those elements, each of the 36 participants was assigned to a specific group, so that the three of them would be balanced and heterogeneous. Table 2 below gives the detailed information on the groups.

	SEGMENTAL	PROSODIC	CONTROL	TOTAL
N° of participants	**n = 12**	**n = 12**	**n = 12**	**N = 36**
N° of male participants	2	2	2	6
N° of female participants	10	10	10	30
N° of A2 level	2	2	2	6
N° of B1 level	6	6	6	18
N° of B2 level	4	4	4	12
Ages (range)	18-23	18-21	18-21	18-23
Age (mean)	**19.25**	**18.83**	**18.83**	**18.97**
Ages of onset of learning (range)	7-11	7-10	7-11	7-11
Age of onset of learning (mean)	**9**	**8.75**	**9**	**8.92**
Years of study of English (range)	8-12	7-13	7-12	7-13
Years of study of English (mean)	**9.5**	**9.67**	**9.42**	**9.53**

Table 2. Participant and group information

The mean age of the participants – consisting of 30 women and 6 men – was 18.97 years, ranging from 18 to 23. The mean age at which they began studying English – in

primary school for all of them – was 8.92, and the average length of (continuous) study of the language was 9.53 years.

Each group was made up of the same number of students with an A2 level of English, with a B1 level, and with a B2 level. Each consisted of two men and ten women. As much as possible, they were balanced for age, age of start of English at school, and length of study of English. Tables 3, 4, and 5 below give the details of each of the three groups. The participants of the S-group are referred to with the letter S followed by numbers from 01 to 12. Those belonging to the P-group are referred to with the letter P and the numbers 01 to 12. Those of the C-group are numbered from 01 to 12 preceded by the letter C.

PARTICIPANT	GROUP	GENDER	AGE	LEVEL OF ENGLISH	AGE OF ONSET OF LEARNING	YEARS OF STUDY OF ENGLISH
S01	S-Group	M	21	B1	10	10
S02	S-Group	M	23	A2	10	12
S03	S-Group	F	21	B1	7	8
S04	S-Group	F	18	A2	7	11
S05	S-Group	F	18	B1	7	11
S06	S-Group	F	18	B2	8	10
S07	S-Group	F	19	B2	10	8
S08	S-Group	F	18	B1	9	9
S09	S-Group	F	19	B2	9	11
S10	S-Group	F	18	B1	10	8
S11	S-Group	F	20	B1	11	8
S12	S-Group	F	18	B2	10	8

Table 3. Segmental Group

PARTICIPANT	GROUP	GENDER	AGE	LEVEL OF ENGLISH	AGE OF ONSET OF LEARNING	YEARS OF STUDY OF ENGLISH
P01	P-Group	M	18	B2	10	8
P02	P-Group	M	21	B1	8	13
P03	P-Group	F	19	B1	8	10
P04	P-Group	F	18	B2	8	10
P05	P-Group	F	20	B2	7	13
P06	P-Group	F	18	B1	10	8
P07	P-Group	F	18	B1	8	10
P08	P-Group	F	19	A2	8	9
P09	P-Group	F	18	B1	10	8
P10	P-Group	F	19	B1	8	10
P11	P-Group	F	20	A2	10	10
P12	P-Group	F	18	B2	10	7

Table 4. Prosodic Group

PARTICIPANT	GROUP	GENDER	AGE	LEVEL OF ENGLISH	AGE OF ONSET OF LEARNING	YEARS OF STUDY OF ENGLISH
C01	C-Group	M	18	B2	7	11
C02	C-Group	M	19	B2	9	10
C03	C-Group	F	19	A2	11	7
C04	C-Group	F	19	B1	7	12
C05	C-Group	F	19	B1	9	9
C06	C-Group	F	18	B1	8	10
C07	C-Group	F	20	B2	8	12
C08	C-Group	F	18	B1	10	8
C09	C-Group	F	18	A2	10	7
C10	C-Group	F	21	B2	9	11
C11	C-Group	F	19	B1	11	7
C12	C-Group	F	18	B1	9	9

Table 5. Control Group

No one was paid to complete the experiment, as they were led to believe that the training sessions were part of the usual English course requirements.

Statistical tests were performed to determine whether the three groups differed in mean age, age of start of English, and length of study of English. A one-way analysis of variance (ANOVA) was conducted for each of these variables, setting the alpha level at $\alpha = 0.05$. We found no statistically significant differences in mean age ($F(2, 33) = 0.4443$, $p = 0.645$), in age of start of English ($F(2, 33) = 0.1467$, $p = 0.864$), or in length of study of English ($F(2, 33) = 0.062551$, $p = 0.939$). Consequently, the participants of the three groups could be considered fairly equal to one another, whether concerning their characteristics or their proficiency levels in English.

4.2.3. Treatments

Each group received a different treatment, which corresponded to a different teaching approach on certain aspects of English phonology – particularly those that present some

difficulties for French speakers, as reviewed in Section 3. Despite these different conditions, none of the participants knew about the goal of the study. They thought that the *pronunciation lessons* – as we would call the experimental training conditions – were part of their usual English lessons and academic syllabus and that the tests – called *tasks* – were part of the examination process. They were not explicitly informed that the different groups would receive different types of such pronunciation lessons.

Apart from the issue of the participants' personal motivation, we had to cope with the widespread problem that many university students in France often do not attend classes, or only selectively, believing that it is not compulsory or systematically controlled by teachers. Therefore, they had been told that attendance to the classes was compulsory and it would be taken into account in their final marks in English. Also, the experiment took place during the second academic semester, which increased chances that the present students were regular and most likely to attend every class of the semester.

In this subsection, we will only consider the two experimental treatments and leave the control group (who did not receive any treatment although they did have English classes at university, as explained above) out of consideration. Although segmentals and suprasegmentals are interdependent aspects and unavoidably in contact with each other, we developed two approaches with each a different focus. In fact, this study does not so much assess two different teaching *methods*, but rather two approaches with different *focuses* (segmental features vs. prosodic features).

One of the methodological limitations of the pilot study concerned the short punctual type of training that the subjects had received (one two-hour training session). However, the length and amount of instruction must be sufficient in such a comparative experiment to increase the chances that the pre-post difference is due to the experimental conditions (Krashen, 1981). To accommodate that, the whole treatment in our revised experiment took place over one academic semester, consisting of 12 weeks. The training consisted of 10 weekly sessions, each lasting about 40 minutes – so that their possible concentration limit was probably not exceeded (as recommended by E. Soroli, 2012: personal communication).

We personally taught both training sessions, which was motivated for several reasons. First, finding external teachers, as was the case in Derwing et al.'s (1998) experiment, posed an insurmountable practical problem in that none of the English teachers had sufficient knowledge of English phonology at the university where the experiment took place, and no one's timetable allowed them to be involved. Second, it enabled us to control for undesirable interference of suprasegmental teaching in the segmental training, and vice versa – although, as will be explained below, some features are at the crossroads between segmentals and suprasegmentals, and a complete separation of the two aspects is neither possible, nor desirable. Finally, a major reason was that we were the participants' usual English teacher, and they were supposed to think that the pronunciation lessons were part of the normal syllabus.

The limited length of the treatment period constrained us to make some choices in the contents of the two types of training, not only because it would have been impossible to teach each and every phonological aspect in either experimental condition, but also because the objective was not to make the learners become experts in segmentals or suprasegmentals. As pointed out in Jenkins (1998, 2002), choices in L2 pronunciation teaching contents must take into consideration what are called *core* and *non-core* aspects of pronunciation – the former being given the priority over the latter – , in addition to considering the learners' L1 background. The first choice to make was the variety of English that was to serve as a model in the lessons. This decision had considerable importance for the selection of native speakers that would score the L2 productions. Some authors have suggested to centre teaching methods on what is important to intelligibility for any native or non-native English speaker. According to Jenkins (1998: 119), “the acquisition of a native-like accent is no longer the ultimate objective of the majority of learners, nor is communication with native speakers their primary motivation for learning English”. In the same respect, Cruttenden (2008) mentions what he calls “Amalgam English”, which is based on the English phonological features that could be understood by any native or non-native speaker. Similarly, Brown (1988) tried to develop the notion of *functional load* in the field of L2 acquisition. According to him, many features, especially phonemic contrasts (e.g., /ʊ/ – /u:/) which are often typically emphasised by L2 teachers, in fact have low functional load; this

means that a confusion between those sounds is unlikely to occur and cause miscommunication (see Section 3). For example, a situation in which one could misunderstand *should* for *shoed* is unlikely to occur. Consequently, those authors recommend that L2 teachers should go through a selection process before teaching pronunciation to non-native speakers. By contrast, Finch and Ortiz Lara (1982) point out that RP English or GA English, which contain no regional characteristics, should be considered.

As far as our experimental treatments are concerned, a specific variety of English was indeed used consistently, all the more so as the training sessions had to resemble typical pronunciation lessons, and most EFL materials in France adhere to one specific variety. As a result, we chose Received Pronunciation "RP" English – sometimes called BBC English (Roach, 2009; Trask, 1996). There are several reasons for this choice: (a) even though effectively spoken by very few native speakers, it is a well-known and widely-taught variety across the world; (b) it is the most frequently used model in France and other countries in EFL and ESL teaching; and (c) it would simplify the finding of native speakers to be the evaluators of the productions, not only because the United Kingdom is geographically close-by, but also because one may well expect that all British English speakers find RP easy to understand, this accent often being the "standard" – in the media, for instance – and devoid of any marked features. Nonetheless, as detailed below, some choices were bound to be made regarding the phonological aspects to include in the lessons, in so far as teaching everything about RP English segments or prosody is impossible even with several lessons spread over several months. The theoretical background provided in Section 3 served as a reference.

Although the experimental groups were heterogeneous, the training was the same for every student within a group. To ensure that the students with the lowest level (A2) were able to understand the lesson as well as the students with the highest level (B2), many technical terms and metalanguage (e.g., prosody, phoneme, stress-timing, etc.) were avoided. Before the training sessions began, their contents and corresponding written documents were examined by two linguistically-inexperienced French learners not belonging to the experiment in order to assess clarity and understandability, and possibly bring some alterations. None, however, was required. All the lessons were

given in French to enhance clarity and understandability for the learners, who were not specialists in English and had different levels of proficiency. As far as the methods and documents are concerned, they were inspired by those used by Finch and Ortiz Lara (1982), Fraser (2001), Herry-Bénit (2010), Huart (2002, 2010), Kjellin (1999), Ladefoged (2001), Marsaleix (2005), Roach (2009), and the English phonetics compendiums from Université Lille 3 (Lemmens, 2010). The analysis of the differences between the French and the English systems, as described in Section 3, was of particular use because it enabled us to insist on the specific features that French speakers typically consider difficult about spoken English (see the next two subsections).

Both types of training included theoretical notions and many examples accompanying any new linguistic concept, with many chorus and individual repetitions. Frost (2004) found that a group of learners that learnt theoretical notions on a phonological aspect, listened to a model (i.e., the teacher), and then got accustomed to repeating showed better results than a group that did not follow this method. We thus used this method; we systematically pronounced any target item several times first to increase the chances that the learners acquire the model (Frodden & McNulty, 1996; Kjellin, 1999); then, each student had to individually repeat all the items, and the teacher corrected and encouraged them. Chorus practice was also systematic, given its efficacy in previous studies (Kjellin, idem). At the beginning of each training session, a recap of the previous class was given and the students could freely express themselves on any point that had been treated previously.

Once again, to avoid any bias towards either treated group, the number of opportunities that the participants had to repeat a target sound, word, or phrase was equal in the two groups. In other words, the number of examples was equal in the two types of materials used in the different conditions. The stimuli of the pre-tests and post-tests were never used in the either type of training. To avoid the undesirable interference of the other aspect in a specific type of training, prosodic features (i.e., lexical stresses, tonic accent, rhythm, intonation) were not mentioned during the S-training classes and prosodic errors were not corrected in the S-participants' productions; conversely, segmental errors (i.e., typically, mispronunciations of consonants and vowels such as the dental fricatives or the glottal fricative) were not corrected or mentioned with the P-

group. It is crucial, however, to remember that many segmental aspects are dependent on suprasegmental phenomena, and we wish to remind the reader that our objective is not to argue in favour of a separation of the two aspects – which would be impossible – but rather to understand whether EFL learners would benefit from receiving a teaching that places prosodic aspects before segmental ones, as has frequently been claimed in the SLA literature. As far as the schwa is concerned, its articulation was part of the S-training like the other English vowels, but it was not explicitly taught in the P-training although vocalic reduction (using nonsense words) was explained when describing word and sentence stresses, emphasising the de-stressing and reduction phenomena rather than the articulation of the quality of the vowel (see the following subsections).

The conception of the teaching materials took several months. Our pedagogical objectives were that the students would acquire theoretical knowledge on English segments or prosody. Nevertheless, the objective of the training was not quite to test a total separation of segmental teaching and suprasegmental teaching, but to test the effects of focusing L2 pronunciation teaching on either segmental aspects, or suprasegmental aspects. Through the numerous examples, the objective of the lessons was to give the students the necessary tools to be able to generalise the acquired knowledge to other linguistic items and other communication situations. Finally, the listening to a model (i.e., the teacher), oral practice, and repetitions were meant to help all the learners improve their production skills, whichever group they belonged to, but also to develop their oral comprehension abilities and thus be able to understand spoken English from other sources than the teacher. The following subsection provides further details on the lessons, the materials, and the target linguistic features of the training sessions.

Segment-based approach

For the treatment of the S-group, the objective was to make the learners acquire generalisable notions and experience in the production (and perception) of English vowels and consonants. The differences with the French phonemic inventory were particularly emphasised.

The S-training differed from the P-training in that it mostly concerned the sound level and the syllable (or monosyllabic lexical word) level. No grammatical words, polysyllabic words, phrases, or full sentences were present in the examples of the lessons. The students' prosody, including lexical stress and intonation contour, was never corrected or mentioned, as only the realisations of individual sounds were focused on. Overall, several aspects were included, with a combination of elements of phonemics, articulatory phonetics, phonotactics, and graphophonemics. However, some aspects were more emphasised than others, taking into account the differences between French and English and learners' typical difficulties and predictable production errors. For example, we insisted on the differences at the phonemic level, although we included the phonetic analysis of some sounds, especially the distinction between some allophones such as the aspirated voiceless plosives – which is crucial to the understanding of a word (e.g., *pie* vs. *buy*). As recommended by Cruttenden (2008), the allophones of /l/ (especially the clear vs. dark/velarised /l/ distinction) were considered less important, because they do not discriminate among words and many accents of English do not contain that distinction. The author reminds the reader that "[…] learners will be perfectly intelligible if they use only [l]" (Cruttenden, idem: 218).

Vowel length and pre-fortis clipping (i.e., the phonetic shortening of a vowel sound before a fortis consonant) were not part of the training, either. Those two aspects would not only have rendered the lessons more complicated for the linguistically-untrained learners, but they are also too much connected with prosodic aspects. Similarly, there was no teaching of the reduced forms of grammatical words as that depends on rhythm and the sentence level, which was part of the Prosodic training. As for graphophonemics, that is, the relationships between sound and spelling, it was regarded as necessary for the learners to be able to generalise and apply the lessons to other linguistic items. The work of Deschamps et al. (2004) was useful for the conception of the teaching materials and the oral explanations.

The segmental training followed a specific order to teach segmental features during the 10-week period, with the help of a written document/compendium that was used all along. The lessons unfolded as follows:

1) International Phonetic Alphabet: the IPA was introduced, not so much for the students to learn it by heart, but mostly for simplicity and convenience in the various explanations. The learners were allowed to keep the alphabet with them and to refer to it during the lessons, since the main focus of the training was on the articulation and oral practice of the sounds.

2) Realisation of the English consonants: the students were taught to articulate the consonants properly, being reminded that the letters may be the same in the two languages, but their pronunciations are different. We decided not to include the phonetic alveolar vs. dental realisations of consonants like /t/, /d/, and /s/, because it does not lead to misunderstanding, and even some English speakers produce those sounds as dental rather than alveolar, and conversely for French speakers (Mortreux, 2008). Instead, the following points were included: the realisations of the dental fricatives /θ, ð/, which French learners typically replace with /s, z/ although the distinction bears high functional load (Brown, 1988); the voiceless fricative /h/; the post-alveolar approximant [ɹ]; the aspiration phenomenon of the plosives /p, t, k/ in initial position because it is thought to cause misunderstanding if not realised properly (Roach, 2009). In the written document given to the students, the examples (i.e., the items for oral practice) included typical minimal pairs such as *thin – sin – tin* and *pie – buy.*

3) English consonants and spelling: the main rules concerning the identification of the consonant sounds in spelling were covered, even if some of them might have seemed evident or easy (<h>, <th>, <r>, the identification of aspirated voiceless plosives, but also the <ch> /tʃ/ vs. <sh> /ʃ/ distinction, and the values of <j> and <g>). Some occurrences of silent consonant rules were given (<l> in <-alf>, <-alk>, <-alm>; <k> in <kn>; <gh> in <-ght>; <t> in <-sten>, <-stle>), leaving out less common ones such as the silent <p> in the sequence <ps->. The examples comprised cases such as *calf, wrestle, kneel,* or *fright.*

4) Realisation of the English vowels: the lax/tense dichotomy was introduced, based on all the RP vowel sounds but not so much emphasising typically RP centring diphthongs such as /ɪə/ and /ʊə/, the misproduction of which does not lead to

misunderstanding as they are not even present in many other English accents (Cruttenden, 2008). Also, non-rhoticity was not taught; producing /r/ in all contexts should be no impediment to a native listener, because many English accents – even from the British Isles – are rhotic. The book by Herry-Bénit (2010) was useful for explaining the articulation of some vowels from a French speaker's point of view (e.g., lax /ɪ/ being closer to French <é> /e/ than French <i> /i/, contrary to what most learners think). Once again, certain purely phonetic details, such as the difference between the realisation of the sequence of French vowels [aj] instead of the English diphthong [aɪ] (Herry-Bénit, idem), were disregarded as of little use. The distinction between lax vowels and tense vowels was particularly emphasised overall, not insisting too much that the difference lies in the length (nb. pre-fortis clipping phenomenon was not taught) but mostly that the quality of the vowel determines its value (e.g., the /ɪ/ – /iː/ distinction is especially a question of quality, one being closer to French /e/ and the other to /i/).

5) English vowels and spelling: the basic rules to determine whether a vowel has a lax or tense value were given: VC#, VCC, VC*e*. Other graphophonemic rules included the values of the most common digraphs (<au/aw>, <ea>, <ee>, <oo>, <ou>, <ow>, and the three possible realisations of the morpheme <-ed>), and the values of some vowels in specific contexts (<V+gn(e)>, <V+ste>, <wor+C>, <f/p/b+u+ll/sh/tch>). As the priority was the individual sound, typical minimal pair drill exercises were included (e.g., *sit – site*, *cat – Kate, fill – feel*), but nonsense monosyllabic words were also used to explain the articulations of sounds to the learners (e.g., *bab – babe, dib – dibe*).

6) General recap and further practice: at the end of the whole training, a brief summary of the important points that had been covered in all the lessons was given, and another practice session enabled the learners to produce L2 items. They first had to try not looking at the lessons to check if they remembered well and if they could apply what they had learnt about both consonants and vowels within one set of examples. As in all the previous lessons, the examples were mostly exercises in which they first had to determine, for example, the value of the vowel before checking the answer in their course notes and pronouncing the whole word. A final important aspect was the practice

of the voiceless fricative /h/, not only its realisation when the letter <h> occurs, but also its non-realisation in words beginning with a vowel. As was explained in Section 3, the phenomenon of intrusive [h] is very common among French speakers., which is why the examples contained minimal pairs such as *heart – art* and *heat – eat.*

Prosody-based approach

Bolinger's (1972) famous paper suggests that it is impossible to predict stresses and accents, as many rules have many exceptions. Many authors indeed agree that suprasegmentals are quite hard to teach to learners, making segmentals obtain the priority (Burgess & Spencer, 2000). Nevertheless, we developed lessons emphasising the main prosodic features of English: stresses, accents, rhythm, and intonation. The P-group followed a very similar method to the S-training, aiming at having the participants acquire generalisable theoretical background and practical experience in the production (and perception) of some important suprasegmental features in English. Once again, the differences with the French system were highlighted.

Contrary to the S-training, the P-training concerned the polysyllabic word level and the sentence level. The students' realisations of individual sounds were never corrected or mentioned, although vocalic reduction was implicitly included as part of the lesson on lexical stress and rhythm. The written document that was used for the lessons was exactly as long as the one used for the S-lessons, and they contained as many examples to repeat, so that each P-participant practised speaking as many times as each S-participant. The prosodic training followed a specific order in the teaching of suprasegmental features:

1) Word stress: the first lessons were an introduction to English lexical stress, starting with its definition and realisation. A simple polysyllabic word with a 010 stress pattern (*computer*) served for practice. Just as the S-group was introduced to the IPA alphabet as a visual aid, a simple marking system (i.e., the diacritic ˈ) within the text was adopted for the P-training lessons, as well as dots placed immediately under the word to represent syllables, with a larger dot representing the stressed syllable (Finch & Ortiz Lara, 1982; Wong, 1987):

com'puter
. ● .

As the objective was to centre the teaching on suprasegmentals, we, when explaining how to produce the items, systematically uttered non-linguistic syllables (e.g., *na'nana* [nə'nænə] or *ta'tata* [tə'tætə]) throughout the training. As for the students, they produced the real items as printed on the documents, only their pronunciations of individual sounds were not corrected (e.g., the substitution of /θ/ with [s]). In addition, we decided to focus on primary stress, following Cruttenden's (2008: 238) claim:

> Although many longer words contain primary accented syllables, secondary accented syllables and prominent syllables based on vowel quality alone, it is the position of the primary accent which contributes most to a word's accentual pattern (and which will be the principal cue to the nuclear tone [...]).

The introduction of lexical secondary stress would have made the training longer, more difficult because of the numerous rules, and therefore unbalanced compared to the S-training.

As Field (2005: 420) points out, "one way to present English lexical stress is through a set of rules […]. Clearly, mastering a rule is very different from internalizing a stress pattern for a specific item". The second part of the lesson on English lexical stress thus consisted in providing the students with the major rules that would enable them to stress a word correctly (see Deschamps et al., 2004). The tendency, mentioned by Roach (2009), concerning disyllabic words (oxytone, i.e., 01 stress pattern for verbs, and paroxytone, i.e., 10 stress pattern for nouns and adjectives) was explained – albeit nuanced. Then, most stress-imposing endings (*-oo*, *-een*, *-ic(s)*, *ION* rule*,* proparoxytone stress patterns, *-ate*, *-ity*, etc.) and neutral suffixes (*-ed, -es, -ly, -ism, -ful,* etc.) were taught. Each rule was accompanied with sets of examples, exercises in which the students had to apply the rules, and oral practice.

2) Rhythm: through the notion of lexical stress, rhythm could be introduced quite naturally. Once again, as the emphasis was the suprasegmental level, the production of words by the teacher did not really matter and again, we produced nonsense phrases

such as *tatata* or *nanana* in the explanations; the phenomenon of vocalic reduction, quite at the crossroads between segmentals and suprasegmentals, was practised when describing word and sentence stresses, emphasising the de-stressing phenomenon rather than the quality of the vowel, as previously explained, and favouring repetitions rather than theoretical explanations. The visual aid in the form of small and large dots representing unstressed and stressed syllables respectively was kept. Before the students could practise rhythm production on whole sentences, they were taught the main rules of the de-stressing of grammatical words and the stressing of content words (nouns, verbs, adjectives, etc.). In the examples printed in the documents, they were asked to place dots under the sentences by themselves, and once the correction was given, they had to practise repeating. In order to enhance the stress-timing rhythm of English and trigger unconscious practice of (relative and weak) isochrony, there were series of utterances like the following (from Reed, 2012):

(a) 'Cats 'chase 'mice.

(b) The 'cats 'chased the 'mice.

(c) The 'cats have 'chased the 'mice.

(d) The 'cats have been 'chasing the 'mice.

(e) The 'cats could have been 'chasing the 'mice.

3) Pauses: the rhythm of a language and speech fluency involve pauses and the proper chunking of speech into units. The students were taught the use of shorter or longer pauses, representing breath-groups (see Section 3 for more details). The hints given by punctuation were highlighted, although also nuanced since when there is a pause, there can be no punctuation, and vice versa. We used visual in-text marking (using "/" and "//") as in the traditional British prosodic transcription system.

4) Tonic accent: with the notions of stresses and rhythm acquired, the role and placement of the nuclear accent in an intonation unit were studied. Using the same visual aid as presented above, even larger dots than those showing lexically stressed syllables (i.e., rhythmic beats) served to indicate the syllable carrying the nuclear accent, which was also underlined in the text. The explanations aimed at emphasising the major role of English nucleus placement in that it conveys the major piece of information in an utterance. There were many examples in which the difference with the

French system was obvious, such as *I did it, 'not you!* (where French would also resort to syntactic processes, like clefts: *C'est moi qui l'ai fait, pas toi*). Students were given series of sentences illustrating the role of tonicity, such as the following:

(a) 'Peter 'lent me his 'book.

(b) 'Peter 'lent me his 'book.

(c) 'Peter 'lent 'me his 'book. […]

5) Intonation contours: according to Patel (2008, cited in Gilbert, 2008), the pitch change is not so important as long as an accent is correctly produced. However, determining which syllable in a prosodic unit carries the nuclear accent is inseparable from the notion of intonation contour (or *tone* in the Hallidayan sense). The P-students first practised the realisation of the three main English tones (i.e., fall, rise, and fall-rise) on a single word: *no*. In addition to the other visual aids, with in-text diacritics and underlining and dots underneath, arrows (↘, ↗, and ↘↗ for fall, rise, and fall-rise respectively) served to indicate the direction of the contours. This system was regarded as the better one compared with ToBI (see Section 3 for more details), which learners often consider to be more complicated (Toivanen, 2005). Finally, the meaning of each tone was presented; the similarities with French intonation stood out, although the fall-rise – which is more typical of English – needed further explaining.

6) General recap and further practice: as at the end of the S-training, the group had a brief summary of the important points that had been taught over the preceding weeks, and a final set of examples to practise the production of suprasegmental aspects. With specific sample sentences containing features that had been studied, the students had to remember and apply all the rules, adding diacritics for stresses, underlining the nuclei, indicating pauses, and adding the appropriate arrows in front of the nuclear syllables. The dots system was used again. This is an example:

'What are you ↘looking at?

• . . ● . .

Aligned with the orthographic words, the smallest dots represent the unstressed syllables, the larger dot represents the lexically stressed syllable, and the largest dot indicates the location of the nuclear accent, which is also underlined within the text. The arrow shows the movement of the pitch.

4.2.4. Summary

The development of the experimental protocol took almost one year. As previously explained, each and every single aspect of the experiment had to be carefully considered, and it was necessary to control for any factor in order to anticipate and preclude possible flaws in the methodology which might otherwise have influenced the outcome of the experiment. The prior elaboration of a pilot study, although far from being flawless, was a crucial step to observe those errors and be able to revise the experimental protocol to its current design.

Although finding volunteers in such an experiment can prove to be challenging, we were able to work with a fairly large sample of French EFL learners, whose backgrounds were meticulously studied before they were assigned to a specific condition – Segmental, Prosodic, or Control. In addition, it was possible to set up three equal groups and the various statistical tests suggested no significant differences among them. Meanwhile, the two main treatments had to take into account the heterogeneity of the groups while trying to balance the contents of the segment-based teaching approach and the prosody-based teaching approach. Their conception also took quite a long time and required a certain amount of research, materials, reviews, and tests.

As regards the testing of the participants' skills in oral English, they consisted of different tasks: word and sentence reading and conversation for the testing of their production skills, and a cloze passage and a sentence dictation for the testing of their perception skills. Like the two types of training, each test was reviewed several times before being implemented; particularly, we made sure that neither of the treated group would be favoured and that the acquired knowledge from the two treatments could equally be re-used in all the tests.

The following subsections look at the detailed conceptions, methods, and results of the two types of experimental tasks (L2 production and L2 perception respectively), which rely on the unique hypothesis that training French EFL learners in English suprasegmental aspects is more beneficial to them than training them in English segmental aspects.

4.3. Production tests

4.3.1. Stimuli and evaluation methods

For the production task, we included both a guided type of production (i.e., participants reading predefined stimuli) and spontaneous speech (i.e., participants answering questions). Controlled read speech allows us to have a uniform basis for comparison; as Bertrán (1999: 109) points out, "a laboratory corpus, made up of several 'artificial' utterances created *ad hoc* is more reliable, since it permits the isolation of the variables under study as well as the neutralisation of other factors". Similarly, Wong (1987: 16) underlines the advantage of resorting to this type of speech for the evaluator(s) of the productions, who then has(-ve) a "uniform database for every student".

The inclusion of spontaneous speech production is equally important, since "unrehearsed, spontaneous speech is arguably the most appropriate way to probe true ultimate attainment" (Moyer, 2007: 113). Spontaneous speech is comparable to natural conversation and completes the contribution of read speech in showing the major role of prosody, for example with the constant shift in tonicity according to given or new information which is not found in isolated items. Finally, being good at reading does not necessarily imply being good at speaking naturally, and vice versa; having both types of sample speech increases the validity of the results through the assessment of the students' skills.

Stimuli

Read speech collection was based on a selection of English words and sentences. The criteria that those items had to meet were the following: (a) they had to contain typical segmental difficulties for French speakers; (b) they had to contain typical prosodic difficulties for French speakers; (c) there should be as many segmental difficulties as prosodic difficulties in so far as this was possible; and (d) whichever training the participants attended, they had to be able to generalise and apply what they had learnt to the stimulus items once the training sessions were over. Therefore, all the stimulus items contained target features and were in line with the lessons of the two treatments, which means that even though the items were not present in the lessons and the examples of the training were not part of the test stimuli, their pronunciations could be identified or

guessed from the rules that had been learnt by either experimental group. Tables 6 and 7 below present the stimuli of the read speech production task. Using the International Phonetic Alphabet and based on RP English transcriptions, the words in Table 6 are transcribed with phonetic details to enhance the difficulties that French speakers might encounter. The places of lexical stresses (marked ˈ and ˌ for primary stress and secondary stress respectively) are shown. The sentences in Table 7 are transcribed phonemically (e.g., the post-alveolar approximant is transcribed /r/ instead of [ɹ]). Following a tonetic stress marks system as used in Roach (2009) and other British works, primary stresses and secondary stresses are shown, the syllables bearing nuclear accents are underlined, and arrows indicate the intonational contours, in keeping with unmarked prosodic patterns. The two tables also present the main typical segmental and suprasegmental difficulties in each item, usually causing French speakers to misproduce them.

WORD	# SYLL.[10]	FREQ.[11]	SEGMENTAL DIFFICULTY	PROSODIC DIFFICULTY
breathing [ˈbɹiːðɪŋ]	2	11.43 / 24.2	<ea> value; /iː/ vs. /ɪ/; voiced <th>; [ɹ]	Stress (10): neutral suffix
roses [ˈɹəʊzɪz]	2	6.44 / 14.91	VCe# (tense <o>); [ɹ]	Stress (10): neutral suffix
purple [ˈpʰɜːpɬ]	2	11.72 / 12.77	VCC (r-coloured lax <u> /ɜː/); aspirated /p/; syllabic velarised /l/	Stress (10): disyllabic adjective
shouted [ˈʃaʊtɪdˀ]	2	8.74 / 27.42	<ou> value /aʊ/; <-ed> value; <sh> value	Stress (10): neutral suffix
influenced [ˈɪnfluənst]	3	6.34 / 25.65	Intrusive /h/; VCC (lax <i>); <-ed> value	Stress (100): stress-imposing <-uence>, neutral suffix
unhappy [ˌʌnˈhæpi]	3	8.17 / 18.74	VCC (lax <u>); VCC (lax <a>); /h/ realisation	Stress (210): prefixed disyllabic adjective
fortunately [ˈfɔːtʃənətli]	4	10.28 / 16.33	/ɔː/; schwa	Stress (1000): stress-imposing <-ate>, neutral suffix

Table 6. Details of the words in the reading test

10 Number of syllables.

11 Frequency of the lexical words (i.e., nouns, verbs, adjectives, adverbs) in the British National Corpus. Number of instances per million words. Left number = instances in the spoken part / right number = instances in the whole corpus (written and spoken parts).

# SYLL.	TYPE	FREQUENCY OF LEXICAL WORDS IN BNC
Paul is talking to his best friend. /ˈpɔːl ɪz ˈtɔːkɪŋ tu ɪz ˈbest ↘frend/		
8	Declarative	115.85 / 114.47 ; 432.38 / 131.02 ; 253.99 / 355 ; 102.88 / 166.2
I do not buy dark clothes; I usually buy white ones. /aɪ də ˈnɒt ˈbaɪ ↘↗dɑːk ˈkləʊðz | aɪ ˈjuːʒəli ˈbaɪ ↘waɪt wʌnz/		
13	Declarative	260.81 / 124.92 ; 162.06 / 242.39 ; 58.02 / 70.56 ; 143.81 / 191.61 ; 151.68 / 238.17
The problem of climate isn't taken seriously. /ðə ˈprɒbləm əv ˈklaɪmət ˈɪzn̩t ˈteɪkn̩ ↘sɪəriəsli/		
12	Declarative	345.15 / 290.33 ; 9.8 / 28.26 ; 230.07 / 350.84 ; 41.4 / 56.48
Have you tasted this new wine? /ˈhæv ju ˈteɪstɪd ˈðɪs ˈnjuː ↗waɪn/		
7	Interr. Y/N	28.91 / 40.42 ; 633.82 / 1261.5 ; 38.91 / 61.56
Why didn't he forget about it? /ˈwaɪ ˈdɪdn̩t i fə↘get əˌbaʊt ɪt/		
8	Interr. WH	116.14 / 59.89
Stop playing with your phone! /ˈstɒp ˈpleɪɪŋ wɪð jɔː ↘fəʊn/		
6	Imperative	253.7 / 147.92 ; 109.51 / 107.49 ; 196.16 / 77.67
How awful that party was! /ˈhaʊ ˈɔːfl̩ ˈðæt ↘pɑːti ˌwɒz/		
7	Exclamatory	98.66 / 31.62 ; 225.08 / 403.91

Table 7. Details of the sentences in the reading test

At the segmental level, the items related to lax vs. tense vowel contrasts (e.g., /iː/ vs. /ɪ/ in *breathing*), specific digraphs (e.g., <aw> in *awful*), instances of silent consonants (e.g., <l> in *talking*), aspiration phenomena (e.g., [p^h] in *purple*), and typically English sounds, that is, absent from the French phonemic inventory, such as the glottal fricative /h/ and the post-alveolar approximant [ɹ]. At the suprasegmental level, there were instances of the basic stress rule for disyllabic verbs and nouns (e.g., 01 vs. 10 in

forˈget and *ˈparty*), stress-imposing endings and neutral suffixes (e.g., *-ate* and *-ly* in *ˈfortunately*), the de-stressing of grammatical words in unmarked sentences, the placement of the nuclear accent with both the general Last Lexical Item rule and contrastive tonicity, and basic intonational contours (declaratives, questions, etc.) including the rise, the fall, and the fall-rise. The sentences consisted of relatively common words. Six of them were made up of one clause, and one contained two clauses. As for the words, only polysyllabic words were used; a monosyllabic word, apart from having either a falling or a rising intonation, mostly contains segmental difficulties for L2 learners and does not really enhance prosodic problems as was desired. Similarly, polysyllabic words with lexical stress on the final syllable (01 pattern) were not used; such isolated items acting as their own prosodic phrases, even though including an important prosodic feature of English which is lexical stress, are less likely to be problematic to French speakers, whose L1 already tends to stress the right-most syllable of a prosodic unit (Cutler & Carter, 1987). The frequencies of all the lexical words from the word list and the sentence list were checked in the written and oral parts of the British National Corpus (BNC). On the one hand, using high-frequency words would increase the chances that the participants knew these words, should they not be close to their French equivalents. On the other hand, low-frequency words would serve to check whether the participants could apply what they learnt on new (possibly unknown) items. Including both types of words would therefore allow for a balance between common and uncommon words.

In order to obtain spontaneous speech production samples from the participants, we resorted to a conversational task, as it is common in foreign language oral examinations in France and consequently something that the participants might be familiar with. This kind of data comes close to an actual, natural conversation between two individuals, and it also avoids the problem of the overlapping of voices that may occur when recording role plays or debates. For this conversational task, the participants were asked basic questions on an open topic which all of them should have been able to understand even with an A2 level of proficiency in English. We chose the topic of *holidays*, particularly because it triggers the use of a large number of grammatical aspects and tenses (future,

present, past) and various lexical fields (hobbies, travelling, working, studying, etc.). Moreover, it can preclude the problem of finding ideas of what to say as it can lead to many other conversation topics such as countries, languages, cultures, etc. (N. Herry-Bénit, 2012: personal communication).

Procedure

To collect the speech samples, the participants had a headset with a microphone, which was plugged to a computer, and the recording device was the software *Audacity*. Before the experiment, the microphone volume was adjusted and the recording quality was tested. In the protocol, the read speech task always preceded the spontaneous conversation task. First, there was an oral explanation in French of how the task would take place. A full-screen slide presentation was open on the computer, displaying the following instructions:

Des mots et phrases en anglais vont s'afficher. Lisez-les à haute voix dans le microphone. Appuyez sur la barre espace pour accéder au suivant. Vous pouvez prendre votre temps pour réfléchir quelques secondes avant d'enregistrer.

["English words and sentences will be displayed on the screen. Read them out into the microphone. Press the space-bar to go to the next item. You can take your time and think for a few seconds before recording."]

The participant was allowed to record an item once again if s/he had misread it, stammered, or coughed, for example. After the participant had the headset on and was asked if s/he had any questions, the recording device was started and not stopped until the end of the task. In the slide presentation, all the stimuli – words and sentences – had been mixed and randomised, and they appeared one by one with nothing else on the slide. At the end of the list, the word *Fin* ("End") appeared on the last slide. After the recording of the words and sentences, the conversation task started. Still with the headset and the recording software on, we sat with the student and started the conversation, asking various questions. To avoid conversation lulls and to make sure that the speakers had something to say, we mostly asked open-ended (*wh*-) questions

and avoided closed-ended (*yes/no*) questions. Below is a list of the recurrent questions that we asked the students during the interviews, one question usually leading to another as in a natural conversation:

What do you like doing during the holidays?
What are your hobbies when you have free time?
What did you do last year in summer?
What are you going to do next summer?
What countries have you visited?
What is your favourite country?
What did you visit there?
What countries would you like to visit in the future?

Once the pre-test data were collected, the students were assigned to one of the three experimental groups: Prosodic, Segmental, or Control. As already said in the previous subsection, they were blind to the experiment. Over the lessons, the students were able to practise speaking, depending on the experimental condition that they belonged to. The post-training recordings took place in exactly the same conditions as the pre-training recordings, after all the lessons were over. Although the participants might find it out, they were not directly informed that it would be the same stimuli as those with which they were presented a few months earlier. The order of appearance of the words and sentences in the slide presentation had been changed from that of the pre-training session.

With the software *Audacity*, the recorded tracks were cut up into separate sound files (in .wav format) such that each item could be used for the blind subjective evaluations. The pre- and post-recording sessions yielded 540 sound files each (36 [participants] x 15 [7 words + 7 sentences + 1 extemporaneous speech sample]), the durations of which depended on what was recorded, ranging from two seconds long for some words to two minutes long for the spontaneous speech samples. However, to keep things manageable for the evaluators, only 40-second-long samples of the spontaneous speech recordings were used for the subsequent scoring task. In total 1080 sound files were created (540 x 2), of which 504 files contained words (252 pre + 252 post), 504 files contained

sentences (252 pre + 252 post), and 72 files contained spontaneous speech samples (36 pre + 36 post).

Subjective evaluations

As in previous comparative studies investigating the effects of two L2 teaching approaches on differently treated groups of learners, the non-native productions were submitted to a subjective evaluation in which listeners were asked to rate them. In previous studies, listener-judges involved in subjective evaluations had various backgrounds, from naïve linguistically-untrained native speakers through L2 teachers to specialists in phonology or phonetics (Moyer, 2007). Using different types of listeners for the same scoring task can indeed be envisaged (as we did in our pilot study) provided that a statistical reliability test is run afterwards. According to Munro and Derwing (2006: 522), "second language teachers, who are often very experienced in listening to L2 speech, are not necessarily the best judges of their own students' comprehensibility". Similarly, Nakashima (2006) believes that teachers are not good judges of learners' performance, particularly because they are too much accustomed to their productions and might not notice as many errors as they should, and therefore the scores might be too lenient.

In the present study, we decided to reinforce the overall reliability by keeping the group of listener-judges homogeneous. The judges that participated in our evaluations were all untrained native speakers, as one of our objectives was to observe whether native speakers typically and unconsciously attach more importance to prosodic accuracy than segmental accuracy. Nonetheless, having specialists run an analysis of the productions could be considered for future analyses of the data. The selected native English speakers were all from England, particularly because the two experimental treatments that the French participants received were based on RP English. Despite the formal consistency in the choice of listeners, Flege, Bohn, and Jang (1997: 451) point out:

> One can never be certain that the listeners chosen for an intelligibility test adequately represent the variety (or varieties) of the target language that

one's non-native subjects have heard and presumably learned to some degree.

The number of raters in subjective evaluations has considerably varied from one study to another, ranging from only 1 or 2 listeners to over 80, as explained by Piske, MacKay, and Flege (2001). According to Moyer (2007: 115), who reviewed the SLA studies that included subjective evaluations, "2 or 3 raters are enough to get solid results from an inter-rater reliability measure, such as Cohen's Kappa", and the author considers this "a good (minimum) standard". Via personal contacts and online advertisements, we managed to find 10 volunteers who fulfilled the above-mentioned criteria to carry out the evaluations. They filled in a questionnaire (Appendix C) enquiring about their backgrounds. The group of selected native speakers consisted of five women and five men, all of whom were meta-linguistically and phonetically inexperienced, and none of them spoke any foreign language fluently, nor were they regularly exposed to non-native speech. None of them reported any hearing impairment before the scoring task began.

In some SLA studies, the listeners in the subjective evaluations rated the *comprehensibility* of the L2 productions on the one hand, and/or the degree of *foreign-accentedness* on the other hand, particularly because a non-native speaker with a strong foreign accent can still be perfectly understood by native listeners (Munro & Derwing, 2006), despite the mental fatigue and necessary corrections for the native listeners. The major disadvantage of this option, however, is that it doubles the (already considerable) work for the volunteering raters. Consequently, the native English listeners in our study were given only one aspect to judge in the evaluations of the L2 productions. Trofimovich and Isaacs (2012) examined the linguistic aspects that are related to foreign accent rating and to comprehensibility rating. Their study of ratings by a large group of raters – including both native speakers and experienced teachers – revealed that foreign accent rating was usually related to aspects of phonology, including rhythm and segmental and syllable structure accuracy, whereas comprehensibility rating was mostly related to grammatical accuracy and lexical richness. Indeed, "free speech is arguably the most natural task, but it is also the most prone to mistakes beyond the phonological

level" (Moyer, 2007: 114). This is why we did not select *comprehensibility* as a criterion for the native speakers to score in the study. Instead, the listener-judges were asked to judge the overall *pronunciation accuracy* of the speaker in each of the recordings, referring to the more general sense of *pronunciation* as including both segmental and suprasegmental aspects of speech (Cruttenden, 2008; Gilbert, 2008), thus being closer to the degree of foreign-accentedness criterion in some studies. The use of this criterion in preference to *comprehensibility* or verbatim *foreign accentedness* reduced the risk of interference of other factors such as grammatical and lexical mistakes in the listeners' judgements of the spontaneous narratives, so as to provide a clearer answer to the central research question on the roles of the different phonological aspects.

As pointed out in Southwood and Flege (1999: 336), "although a variety of scaling techniques have been used to judge foreign accent, there is uncertainty as to which scale is the most appropriate". A review of the literature reveals that subjective evaluations have involved a wide range of scales, from three points to nine points (Piske, MacKay, & Flege, 2001). Using a three-point scale is advantageous inasmuch as the degrees and criteria are clear-cut and thereby force the listener to make a firm decision as to the degree of foreign-accentedness, comprehensibility, or overall pronunciation accuracy of the recorded speaker, even though one may argue that it does not offer enough nuances, especially in the context of inter-group comparison. By contrast, a nine-point scale makes it possible to compare groups with more accuracy through the computing of precise mean scores; however, some may argue that too many choices risk being a source of confusion for untrained listeners, who therefore might fail to use all the possible degrees of the scale and give inaccurate scores. We decided to use a five-point scale in the rating task, which is also one of the most widespread systems used in SLA studies (Moyer, 2007; Piske et al., idem). The five levels of the scale, measuring the degree of pronunciation accuracy in a production, were defined as follows:

1 = very bad.

2 = bad.

3 = medium.

4 = good.

5 = very good / native(-like).

The judges were asked to use these five possible scores only, excluding zero and decimal numbers. They were given the exact following instructions, printed on a document:

You will listen to English words and sentences, recorded by different speakers. For each recording, you have to score the ***overall pronunciation accuracy*** *of the speaker's speech, using the following 5-point scale.*

The raters were given the list of the 14 items that were recorded by the non-native participants, for evident reasons. Taking the example of the isolated item *breathing*, likely to be pronounced [ˈbɹiːzɪŋ] by a French speaker, an evaluator might score it 4 or 5 assuming that the target item was *breezing*. Similarly, the list of test sentences was shown to the listeners if only for the punctuation, because the inaccurate realisation of an intonational contour might mislead them into interpreting an utterance as a question when it was supposed to be a declarative sentence, for example.

The exact instructions given to the listeners for the evaluations of the spontaneous speech samples were as follows:

Score the overall pronunciation accuracy of the main speaker in each of the following recorded conversations. The speakers were asked basic questions on the topic of holidays ("What do you like doing during the holidays?", "What did you do last summer?", "Do you have any plans for next summer?", "What countries have you visited?", etc.).

In these instructions, *main speaker* was specified because the teacher's voice asking the questions could also be heard in the background, although it was much fainter. Also, before the beginning of the spontaneous speech scoring task, the listeners were reminded that rating the pronunciation accuracy of the speakers should exclude the consideration of other factors, such as grammatical or lexical mistakes.

The total number of recordings to score was considerable as it exceeded 1000. Despite the enormous task, it seemed preferable that all the listeners should rate all the

productions, mostly because of the subjective nature of the evaluations. Asking some listeners to rate only a part of the collection of L2 productions and other listeners to rate another part would have made the analysis of the scores more complex and less reliable, because judgements may significantly vary from one listener to another despite their common background. The evaluations of the read speech productions were done separately from the evaluations of the spontaneous speech samples, to avoid any effect of mental fatigue in the listeners. All the read words and sentences were doubly randomised, that is, across tests and across groups. The whole scoring task was divided into four listening sessions; two for read speech productions, and two for spontaneous speech productions. The evaluations were individual; the raters listened to the recordings and then wrote down their scores in a table on a piece of paper. For practical reasons and to make the whole task less tedious to the volunteering listeners, they were together during the sessions, but no mutual consultation was allowed.

The five degrees of the scale were presented below the written instructions on each listener's document, as well as a list of numbers corresponding to the randomised productions. The listeners were told again that they were to give subjective evaluations, hence they did not need to justify any of their choices (see Scheuer, 2010). Before the scoring task began, they had a short practice session with five recordings that were not part of the experiment (from Capliez's experiment, 2011a) in order to familiarise them with the task and the scale. The subjective evaluations were individual and blind; the native speakers were not told anything about the experiment, the method, or the objective, nor were they told about the number of recorded speakers or that the speakers were French speakers. The listeners were not paid to complete the task.

Intra- and inter-rater reliability

The level of consistency of the raters' scores has been doubly evaluated with inter- and intra-rater reliability tests. *Intra-rater reliability* was assessed via two methods: (a) the blending of control native-speaker recordings into the non-native productions during the scoring tasks, and (b) the repeating of some of the L2 productions. Previously recorded native-speaker samples had been mixed with the randomised data so as to make the evaluation process more accurate. Three native speakers – two female and one male –

from southern England, with no obvious regional accent, took the read speech and spontaneous speech tests in the same conditions as the French participants. They were chosen to do the recordings because their profiles were very similar to those of their French counterparts: Native 01 (N01), a female student, was 18 years old; N02, a female student, was 18 years old; N03, a male student, was 22 years old. In this way, their voices could fully blend into the recorded data. 45 files were thus added to the existing 1080 sound files: 15 (7 words + 7 sentences + extemporaneous speech sample) x 3. To further assess intra-rater agreement, twelve of the non-native read productions – six from the pre-tests and six from the post-tests, all from different speakers – were repeated and also randomised and blended into the collection of recordings for the listeners to rate. As such, it was possible to verify the consistency of a rater's score for the same excerpts.

In total, there were 1137 sound files to be rated in the scoring task (1080 original sound files, 45 native productions, and 12 repeats)[12]. We decided that a listener's score sheet would be discredited and unused in the analyses if one or several of the following conditions applied:

- s/he rated more than **6** repeated items (out of 12) differently by one point either time;
- s/he rated more than **4** repeated items (out of 12) differently by two points either time;
- s/he rated more than **2** repeated items (out of 12) differently by three points either time;
- s/he did not rate **1** of the native productions with at least 4 on the 5-point scale[13].

For example, if one of the raters gave a 5 for an item, and then for the same item s/he gave a 3 (i.e., different rating by two points), and if that happened for 5 repeated items out of the 12, then the rater's whole score sheet would not be taken into account in the analyses of the results. In the same respect, if a rater gave a 2 to a native recording, his/her whole score sheet would also be dismissed.

12 I sincerely wish to thank all the native listeners again who kindly accepted to complete the task voluntarily.

13 The possibility that a listener might only give a 4 (i.e., not the highest score) to a native recording had to be accepted, as explained in Scheuer (2010).

Table 8 below shows, for each rater, the total number of times that they rated one of the 12 repeated items differently by one point and by two points. None of the listeners rated a control native recording less than 5, and none rated a repeated item differently by three or more points, which meant that all of them were fairly consistent and therefore all the score sheets could be taken into consideration in the analyses.

RATER	Number of one-point differences	Number of two-point differences
Rater 1	3	
Rater 2	3	
Rater 3	5	
Rater 4	4	
Rater 5	6	1
Rater 6	3	1
Rater 7	4	
Rater 8	5	2
Rater 9	1	
Rater 10	3	1

Table 8. Number of times each rater scored a repeated item differently

The *inter-rater reliability* of the listener-judges, that is, the level of agreement from one judge to another, was calculated for read speech ratings and spontaneous speech ratings, using the statistical software *SPSS*. As is explained in Larson-Hall (2010), one way of calculating inter-rater reliability is to look at Cronbach's alpha, with a minimum level of 0.7 usually being considered an acceptable degree of reliability among raters. For read speech ratings and a total of 1008 items (i.e., 36 speakers x 14 items x 2 sessions), the obtained Cronbach's alpha is 0.91. For spontaneous speech ratings and a total of 72 items (i.e., 36 spontaneous samples x 2 sessions), the Cronbach's alpha is 0.87. Overall, the level of agreement among the 10 judges on all the ratings can be considered quite high for both read speech ratings and spontaneous speech ratings.

4.3.2. Analyses and hypotheses

The detailed scores that the listeners gave to the recordings are in Appendix D. The mean scores obtained by each of the French-speaking participants in the native listeners' evaluations were computed, grouped, and averaged in order to obtain the means of each group before and after the treatment period. Therefore, each of the three groups had four mean scores:

1) a pre-test mean for read production (of which one mean for word reading and one mean for sentence reading);
2) a pre-test mean for spontaneous production;
3) a post-test mean for read production (of which one mean for word reading and one mean for sentence reading);
4) a post-test mean for spontaneous production.

Given the pre-test/post-test protocol used in the comparison of the three experimental groups of French EFL learners, we ran two types of analyses. First, a *within-groups* analysis, based on the comparison between each group's pre-test mean and post-test mean, independently of one another, makes it possible to observe their improvement over time and tell whether the two conditions have had a significant impact on the learners' L2 production skills, compared with the non-treated group. Such an analysis plays a crucial part in the whole analysis to reliably answer the central question and objectively compare the two teaching methods under consideration. Second, a *between-groups* analysis, based on the comparison of the means obtained by the three groups, is the key stage to address the central question on the efficacy of different teaching approaches. This final step allows us to observe the differences among the groups, and which of the teaching approaches has had a better impact on the French learners' production skills in English. More generally, this pivotal analysis helps determines the role of prosody as compared with that of segmental features in L2 teaching and the acquisition of English phonology by French speakers, and by extension, within English phonology.

Our central hypothesis is that the prosodic group will show stronger improvement than the other groups according to the native speakers' judgements. Here are the sub-

hypotheses that concern the within-groups analyses of the scores obtained by the French-speaking participants:

H01: The S-participants will have higher scores in the post-tests than in the pre-tests for read speech.

H02: The P-participants will have higher scores in the post-tests than in the pre-tests for read speech.

H03: The C-participants will have virtually the same scores in the post-tests as in the pre-tests for read speech.

H04: The S-participants will have higher scores in the post-tests than in the pre-tests for spontaneous speech.

H05: The P-participants will have higher scores in the post-tests than in the pre-tests for spontaneous speech.

H06: The C-participants will have virtually the same scores in the post-tests as in the pre-tests for spontaneous speech.

The table below recapitulates the six hypotheses:

Read	Pre S < Post S (H01)	Pre P < Post P (H02)	Pre C = Post C (H03)
Spontaneous	Pre S < Post S (H04)	Pre P < Post P (H05)	Pre C = Post C (H06)

Table 9. Within-groups differences: hypotheses on the production results

The following sub-hypotheses are those that we put forward as regards the results of the between-groups analyses of the production tests; the two hypotheses in bold are central to our research question on the comparison between the two teaching approaches and the effects of a prosody-centred approach and a segment-based approach:

H07: The S-group will have higher scores than the C-group for read speech.

H08: The P-group will have higher scores than the C-group for read speech.

H09: The P-group will have higher scores than the S-group for read speech.

H10: The S-group will have higher scores than the C-group for spontaneous speech.

H11: The P-group will have higher scores than the C-group for spontaneous speech.

H12: The P-group will have higher scores than the S-group for spontaneous speech.

The following table recapitulates the hypotheses:

Read	S > C (H07)	P > C (H08)	P > S (H09)
Spontaneous	S > C (H10)	P > C (H11)	P > S (H12)

Table 10. Between-groups differences: hypotheses on the production results

Once again, the general hypothesis that lies behind all this set of sub-hypotheses is that prosody-centred training will have a more beneficial effect on the learners' speaking skills in English. The presentation and discussion of the results below provide an answer to each sub-hypothesis before leading to the final answer to our central question on the importance of prosody in L2 teaching.

4.3.3. Results

In the statistical results presented from this section onwards, the alpha level is set at α = 0.05, meaning that the null hypothesis is rejected if the p value of the statistical test is lower than 0.05. The following table provides the widely-accepted correspondences between p values and the levels of significance, as well as the symbols used in each case:

SYMBOLS	PHRASE	P VALUE
NS	Not significant	P > 0.05
*	Significant	P < 0.05
**	Highly significant	P < 0.01
***	Extremely significant	P < 0.001

Table 11. P values and significance (from Motulsky, 2010: 124)

Read speech

Paired-samples t-tests were performed in order to tell whether the difference within each of the three groups from the pre-reading tests to the post-reading tests was statistically significant. In other words, they served to observe whether the groups' reading skills significantly improved after the treatment period. We used the statistical software *SPSS* to perform the tests. To be as accurate as possible, we did not enter the general means of each participant (i.e., 12 means per group), but the means per item of each participant,

based on the listener-judges' scores: 14 items (i.e., 7 words and 7 sentences) x 12 participants = 168 means. For the S-group, t(167) = 3.6982, p = 0.0003; for the P-group, t(167) = 1.2389, p = 0.2171; for the C-group, t(167) = 0.7771, p = 0.4382. The within-groups difference of the S-group in the reading test is extremely significant, but it is not significant for the other two groups, including the P-group who was trained. Table 12 below recapitulates the results:

	PRE-SCORE	POST-SCORE	SIGNIFICANCE
S-group	2.89	3.05	***
P-group	3.3	3.36	NS
C-group	2.76	2.72	NS

Table 12. Mean scores for read speech (pre-post differences)

For more precision, paired-samples t-tests were run again in order to observe the within-groups differences for word reading on the one hand, and sentence reading on the other hand. For accuracy reasons, we chose not to enter the general means of each participant, but the means per item of each participant: 7 items (words or sentences) x 12 participants = 84 means for words, and 84 means for sentences. In the word-reading task, the following results were obtained: for the S-group, t(83) = 1.6991, p = 0.0931; for the P-group, t(83) = 0.4855, p = 0.6286; for the C-group, t(83) = 0.1437, p = 0.8861. In all three cases, the within-groups difference is not significant, as is summarised in the following table:

	PRE-SCORE *WORDS*	POST-SCORE *WORDS*	SIGNIFICANCE
S-group	2.94	3.05	NS
P-group	3.37	3.34	NS
C-group	2.73	2.72	NS

Table 13. Means scores for read words (pre-post differences)

In the sentence-reading task, the S-group obtained t(83) = 3.6102, p = 0.0005; the P-group obtained t(83) = 2.3154, p = 0.0231; the C-group obtained t(83) = 1.1573, p = 0.2505. The within-groups difference is extremely significant for the S-group and it is

significant for the P-group, whereas it is not significant for the C-group as could be expected because they received no treatment:

	PRE-SCORE *SENTENCES*	POST-SCORE *SENTENCES*	SIGNIFICANCE
S-group	2.84	3.05	***
P-group	3.24	3.37	*
C-group	2.79	2.73	NS

Table 14. Mean scores for read sentences (pre-post differences)

A one-way analysis of variance (ANOVA) was performed in order to make sure that the three groups were equal in the pre-reading tests, before the training sessions began. Although an effort had been made to keep a balance when assigning the participants to the three groups (see details on group formation above), a significant difference was found, $F(2, 33) = 10.69$, $p < 0.0001$, which means that the three experimental groups were not equal in the pre-tests. Post-hoc tests revealed no difference between the S-group and the C-group ($p = 0.2994$), but a significant difference between the P-group and the C-group ($p = 0.0003$), and a significant difference between the S-group and the P-group ($p = 0.0022$).

Given the pre-test/post-test and multi-group design of the experiment, a repeated-measures (also called "two-way/within-between") ANOVA was conducted, with Time (two levels: Time 1 = pre-test and Time 2 = post-test) and Group (three levels: S, P, and C) as the within-subjects and between-subjects factors, respectively. The effect of time, $F(2, 33) = 2.271$, $p = 0.141$, was not significant (also see the within-groups statistical analyses above for more details), and the effect of group, $F(2, 33) = 12.967$, $p < 0.0001$, was extremely significant. The interaction of the two factors, $F(2, 33) = 2.055$, $p = 0.144$, was not significant. Post-hoc tests revealed that there was a statistical difference among the groups: S vs. C: $p = 0.156$ (non-significant); P vs. C: $p < 0.0001$ (extremely significant); S vs. P: $p = 0.009$ (highly significant), as confirmed by the one-way ANOVA performed on the pre-test scores.

The difference between the three experimental conditions is not significant, taking into account the effects of the two treatments over time; the groups did not have

significantly different changes from pre to post. Furthermore, the three groups were not equal in the pre-tests; overall, the P-group showed significant differences with the S-group and the C-group. The S-group and the C-group were not different. In the figure below, the mean scores and evolutions of the three groups are represented:

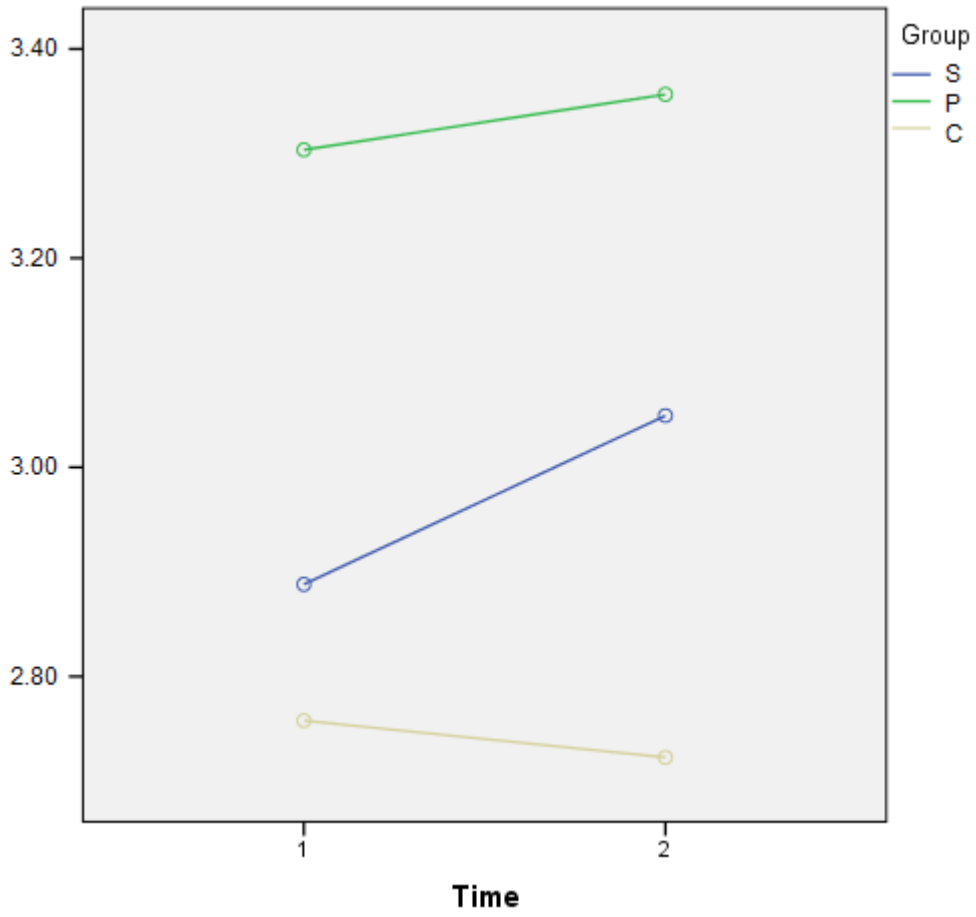

Figure 4. Interaction plot between Time and Group (read speech production)

As is confirmed by the results, the within-groups change of the C-group in the read speech task is non-significant, probably because they received no treatment; it is significant for the P-group's sentence-reading skills, whereas it is significant for the S-group. There was no significant difference for word reading in any of the groups. It should be noted that the overall improvement of the S-group – from 2.89 to 3.05 – is slightly stronger than that of the P-group – from 3.3 to 3.36. The directions of the lines representing the evolutions of the three groups in the figure bring support to that. The

figure also shows the significant between-groups difference in the pre-tests; the P-group performed better than the other two – who were equal, as could be expected from the creation process of the groups – before the training started. Such a between-groups difference in the pre-tests was bound to have an impact on the results of the groups in the post-tests.

Spontaneous speech

Paired-samples t-tests were performed to observe whether the difference within each of the three experimental groups from the pre-speaking tests to the post-speaking tests was significant. In other words, they served to determine whether the groups' speaking skills significantly improved after the treatment period. We used the mean scores of each participant based on the listener-judges' scores: 1 spontaneous speech sample x 12 participants = 12 means. For the S-group, $t(11) = 1.2462$, $p = 0.2386$; for the P-group, $t(11) = 0.7467$, $p = 0.4709$; for the C-group, $t(11) = 1.5145$, $p = 0.1581$. The within-groups differences of the three groups in the spontaneous speech tests are not significant. Table 15 below recapitulates the results:

	PRE-SCORE	POST-SCORE	SIGNIFICANCE
S-group	3.12	3.3	NS
P-group	3.48	3.57	NS
C-group	3.09	2.92	NS

Table 15. Mean scores for spontaneous speech (pre-post differences)

Although the non-significance of the within-groups difference in the C-group was expected as they did not receive any treatment, the results for the S-group and the P-group suggest that the two types of training did not have any significant effect on the participants' abilities to speak English spontaneously.

A one-way ANOVA was performed on the pre-speaking test means of the three groups to check whether the three groups were equal before the treatments: $F(2, 33) = 2.707$, $p = 0.082$. There was no significant difference among the groups in the pre-tests. A repeated-measures ANOVA was conducted using the participants' scores in the spontaneous speech tasks, with Time (two levels: Time 1 = pre-test and Time 2 = post-

test) and Group (three levels: S, P, and C) as the within-subjects and between-subjects factors, respectively. The effect of time, $F(2, 33) = 0.200$, $p = 0.658$, was not significant (also see the within-groups statistical analyses above for more details), and the effect of group, $F(2, 33) = 5.114$, $p = 0.012$, was significant. Post-hoc tests revealed that there was a slight statistical difference among the groups: S vs. C: $p = 0.386$; P vs. C: $p = 0.014$; S vs. P: $p = 0.179$. The interaction of the two factors, $F(2, 33) = 2.077$, $p = 0.141$, was not significant.

In the pre-tests, the three groups showed no strong significant differences, which suggests that they were virtually equal. The difference among the three experimental conditions is not significant, taking into account the effect of the two treatments over time; the groups did not have significantly different changes from pre-tests to post-tests. The following figure represents the mean scores and evolutions of the three groups:

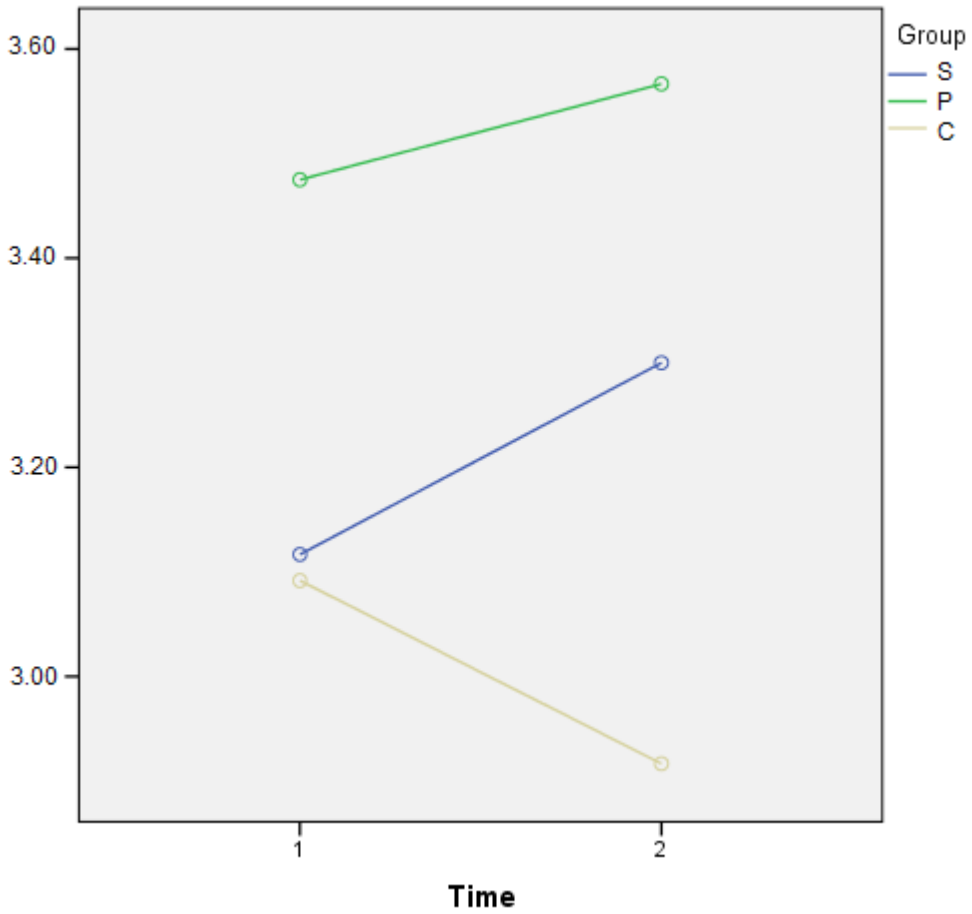

Figure 5. Interaction plot between Time and Group (spontaneous speech production)

The results presented above regarding the within-groups differences revealed no significance, which was to be expected for the C-group only as the participants did not receive any treatment. Looking at the figure above, however, the directions of the lines do show improvement for the two treated groups, which seems to suggest a certain effect of the training on the participants' speaking skills. Also, a difference between the P-group and the other two groups in the pre-tests is visible in the figure, even though the statistical tests failed to find any difference.

4.3.4. Discussion

Within-groups

Through paired-samples t-tests, the difference within each group from the pre-production tests to the post-production tests was analysed. The following table recapitulates the initial hypotheses that were posited in 4.3.2, and summarises the results:

	HYPOTHESIS	VALIDATED / INVALIDATED	PRECISIONS
H01 (read S)	Pre S < Post S	V	Extremely significant for sentences only
H02 (read P)	Pre P < Post P	I	Slightly significant for sentences only
H03 (read C)	Pre C = Post C	V	
H04 (spont. S)	Pre S < Post S	I	Non-significant improvement by 0.21 (out of 5)
H05 (spont. P)	Pre P < Post P	I	Non-significant improvement by 0.09 (out of 5)
H06 (spont. C)	Pre C = Post C	V	Non-significant regression by 0.17 (out of 5)

Table 16. Answers to the hypotheses on within-groups production tests

Regarding the participants' performance in the word-reading task of the production test, none of the groups improved significantly, including the S-group who focused on English sound realisation and practised items at the phoneme and word levels. The results were expected for the C-group, who did not receive any treatment. This suggests

that even though all the participants from all three groups followed the same regular external English classes at university at the time of the treatment period, this did not quite have a significant impact on their production skills or interfere with the effects of the different types of training.

As far as the participants' performances in the sentence-reading task are concerned, they improved in both experimental groups, but the S-group did so to a much greater extent. Thus, the training on English segmentals seems to have had a considerable impact on the learners' capacity to produce full English sentences, even though the lessons and document did not include any. The P-group, by contrast, showed a slighter improvement in the sentence-reading task even though that was practised during their training. Several factors may help explain this, such as the teaching method and/or contents of the P-training, the students' motivation and personal learning of the lessons (also see Krashen's Model as detailed in Section 2), or the possible difficulty to understand the lessons in comparison with the S-training, despite the avoidance of metalanguage. However, it may be that native speakers attach more importance to segmental accuracy when judging a non-native speech sample than to prosodic accuracy, which would explain why the S-group showed more considerable improvement than the P-group according to the subjective evaluations.

As for spontaneous speech, none of the groups significantly improved after the treatment period. This was to be expected for the non-treated group, suggesting that the participants' external English classes did not interfere with their scores in the tests. Despite our initial hypotheses, the results are quite unexpected for the P-group. Indeed, the role of prosodic features is especially observable in extemporaneous speech, but it appears that the learners who studied them did not improve their speaking skills according to the native speakers' judgements. One of the possible reasons is that the P-training only included theory and repetitions of target words and sentences, but no practice of spontaneous speech, such as conversation in English – which is also true of the S-training and the consequence on the S-group's performance.

Another reason why the two treated groups did not considerably improve in both production tasks may be that the length of the training sessions was insufficient. Although the groups received weekly lessons for several weeks, as in previous similar

comparative studies, it appears that this did not have an effect on their production skills. Nonetheless, all the analyses are based on subjective mean scores given by inexperienced native listeners. According to Flege (1981: 445):

> Listeners are more likely to base a judgment of foreign accent on some combination of segmental, subsegmental, and suprasegmental differences which distinguish the speech of native from that of non-native speakers.

Despite this possibility and the fact that the degree of agreement of the judges in the present study was high according to the inter-rater reliability test, one must also take into account the objective improvement of each participant individually. Indeed, some of the participants within an individual group may not have improved, confirming the subjective judgements, but others did in spite of the scores. The pre-test and post-test realisations of the word *breathing* by Participant P05, for example, shows improvement at the suprasegmental level, but not at the segmental level: from [bɻiˈθiŋg̊]↗ in the pre-test (scored 2.3), to [ˈbɻiziŋ]↘ in the post-test (scored 3.5). Here, the prosodic accuracy seems to have had a positive influence of the listeners' judgements, over the segmental accuracy. In the case of P08's post-test sentences, by contrast, the impact of the P-training on the learner's production skills is rather negative, as the lexical stresses are realised but exaggerated, as if nuclear accents, which leads to robotic, unnatural speech. Looking at the example of P02, the improvement is particularly noticeable in his pre-test and post-test realisations of L2 prosodic features, such as the lexical stress in isolated words (e.g., [ˈbɹeðɪŋ]↘) and in such sentences as *Stop playing with your phone* and *How awful that party was*:

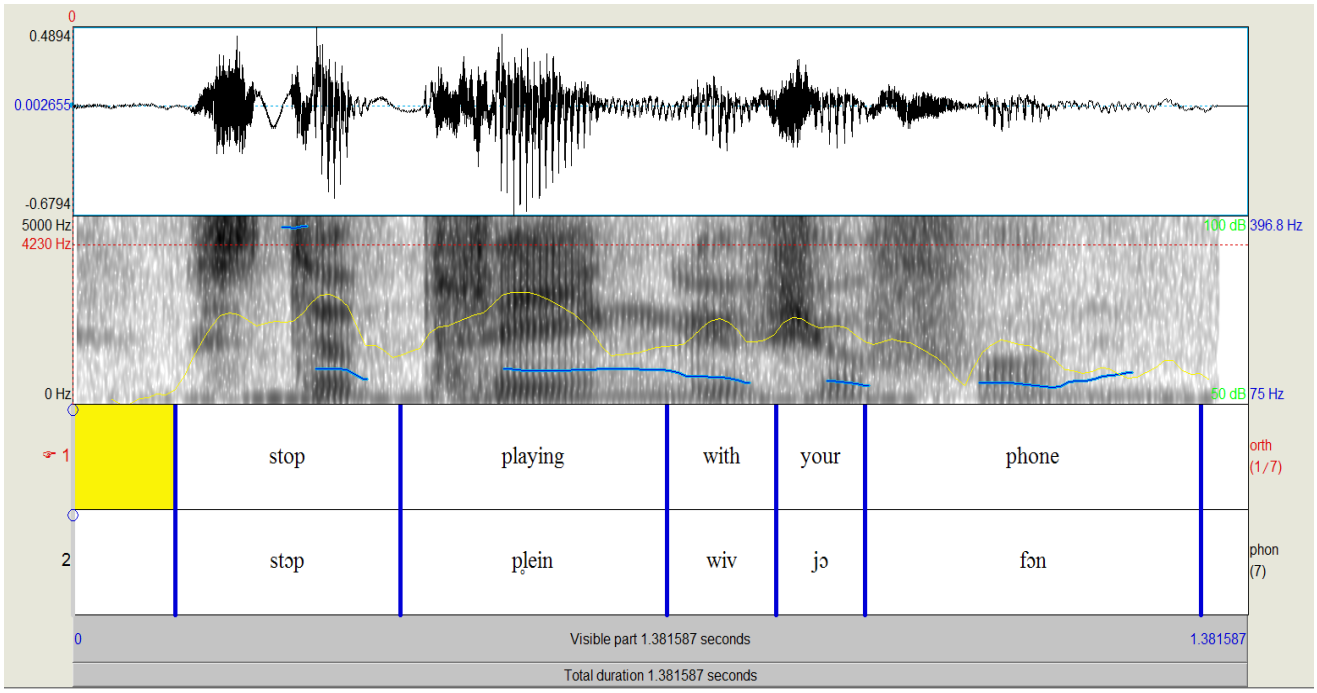

Figure 6. P02's "Stop playing with your phone" (pre-test)

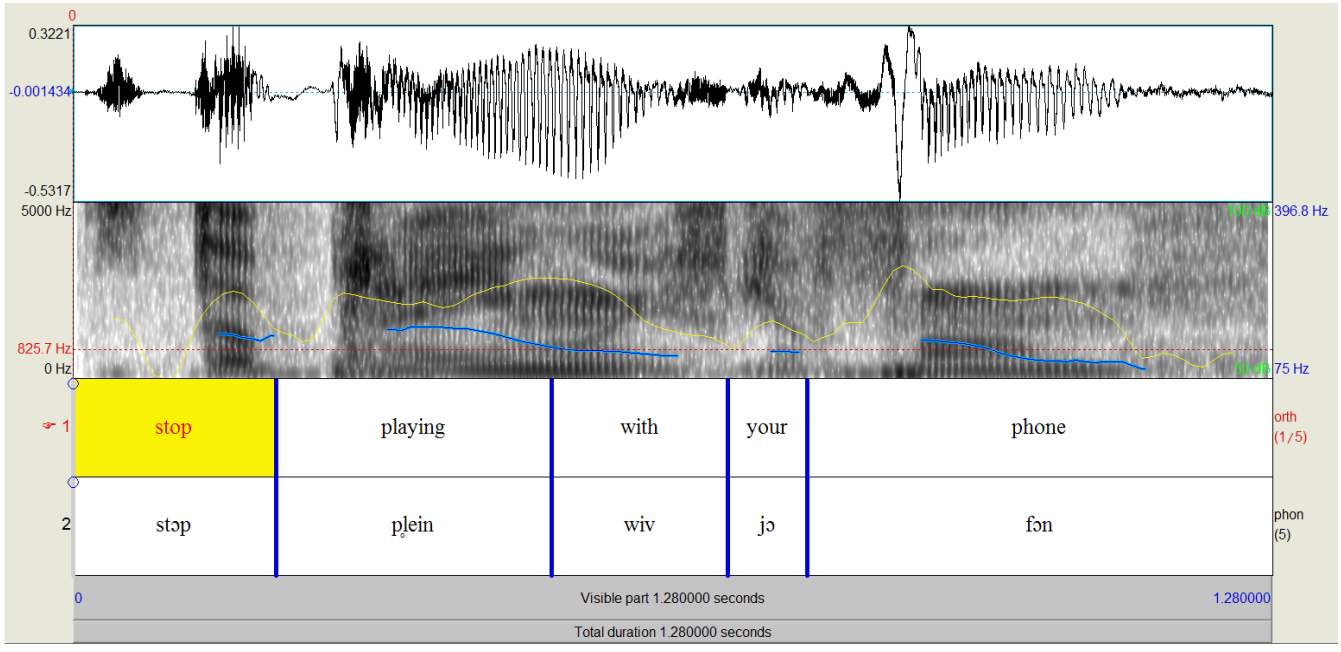

Figure 7. P02's "Stop playing with your phone" (post-test)

In this specific example, while the participant's realisation of target sounds is exactly the same in the pre-recording and the post-recording, the prosody is different; proper

placements of lexical stresses can be heard on *stop*, *play*-, and *phone*, whereas the other elements are reduced, but also the default falling contour is more accurate and a nuclear accent is placed on *phone* in the post-test. In the pre-test, however, the whole rhythm was more monotonous, syllable-timed, and French-like, with for example a minor continuation rise (and lengthening) on *-ing*. Despite this auditory improvement of the participant's L2 prosody, the mean scores that he obtained in the subjective evaluations do not support that, as his pre-test mean and his post-test mean for this specific item are exactly the same (i.e., 3.8) – even though one of the raters gave him the highest score (i.e., 5) in the post-test. Similarly, the participant's realisation of the target prosody in *How awful that party was!* is more accurate in the post-test, where he assigns lexical stresses and the nuclear accent on *par*- instead of retaining a syllable-timed rhythm, and at the same time he retains virtually the same pronunciation of segments, with the notable exception of the vocalic reduction of the second syllable in *awful*, which seems to be the result of his accurate stressing of *aw*-:

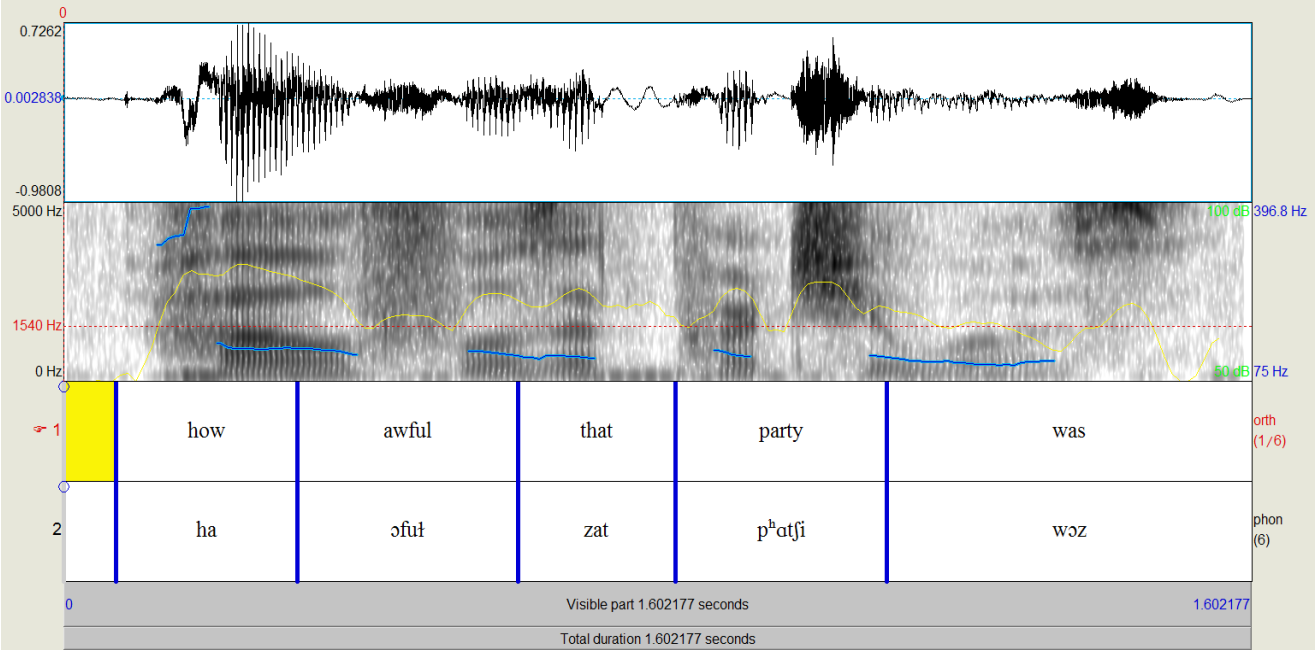

Figure 8. P02's "How awful that party was!" (pre-test)

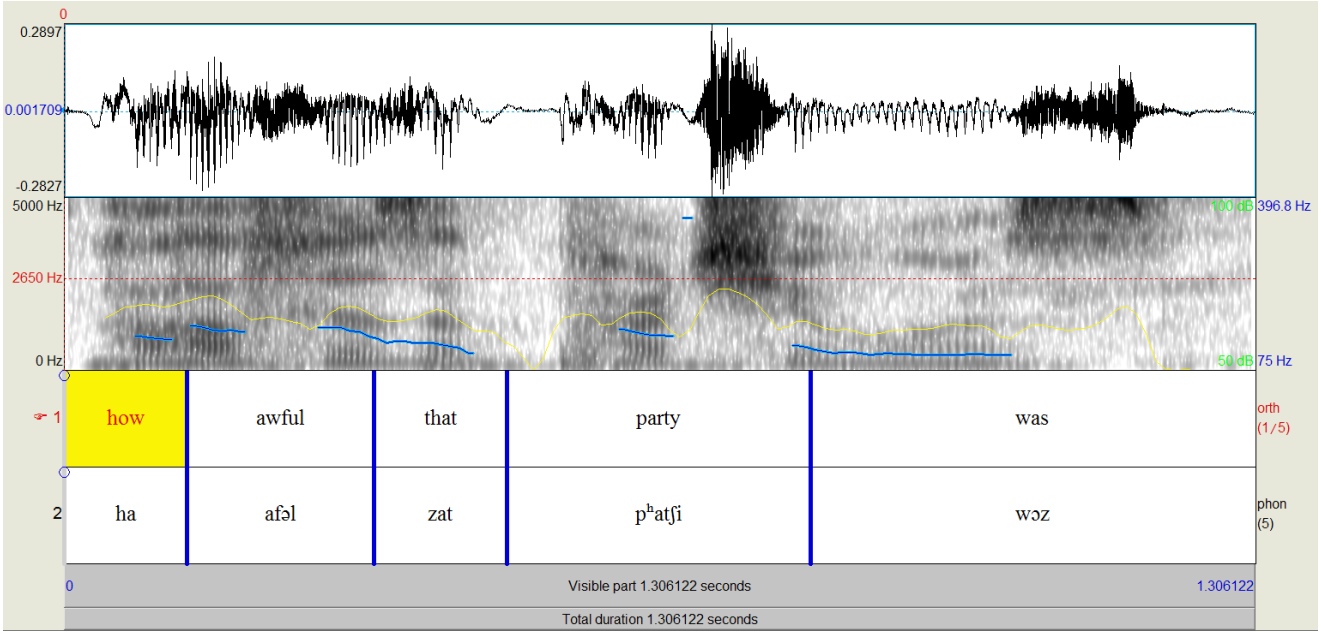

Figure 9. P02's "How awful that party was!" (post-test)

Once again, however, the subjective scores given by the native speakers do not support the auditory improvement.

As a conclusion, even though the within-groups analyses of the tests based on the subjective evaluations failed to lead to the validation of all the initial sub-hypotheses concerning the treated participants' performances, especially in the P-group, the training did have an impact on certain learners' production skills. As is always the case with L2 teaching, positive results cannot always be found with all the learners in a group, which is why relying on means and statistics is more prudent to draw conclusions as to the effectiveness of a teaching approach.

Between-groups

The various statistical tests that were performed made it possible to observe the difference among the three groups, taking into account their improvement from the pre-production tests to the post-production tests. The following table recapitulates the initial hypotheses that were posited in 4.3.2 and summarises the results:

	HYPOTHESIS	VALIDATED / INVALIDATED	PRECISIONS
H07 (read)	S > C	I	
H08 (read)	P > C	I	Significant difference in the pre-tests
H09 (read)	P > S	I	Significant difference in the pre-tests
H10 (spontaneous)	S > C	I	Non-significant higher evolution of the S-group
H11 (spontaneous)	P > C	V	Slight advantage of P over C in the pre-tests
H12 (spontaneous)	P > S	I	Non-significant higher evolution of the S-group

Table 17. Answers to the hypotheses on between-groups production tests

In the pre-training read speech tests, the S-group and the C-group were equal, as could be expected from the initial group-forming procedure. However, the P-group performed significantly better than the other two groups in the pre-tests, which was bound to have an influence on the post-test scores and the between-groups comparison. Furthermore, the interaction between the Time factor and the Group factor was not significant. As a consequence, neither of the treatments has had a stronger impact on the French learners' reading skills in English. Even though the two treated groups showed some improvement, particularly in sentence reading, contrary to the control group, there is no difference among the three of them. Nevertheless, the improvement of the S-group in the sentence-reading task is worth mentioning, because it is stronger than the improvement of the P-group (from 2.84 to 3.05 *** vs. from 3.24 to 3.37 *) even though the opposite is often hypothesised in the SLA literature.

In similar previously-conducted experiments comparing the effect of a segment-based teaching approach with the effect of a prosody-based teaching approach on L2 learners' reading skills, the results were different, as was reviewed in Section 2. In Derwing et al.'s (1998) comparative experiment, neither of the treated groups improved in foreign-accentedness according to native listeners' judgements, although they both did in comprehensibility. Similarly, Ueno (1998) found no significant difference

between the two teaching approaches. On the contrary, both Akita's (2005) and Missaglia's (1999) studies found that a "prosodic" group improved their L2 production skills more than a "segmental" group.

The items used in the read speech tests contained both segmental and suprasegmental difficulties for French learners. Having L2 participants read items aloud is a technique to target specific phonological features and observe errors as well as possible improvement over time (Gilner, 2008). However, Alazard (2011) observes that read speech seems to be more influenced by the L1 features than spontaneous speech, even in spite of the help of punctuation and spelling. In the case of French learners of English, the impact is all the stronger as the two languages have considerably different prosodic structures, as well as different phonemic inventories. Although the outcome of the present experiment runs counter to our initial hypotheses, spontaneous speech testing was crucial to assess the effects of prosody-centred training and segment-centred training.

In the pre-tests, all three groups were equal in the spontaneous speech tasks, contrary to the read speech tasks, which suggests that the group-forming process based on balance and consistency was accurate in this case. However, the effect of Time did not reach significance; neither of the treated groups seems to have improved their speaking abilities. Furthermore, the non-significant interaction between the Time factor and the Group factor suggests that none of the three conditions had a better impact on the L2 learners. Nevertheless, a significant difference was found between the P-group and the C-group; Figure 5 presented above indicated that the P-group indeed outperformed the C-group in the post-tests. That may also be due to the regression of the C-group in the post-test, making the gap between the two groups even bigger. Thus, while it is believed that suprasegmentals play a crucial role in communication, that is, spontaneous conversations, training the French learners in English prosody did not significantly affect native speakers' judgements of the L2 productions in the scope of this experimental study.

Derwing et al. (1998) found that only the group of L2 learners receiving instructions on English suprasegmental features improved in extemporaneous speech. However, those results only concerned improvement in comprehensibility, not foreign-

accentedness which is similar to the rating criterion chosen in the present study. Furthermore, the reader must be reminded that their study, as well as others assessing the effect of L2 prosody, involved learners of English as a second language. In fact, L2 learners who primarily interact with speakers of their own native language tend to have stronger foreign accents than those who use their L1 less often, even when they live in the country where the target language is spoken (Flege, Frieda, & Nozawa, 1997). That is why learners of a second language are usually expected to improve their spontaneous speech skills even without any further formal instructions, because they are immersed in the L2 environment, contrary to learners of a foreign language who usually learn the L2 in academic contexts and have limited L2 exposure.

As was noted in the discussion of the within-groups analyses, neither of the experimental conditions included the practice of spontaneous speech in English, which may explain why the treatments do not seem to have had a positive impact on the learners' speaking skills. Moreover, the subjective aspect of the analyses of the L2 productions may have influenced the outcome. As is pointed out in Piske et al. (2001), morphosyntactic and lexical errors, and even hesitations – which are bound to occur when a speaker is asked to speak an L2 without any preparation – may have influenced the raters' judgements despite explicit instructions that only pronunciation should be taken into consideration, even if the pronunciation of segmentals and/or suprasegmentals was accurate.

The overall rejection of our claim that training EFL learners in L2 prosodic aspects would be more beneficial to them than training them in L2 segmentals may also suggest that neither of these two aspects should be prioritised over the other. In addition to being closely interdependent as regularly noted throughout the present thesis, they function as a whole, and therefore they should equally be included in L2 teaching approaches, the combination of the two being the key to successful communication.

4.4. Perception tests

4.4.1. Stimuli and evaluation methods

As in the tests of the participants' productive abilities for which words and sentences containing segmental and prosodic difficulties were used, the perception tasks (i.e., listening comprehension tests) consisted of target words and sentences used in two types of tasks: (a) a cloze test, in which the participants had to identify missing words from a recorded passage; (b) a sentence dictation test (i.e., *dictée*), in which they had to listen to sentences spoken aloud and write them down.

Stimuli

The first perceptual task was a *cloze test*, that is, a listening comprehension activity in which the students listened to a recorded passage, with the script printed on a document in front of them, and tried to find missing words which had previously been removed. The passage was authentic English, in that it was not purposely recorded for the experiment but selected from a real source, that is, English radio. It was 2 minutes and 20 seconds long and was recorded by a male speaker. The analysis of the excerpt suggests that it is (close to) RP English. The passage was played twice, with an interval of approximately 20 seconds between the two times. In so far as possible, there was a sufficient interval between two missing words, so that two listening sessions should be theoretically sufficient to identify all the missing items. Like the stimulus items of the production tasks, they contained typical segmental and prosodic difficulties for French EFL learners. The activity was informally tested on an external group of French learners of English beforehand, asking them to comment on any aspect of the task which they thought was relevant, particularly their familiarity with the missing words and the feasibility of the exercise (i.e., the possibility to identify all the words after two listening sessions). No problem was reported.

Table 18 below presents the items of the cloze test. Using the International Phonetic Alphabet and based on what the speaker of the recording actually produced, the words are transcribed phonetically to enhance the main difficulties that French speakers might encounter even at the phonetic level. Lexical stresses (marked ˈ and ˌ for primary stress

and secondary stress respectively) are shown. The table also presents the main typical segmental and suprasegmental difficulties in each item, usually causing French speakers to misunderstand them.

WORD	# SYLL.[14]	FREQ.[15]	SEGMENTAL DIFFICULTY	PROSODIC DIFFICULTY
other [ˈʌðə]	2	1449.78 / 1565.85	Intrusive /h/; voiced <th>	Stress (10): disyllabic adjective
seeking [ˈsi:kɪŋ]	2	19.5 / 47.05	<ee> value; VCC (lax <i> /ɪ/); /i:/ vs. /ɪ/	Stress (10): neutral suffix
corruption [kəˈɹʌpʃn̩]	3	2.98 / 14.44	[ɹ]; VCC (lax <u> /ʌ/); <ti> value /ʃ/	Stress (10): stress-imposing <-ion>
contemporary [kənˈtʰemp̚ɹəɹi]	4	4.23 / 45.55	Aspirated /t/; [ɹ]; schwa	Stress (0100): stress-imposing <C + -ary>
European [ˈjɔ:ɹəˌpi:ən]	4	72.43 / 205.66	Intrusive /h/; <eu> value /ju:/; [ɹ]; <e> value /i:/	Stress (10): stress-imposing <-ean> (EXC)
firstly [ˈfɜ:stli]	2	17.29 / 17.37	VCC (r-coloured lax <i> /ɜ:/)	Stress (10): neutral suffix
American [əˈmeɹɪkn̩]	4	55.81 / 163.74	Intrusive /h/; schwa; [ɹ]	Stress (0100): "normal stress rule"[16]
language [ˈlæŋgwɪdʒ]	2	77.14 / 189.42	VCC (lax <a> /æ/); <a> value /ɪ/	Stress (10): disyllabic noun
half-hour [ˈhɑ:fˌaʊə]	3	0.1 / 4.19	/h/ realisation; silent <l>; intrusive /h/; <ou> value	Stress (12): compound, stress shift
advertisements [ədˈvɜ:tɪsmənts]	4	4.71 / 10.82	VCC (r-coloured lax <e> /ɜ:/)	Stress (0100): "normal stress rule"

14 Number of syllables.

15 Frequency of the lexical words (i.e., nouns, verbs, adjectives, adverbs) in the British National Corpus. Number of instances per million words. Left number = instances in the spoken part / right number = instances in the whole corpus (written and spoken parts).

16 The term is used in, for example, Deschamps et al. (2004), Fournier (2007), or Guierre (1979).

practice [ˈpˌɹæktɪs]	2	61.58 / 172.72	VCC (lax <a> /æ/); <i> value /ɪ/	Stress (10): disyllabic noun
incomprehensibly [ˈɪŋkɒmpˌɹɪˈhensəbli]	6	0 / 0.17	Intrusive /h/; VCC (lax <i> /ɪ/); /h/	Stress (200100): stress-imposing <-ible>, neutral suffix
favourites [ˈfeɪvɹɪts]	2	4.17 / 8.59	<a> value (tense /eɪ/); [ɹ]; <i> value /ɪ/	Stress (10)
living [ˈlɪvɪŋ]	2	121.42 / 158.2	<i> value /ɪ/; VCC (lax <i> /ɪ/)	Stress (10): neutral suffix
original [əˈɹɪdʒɪnɬ]	4	47.74 / 114.17	Intrusive /h/; [ɹ]; lax <i> /ɪ/; syllabic velarised /l/	Stress (0100): stress-imposing <-al>
manner [ˈmænə]	2	12.68 / 59.51	VCC (lax <a> /æ/)	Stress (10): disyllabic noun
character [ˈkʰæɹəktə]	3	41.11 / 86.1	Aspirated /k/; <a> value (/æ/); [ɹ]; schwa	Stress (100): "normal stress rule" (unprefixed noun)
stations [ˈsteɪʃn̩z]	2	20.27 / 37.5	Unaspirated /t/; tense <a> /eɪ/; <ti> value /ʃ/	Stress (10): stress-imposing <-ion>
presided [pˌɹɪˈzaɪdɪd]	3	0.48 / 4.44	VCe (tense <i> /aɪ/); <-ed> value	Stress (010): disyllabic verb, neutral suffix

Table 18. Details of the words in the cloze test

The selection of the words for the participants to listen for in the passage was made in a similar manner to the selection of words in the production tasks. The 19 selected words were polysyllabic words, from 2 to 6 syllables long, with a majority of disyllables. Monosyllabic words were not selected for the same reasons as in the production-tests, in that there is no obvious suprasegmental difficulty for French speakers in such items. The lexical stress patterns of the words were consistent with the stress assignment rules that had been taught during the prosodic training (e.g., neutral suffixes, ION rule); none

of them had a 01 stress pattern because it does not pose any specific difficulty for French speakers. At the segmental level, what had been taught during the S-training could equally be found (e.g., VCC patterns, aspirated word-initial plosives). At the semantic level, most of the words should have posed no major comprehension problems for the French speakers, either because they were common words (e.g., *other*, *language*), with their frequencies being checked in the BNC corpus as with the production test stimuli, or because they were close to their French translations due to their Latin origins (e.g., *incomprehensibly*).

The second perceptual task was a *sentence dictation task* (*dictée*) in which the students listened to a speaker utter seven sentences in English, and then wrote them down. Similarly to the reading task of the production tests, the sentences were created while trying to balance typical segmental and prosodic difficulties for French learners of English. Their lengths varied from 7 syllables to 14 syllables, of which one consisted of two clauses. There were different types of sentences: declarative, interrogative, imperative, and exclamatory. Table 19 below presents the sentences; they are transcribed phonemically (e.g., the post-alveolar approximant is transcribed /r/ instead of [ɹ]), in keeping with what the speaker produced when dictating. Following a simple tonetic stress marks transcription system as used in works like Roach's (2009), primary stresses and secondary stresses are shown, the syllables bearing nuclear accents are underlined, and arrows indicate the intonational contours, corresponding to unmarked prosodic patterns.

# SYLL.	TYPE	FREQUENCY OF LEXICAL WORDS IN BNC
Her knowledge of Russian is basic. /hɜː ˈnɒlɪdʒ əv ˈrʌʃn̩ ɪz ↘beɪsɪk/		
9	Declarative	36.22 / 145.89 ; 10.86 / 54.62 ; 51.2 / 111.7
My political ideas are none of your business. /maɪ pəˈlɪtɪkl̩ aɪˈdɪəz ə ˈnʌn əv jɔː ↘bɪznɪs/		
13	Declarative	70.03 / 306.14 ; 61.67 / 109.83 ; 220.37 / 356.81
They weren't speaking to their children; they were shouting to them. /ðeɪ ˈwɜːnt ↘↗spiːkɪŋ tə ðeə ˈtʃɪldrən ‖ ðeɪ wə ↘ʃaʊtɪŋ tə ðəm/		
14	Declarative	70.51 / 58.28 ; 364.17 / 464.24 ; 19.69 / 18.21
Has he explained it to her? /ˈhæz i ɪks↗pleɪnd ɪt tu ə/		
7	Interr. Y/N	24.5 / 68.78
How many hills are there in this region? /ˈhaʊ ˈmeni ↘hɪlz ə ðeər ɪn ˈðɪs ˈriːdʒn̩/		
10	Interr. WH	9.51 / 30.62 ; 87.9 / 100.09
Be careful with the carpet, please! /bi ˈkeəfl̩ wɪð ðə ↘kɑːpɪt ˈpliːz/		
8	Imperative	64.36 / 51.3 ; 30.74 / 23.04 ; 360.43 / 140.07
That was such a boring conference! /ˈðæt wəz ˈsʌtʃ ə ˈbɔːrɪŋ ↘kɒnfrəns/		
8	Exclamatory	38.14 / 16.82 ; 67.44 / 101.26

Table 19. Details of the sentences in the dictation test

The sentences were dictated by a male native speaker from London, who also taught English in a French university. He produced them with an RP accent. Each sentence was repeated twice, with intervals of approximately 20 seconds.

Procedure

As in the production tests, the participants first took the perception tests before they were assigned to one of the three groups. Contrary to the speaking tasks, however, the

cloze test and the dictation test were taken by all the participants at the same time in their usual classroom, like a usual exercise or examination.

The experiment started with the cloze test. The teacher gave an oral explanation in French of the unfolding of the tasks. The document with the script of the recorded passage was handed out, and the following instructions were written at the top of the page:

Écoutez l'extrait sonore et retrouvez les mots manquants.
["Listen to the extract and find the missing words."]

If no one had any questions, the test began, and the passage was played twice as previously explained. Then, the students were given oral instructions about the sentence dictation task, which began immediately afterwards. The seven sentences were produced by the native speaker and repeated twice each. The teacher was very vigilant for any possible cheating among the students when invigilating the two testing sessions, although no problem was observed. In the end, there were 36 papers to collect, that is, the scripts with the filled blanks on one side of the page, and the dictated sentences on the other side.

Once the participants were informed about their groups, they all followed the lessons in which the teacher served as a model for them to hear and imitate English, as part of the same experiment as described from Subsection 4.2 (cf. 4.2.3 for details on the training). However, as said in the description of the protocol, the experimental treatments mostly relied on the students' learning of theoretical rules and L2 repetition, rather than have them straightforwardly train their listening abilities through comprehension exercises or cloze exercises, for example. Their exposure to spoken English was through the listening to the teacher pronounce the items, whether sounds, syllables, and words for the S-group, or nonsense words, phrases, and sentences for the P-group.

The two perception tests were taken again as post-training tests. On the one hand, using the same stimuli in a pre-test and a post-test enables an experimenter to draw a clear parallel between the pre- and post-treatment scores and observe the differences –

and their statistical significances – and possible improvement. On the other hand, with such repeated testing, the speakers' post-test scores risk being affected by their having already taken the same test some time before. Still, we decided that, as in the production tests, the perception post-tests would be the same as the pre-tests. The students were not told that it would be the same exercises as those they had taken a few months earlier. As in the production test, the order of the sentences for the dictation task was different from the pre-test.

Analysis of the cloze tests

First, a preliminary analysis of all the tests collected from the participants was carried out; the tests had previously been anonymised and randomised for us. This step was useful to establish a more accurate and objective scoring scale before running a closer analysis of the tests.

Regarding the cloze tests and the answers given by the participants for the missing words, it was not sufficient to resort to a binary scoring system, with an answer being either *correct* or *incorrect*. To be as accurate and objective as possible, a four-point scoring scale was elaborated:

1 = *no answer* is given.

2 = the answer is *incorrect*.

3 = the answer is *almost correct*.

4 = the answer is *correct*.

Each point corresponded to one item (out of 19 missing words). Nevertheless, even with this more precise system, it was necessary to define each level as clearly as possible. The lowest score 1 corresponded to a lack of answer. Similarly, the highest score 4 meant that the student's answer was exactly what was expected to the letter. As for the two intermediate levels, they were further defined after the preliminary analysis of students' tests. In some cases, the answers would be considered incorrect (scored 2), because the item was wrong. Among such instances, one can find the following: *correction* instead of *corruption*, *Canterbury* instead of *contemporary*, *sitting* or *thinking* instead of *seeking*, *regional* instead of *original*, and *presented* instead of *presided*. In other cases, the scoring scale had to be defined more accurately (see Table

20 below). It was decided that score 3 *almost correct answer* would correspond either to a spelling mistake in the target item (example: **caracter* instead of *character*), or to an inflection or a letter missing (*station* instead of *stations*), even though it sometimes altered the pronunciation from a phonological point of view (it is the case for **maner* instead of *manner*). Even if the two types of mistakes are not of the same nature, they can be considered to correspond to a similar degree of mistake or deviation from the target item.

The preliminary analyses resulted in the following table, serving as a common, unbiased reference scoring system, designed from direct occurrences in the students' anonymised tests:

CORRECT FORM	CONSIDERED *INCORRECT* (2)	CONSIDERED *ALMOST CORRECT* (3)
corruption		*coruption*
European		*Europeen*
contemporary	*contempering*	*contempory*
half-hour		*half, half an hour*
advertisements		*advertiss(e)ment, advertis(e)ment*
practice		*pratice/pratise, practices, practiss*
incomprehensibly	*incomprehensive*	*incomprehensible, incomprehensively*
manner		*maner*
character		*caracter*
presided		*prosided*

Table 20. Details on the scoring scale of the cloze test

Even though some of the choices presented above may be debatable, the principal objective was to adopt a homogeneous scoring system to avoid bias towards any of the groups. In parallel, the mere total number of correct answers (scored 4 on the detailed scoring scale) in each student's test was also counted, in comparison with the total number of incorrect answers (corresponding to scores 1 to 3 on the detailed scoring scale).

To summarise, the cloze tests could be analysed from two different yet complementary perspectives: 1) giving each participant a mean score based on a more detailed reference scoring system which was common for all of them, regardless of test-taking time (pre or post) or group; 2) simply counting each participant's total number of exactly correct answers. The mean scores were averaged for the three groups; each obtained two possible pre-test mean scores and two possible post-test mean scores, depending on the type of analysis.

Analysis of the dictation tests

The students' dictation tests were submitted to a preliminary analysis allowing for the elaboration of a common, unbiased scoring scale for all the participants' tests. The scale is somewhat simpler than the one created for the analysis of the cloze tests:

0 for each *incorrect* or *missing* word.

1 for each *almost correct* word (cf. score 3 in the cloze test).

2 for each *correct* word (grammatical word or lexical word).

The scoring was based on the total number of words per sentence, lexical words (nouns, verbs, adjectives, etc.) and grammatical words (articles, prepositions, auxiliaries, etc.) alike. Contracted forms such as *aren't* were considered one word, and full forms such as *are not* were considered two words.

Once again, despite some possibly debatable choices, the aim was to adopt a consistent homogeneous scoring system. No point was given for any missing word or incorrect word in a sentence; one point was given for each *almost correct* word, the definition of which was the same as the one used for the analysis of the cloze tests above; two points were given for each correctly spelt word to the letter. The following table recapitulates the occurrences of mistakes directly found in the students' anonymised and randomised tests and to which category we considered they belonged:

CORRECT FORM	CONSIDERED *INCORRECT* (0)	CONSIDERED *ALMOST CORRECT* (1)
ideas		*idea, idees*
children		*childrens*
speaking		*speak, speeking, speacking*
shouting	*shooting*	*shouted*
careful		*carful, carefull, carreful, carrefull*
political		*politicals, politic*
business		*bisness, bussiness, buisness*
region	*religion, readen*	*reagion*
hills	*heal, heals, hells, heels, iles, ills*	*hils*
weren't	*won't*	*were*
has		*as*
her	*a*	
explained		*explain*
none		*non*
boring		*borring*

Table 21. Details on the scoring system of the dictation test

In some cases, the erroneous form was considered almost correct despite the resulting alteration of the meaning of the sentence – for example, *shouted* instead of *shouting* – because it phonologically approached the target item, and it was evidence that the student recognised the root word and its having a grammatical inflection. In other cases, spelling mistakes and the mistakes – probably – due to inattention were likewise considered almost correct.

The total number of points obtained by each participant was then averaged, and two mean scores were obtained for each of the three groups: a pre-test mean score and a post-test mean score.

4.4.2. Analyses and hypotheses

The mean scores of each participant were calculated and used to average the mean scores of the three groups; the detailed scores of the participants in the two perception

tests are given in Appendix E. Like the analysis of the speech production tests, the pre-test/post-test protocol would allow for two analyses to be run: a within-groups analysis and a between-groups analysis. First, the *within-groups* analysis compared each group's pre-test mean with their post-test mean, independently of one another, which makes it possible to observe their improvement over time and tell whether the two types of training have had an impact on the learners' L2 perception skills, in comparison with the non-treated group. Such an analysis plays a crucial part in the whole analysis to reliably measure the role of segments in L2 learning. Second, the *between-groups* analysis compared the means obtained by the three groups with one another. Only this final key step enables us to observe the differences among the groups, and whether or not the prosodic approach has had a better impact on the English perception skills of the French learners than the segmental approach. More generally, this pivotal analysis determines the role of prosody as compared with that of segmental features in L2 teaching and the learning of English phonology by French speakers, and by extension, in English phonology.

Our general hypothesis is that prosody-centred training will have a more beneficial effect on the learners' perceptual skills. Here is a set of sub-hypotheses regarding the results of the within-groups analyses of the perception tests:

H01: The S-participants will have higher scores in the post-cloze tests than in the pre-cloze tests.

H02: The P-participants will have higher scores in the post-cloze tests than in the pre-cloze tests.

H03: The C-participants will have virtually the same scores in the post-cloze tests as in the pre-cloze tests.

H04: The S-participants will have higher scores in the post-dictation tests than in the pre-dictation tests.

H05: The P-participants will have higher scores in the post-dictation tests than in the pre-dictation tests.

H06: The C-participants will have virtually the same scores in the post-dictation tests as in the pre-dictation tests.

The following table recapitulates those six hypotheses:

Cloze	Pre S < Post S (H01)	Pre P < Post P (H02)	Pre C = Post C (H03)
Dictation	Pre S < Post S (H04)	Pre P < Post P (H05)	Pre C = Post C (H06)

Table 22. Within-groups differences: hypotheses on the perception results

The following list consists of our sub-hypotheses on the results of the between-groups analyses of the perception tests; the two hypotheses in bold are central to our research question on the comparison between the two teaching approaches and the effect of a prosody-centred approach:

H07: The S-group will have higher scores than the C-group in the cloze tests.

H08: The P-group will have higher scores than the C-group in the cloze tests.

H09: The P-group will have higher scores than the S-group in the cloze tests.

H10: The S-group will have higher scores than the C-group in the dictation tests.

H11: The P-group will have higher scores than the C-group in the dictation tests.

H12: The P-group will have higher scores than the S-group in the dictation tests.

The hypotheses are summarised below:

Cloze	S > C (H07)	P > C (H08)	P > S (H09)
Dictation	S > C (H10)	P > C (H11)	P > S (H12)

Table 23. Between-groups differences: hypotheses on the perception results

After presenting the results, the discussion will provide an answer to each sub-hypothesis in order to address the ultimate question of the impact of prosody-based teaching in learners' L2 perception skills.

4.4.3. Results

Cloze tests

The interpretations of the results in the statistical tests that were performed for the perceptual tasks are based on Motulsky's (2010) table of the significance of p values, presented in 4.3.3. Paired-samples t-tests were performed to observe whether the difference within each of the three groups from the pre-cloze tests to the post-cloze tests was statistically significant. As was previously explained, the cloze tests could be

analysed from two perspectives; first, by simply counting the total number of fully correct answers (i.e., the answer given by the participant is the exact target word with the exact spelling) in the tests for each group, and second, by using a more detailed 4-point scoring scale distinguishing between *blanks* and *incorrect* answers, *almost correct* answers, and *correct* answers. The statistical tests were performed with the data from both analyses.

First, the t-tests were run using the total number of correct answers – which were scored 4 in the detailed analyses – in each group. For the S-group, $t(11) = 3.8011$, $p = 0.0029$, which means that the pre-post difference is statistically highly significant. For the P-group, $t(11) = 5.8407$, with $p < 0.0001$; the difference is extremely significant. Finally, the C-group obtained $t(11) = 1.1030$, and $p = 0.2936$; the difference is not significant. The following table sums up the significance of the results:

	PRE-TEST	POST-TEST	SIGNIFICANCE
S-group	126 (mean = 10.5)	153 (mean = 12.75)	**
P-group	126 (mean = 10.5)	161 (mean = 13.42)	***
C-group	131 (mean = 10.92)	138 (mean = 11.5)	NS

Table 24. Number of correct answers per group in cloze tests (pre-post differences)

Second, using the detailed scores of each group in the cloze tests, the paired-samples t-tests provided the following results. For the S-group, $t(11) = 4.4664$, $p = 0.0010$; the difference is highly significant. For the P-group, $t(11) = 6.1270$, $p < 0.0001$; the difference is extremely significant. Finally, for the C-group, $t(11) = 3.3416$, $p = 0.0066$; the difference is highly significant. The following table sums up the mean scores of each group before and after the training, with the significance of the difference:

	PRE-SCORE	POST-SCORE	SIGNIFICANCE
S-group	3.22	3.5	**
P-group	3.3	3.61	***
C-group	3.18	3.38	**

Table 25. Mean scores in cloze tests (pre-post differences)

The statistical tests with both types of analyses – total number of correct answers and calculation of detailed scores out of 4 points – revealed that the pre-post differences of the S-group and the P-group are highly significant. This suggests that the two groups improved after their training. Concerning the control group, however, the interpretation of the pre-post difference is not the same depending on the type of analysis under consideration. If one only looks at the total number of correct answers from the cloze test sessions, the C-group did not improve significantly, contrary to the other two groups, as could be expected in so far as this group received no training. Nevertheless, using the detailed scores of their performance in the test, the C-group did improve significantly, even though they received no treatment.

A one-way ANOVA was run in order to make sure that the three groups were equal in the pre-close tests, as the case occurred in the production tests that the P-group was better than the other two groups before the training. Using each participant's scores (out of 4) for each target item (i.e., 19 words x 12 participants per group = 228 scores), no significant difference was found, $F(2, 681) = 0.9419$, $p = 0.39$, the three experimental groups were therefore equal in their performance in the pre-cloze tests. The results were the same with a one-way ANOVA performed using the total number of correct answers per group: $F(2, 33) = 9.1332$, $p = 0.91$.

A repeated-measures ANOVA was performed with Time (two levels: Time 1 = pre-test and Time 2 = post-test) and Group (three levels: S, P, and C) as the within-subjects and between-subjects factors, respectively. For more precision, two tests were run, using on the one hand the total number of correct answers of each group, and on the other hand their mean scores based on the four-point scoring scale. Using each group's number of correct answers in the tests, the repeated-measures ANOVA revealed an extremely significant effect of time, $F(2, 33) = 37.596$, $p < 0.0001$, as was confirmed with the results of the within-groups analysis above, but a non-significant effect of group, $F(2, 33) = 0.313$, $p = 0.733$. The interaction of the two factors was significant: $F(2,33) = 4.927$, $p = 0.013$. Post-hoc tests found a significant difference between the P-group and the C-group ($p = 0.012$), but no difference between the S-group and the C-group ($p = 0.090$) or between the S-group and the P-group ($p = 0.662$). Those statistical results seem to be supported by the second repeated-measures ANOVA, which was

performed using the participants' mean scores (out of 4); the effect of time, $F(2, 33) = 61.596$, $p < 0.0001$, was extremely significant, as was confirmed with the results of the within-groups analysis above, whereas the effect of group, $F(2, 33) = 1.378$, $p = 0.266$, was not significant, which was confirmed by the post-hoc tests. However, the interaction between Time and Group was not significant, $F(2, 33) = 0.882$, $p = 0.424$.

The two types of analysis of the data from the cloze tests suggest that the difference among the three experimental conditions is not quite significant, taking into account the effect of the two treatments over time; the groups did not have quite significantly different changes from pre to post. The two figures below represent the evolutions of the three groups over time, first using the count of their correct answers in the test (Figure 10), and second using their mean scores based on the 4-point scoring system (Figure 11):

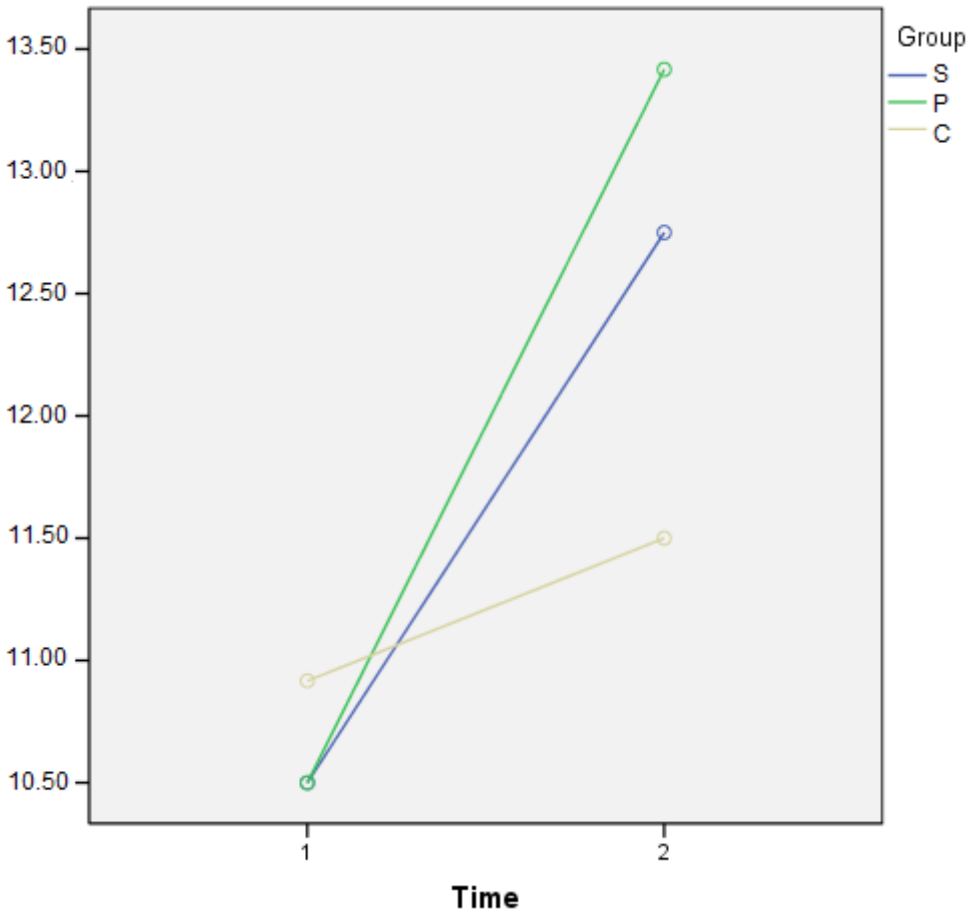

Figure 10. Interaction plot between Time and Group (mean number of correct answers per group in cloze tests)

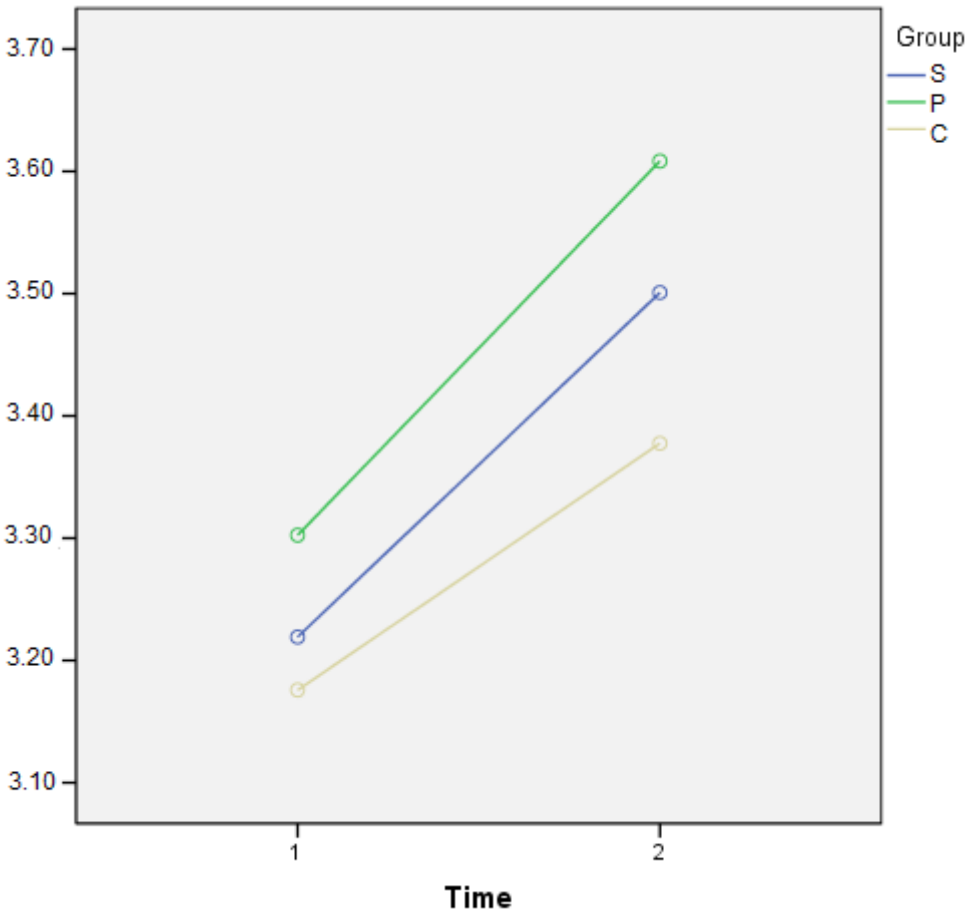

Figure 11. Interaction plot between Time and Group (mean scores in cloze tests)

Figure 10 shows that the S-group and the P-group significantly improved over time (from 126 to 153 correct answers, and from 126 to 161 correct answers, respectively), whereas the C-group did not improve so much, if at all (from 131 to 138 correct answers). The line representing the improvement of the P-group is the steepest of the three, suggesting that they accomplished the best performance overall as well as improved the most; the difference between the post-test scores of the P-group and of the C-group is supported by the statistical tests. As for Figure 11, based on the second analysis of the tests using the detailed scoring system, the difference of improvement is not so clear-cut; although it confirms the results according to which the three groups improved after the training, there is no significant between-groups difference, which means that neither type of training enabled the learners to enhance their skills more.

Dictation tests

Paired-samples t-tests were performed to observe whether the difference within each group from the pre-dictation test to the post-dictation test was statistically significant. The result for the S-group is t(11) = 3.1934, p = 0.0086; the difference is highly significant. For the P-group, t(11) = 3.6354, p = 0.0039; the difference is highly significant, too. As for the C-group, t(11) = 2.9975, p = 0.0121; it is significant. The following table sums up the mean scores of each group in the dictation tasks before and after the training sessions, with the degree of significance of the changes:

	PRE-SCORE	POST-SCORE	SIGNIFICANCE
S-group	11.68	12.37	**
P-group	12.13	13.06	**
C-group	10.23	11.33	*

Table 26. Mean scores in the dictation test (pre-post differences)

Both treated groups improved after their respective treatments. Furthermore, although it was hypothesised that the pre-post change would not be significant for the C-group, the t-test suggested that it was. Therefore, the C-group also seems to have improved in L2 perception over time.

A one-way ANOVA was performed to ensure that the three groups were equal in the pre-dictation tests; with F(2, 33) = 3.171, p = 0.04, the difference is barely significant. Post-hoc tests found no difference between the S-group and the P-group (p = 0.2754), a slight difference between the S-group and the C-group (p = 0.0394), and a highly significant difference between the P-group and the C-group (p = 0.0085). Consequently, the three groups were not quite equal in the pre-dictation tests, as the two groups to be treated, and particularly the P-group, outperformed the C-group.

The groups' scores in the dictation tests were submitted to a repeated-measures ANOVA, with Time and Group as the two factors. The results confirmed that the effect of time, F(2, 33) = 33.721, p < 0.0001, was extremely significant as was found in the within-groups analysis, and the effect of group, F(2, 33) = 3.833, p = 0.032, was significant. Post-hoc tests showed no significant difference between the S-group and the C-group (p = 0.243), a significant difference between the P-group and the C-group (p =

0.019), and no significant difference between the S-group and the P-group (p = 0.705). However, the interaction between Time and Group was not significant: F(2, 33) = 0.676, p = 0.516.

The difference among the three experimental conditions is not significant, taking into account the effect of the two treatments over time; the groups did not have significantly different changes from pre to post. Figure 12 below shows the evolution of each group in the dictation test over time:

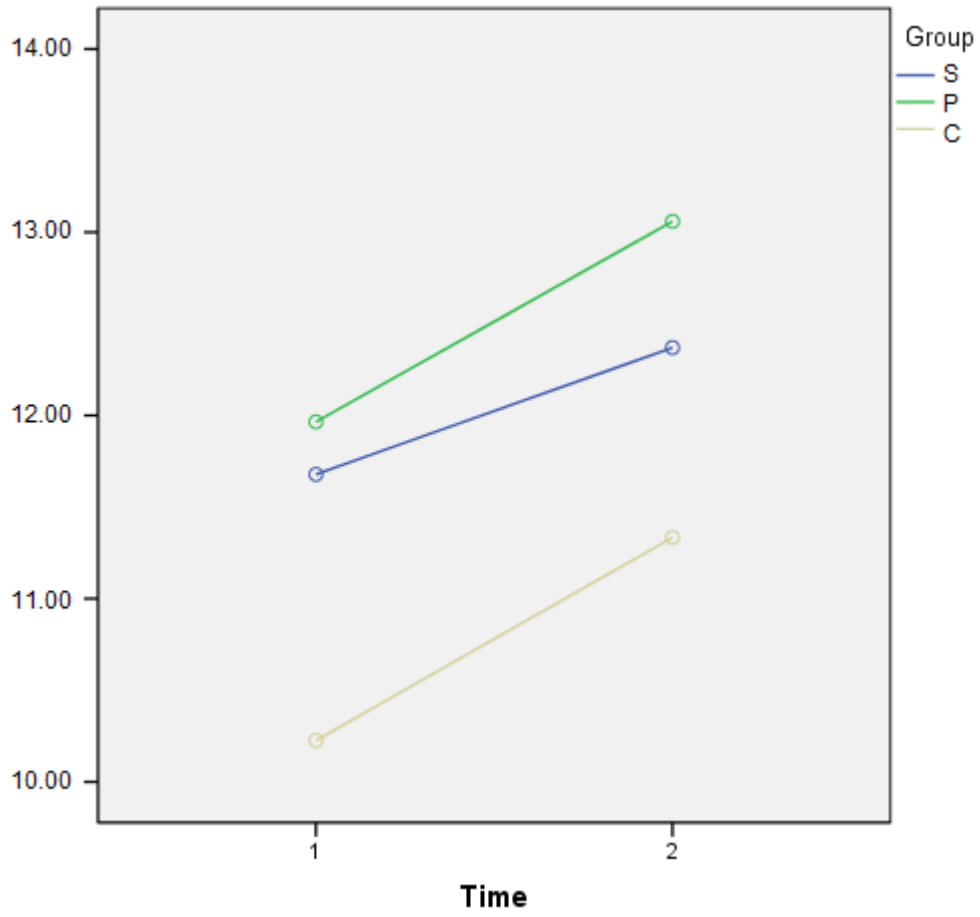

Figure 12. Interaction plot between Time and Group (dictation tests)

The significant difference between the P-group and the C-group is noticeable in the figure, in which the distance between those two groups at both Time 1 and Time 2 is the biggest.

4.4.4. Discussion

The within-groups analyses of the perception tests served to show the difference within each group from the pre-test session to the post-test session. Table 27 is a recapitulation of the outcome, with the validation or refutation of each of the hypotheses that were put forward in 4.4.2:

	HYPOTHESIS	VALIDATED / INVALIDATED	PRECISIONS
H01 (cloze S)	Pre S < Post S	V	** significance
H02 (cloze P)	Pre P < Post P	V	*** significance
H03 (cloze C)	Pre C = Post C	I	Depending on the analysis (** significance vs. NS)
H04 (dictation S)	Pre S < Post S	V	** significance
H05 (dictation P)	Pre P < Post P	V	** significance
H06 (dictation C)	Pre C = Post C	I	* significance (p = 0.01)

Table 27. Answers to the hypotheses on within-groups perceptual tests

As was hypothesised, both the S-group and the P-group showed significant improvement after their training on English segmentals and suprasegmentals, respectively. Such findings suggest that even if a teaching approach is mostly centred on L2 production and does not directly include formal perceptual training, learners' listening comprehension skills may still be enhanced, possibly through the listening to a model (i.e., the teacher's own productions in the case of the present study) and the learning of theoretical notions. In this light, Frost (2004) found more significant improvement of learners' skills when their training included theoretical notions and repetitions after a model, compared with a group of learners that did not receive any theoretical background.

The fact that the control-group students improved their mean scores in the dictation test – and, to a lesser extent, in the cloze tests – at Time 2, while they did not receive any type of training, casts doubts on the validity of the aforementioned results obtained

by the other two groups, and thus on the effective impact of the two central teaching approaches on the learners' L2 perceptual abilities. The choice of using the same stimuli, that is, the same perception tasks and target items, before and after the training sessions presented a risk that the learners would show improvement in the post-tests from having already seen the target items in the pre-tests. Furthermore, all the participants from all three groups continued following weekly English classes during the training period, independently of the present experiment, and it is probable that their English listening skills was enhanced even without any experimental treatment. Although some of the C-group scores were significant, the certain improvement in the two treated groups should be noted. The example of Participant S06 shows a possible efficacy of the S-training, in that the student seemed to become more sensitive to such features as final *-s* (e.g., from incorrect *favourites* and *stations* to correct *favourite* and *station*) and the /s/ vs. /θ/ distinction (e.g., from incorrect *thinking* to incorrect *sinking* for *seeking*). This suggests that the S-approach and the P-approach had significant impacts on the learners' listening comprehension skills, and it was not exclusively due to the re-using of the same perception tasks before and after the training and external English classes.

The following table provides answers to the sub-hypotheses that were initially posited about the outcome of the between-groups analyses of the perceptual tests:

	HYPOTHESIS	VALIDATED / INVALIDATED	PRECISIONS
H07 (cloze)	S > C	I	
H08 (cloze)	P > C	I	Significant difference depending on the analysis
H09 (cloze)	P > S	I	
H10 (dictation)	S > C	I	Significant difference in the pre-tests
H11 (dictation)	P > C	I	Significant difference in the pre-tests
H12 (dictation)	P > S	I	Equal in the pre-tests

Table 28. Answers to the hypotheses on between-groups perceptual tests

None of the hypotheses is validated. The fact that the three groups were equal in the pre-cloze tests allowed for a solid basis before looking at their improvement after the training sessions and comparing their performances. Counting each group's total number of correct answers in the pre-tests and post-tests, we found that both treated groups significantly improved after their training, contrary to the control group, as was expected. The figure illustrating the group's different evolutions suggested that the P-group had the strongest pre-to-post change as the line was the steepest, which was in keeping with the central hypothesis. However, the statistical tests did not find any significant difference between the S-group and the P-group. On the contrary, we found a significant difference between the P-group and the C-group, which points to a considerable effect of the P-training over the other two conditions. Nevertheless, none of the three groups had better improvement if one looks at the scores that were given to them, based on a 4-point scale based on different degrees of mistakes. Furthermore, when using this closer analysis, even the control group – who did not receive any treatment – improved in the post-test, putting into question the effect of the two types of training.

The results suggest that neither the segment-based teaching approach nor the prosody-based teaching approach had a better impact on the EFL learners' skills. Apart

from the possible reason that the same test was used before and after the training, as mentioned in the within-groups analyses above, the characteristics of the cloze test itself may be questioned. In fact, the objective was to assess the French learners' capacity to understand natural English, from an authentic source, that is, when listening to a native speaker's speech. Still, the test failed to measure the participants' actual understanding of a communication situation, such as a conversation. Also, the fact that the passage used in the test only consisted in continuous speech by one male speaker, on one specific topic, may have been a hindrance; some external factors, such as boredom, may consequently have influenced the learners' tests. Finally, the passage was played twice to them, and even though it may seem to be sufficient – particularly because it is already unnatural compared with a daily conversation –, the tests might have been more accurate if the learners had been allowed to listen to the extract a third time, as is often the case in academic listening comprehension tasks, thus giving them more time to write down the missing items on the document.

Contrary to the cloze tests, the three experimental groups did not perform equally in the pre-dictation tests. Indeed, even before the participants were assigned to a specific group and the training sessions began, and despite the group-formation process based on balance and equality, the students that would form the P-group performed, on average, better than the participants of the C-group, and to a lesser extent, than those of the S-group. The results and the between-groups comparison were thus bound to be affected. Although the within-groups analyses revealed that all three experimental groups, including the untreated group, improved over the academic semester, the statistical tests found no significant interaction between the Time and Group factors, and thereby no significant effects of the two treatments from the pre-tests to the post-tests. The significant difference that was found between the performance of the P-group and that of the C-group may have been related to their different levels of performance in the pre-tests. Furthermore, the figures presented above seemed to show that the P-group and the C-group had very similar pre-to-post improvements although not starting from the same level.

In the dictation tests, none of the groups performed better than the other two, taking into account the effects of the two types of training on the learners' performances.

Through the use of the tests based on read speech comprehension, the objective was to be able to isolate target L2 features in order to include all manner of typical segmental and suprasegmental difficulties for French learners, and to make sure that neither of the two treated groups would be favoured. Thus, the sentences contained segmental and suprasegmental aspects that were taught during the lessons of the training, although no item present in the lessons was re-used in the test stimuli. Nevertheless, the limitations of the dictation test should be highlighted. For example, one may wonder whether using seven sentences is sufficient to generalise and test learners' listening skills. Also, the dictation did not contain a full paragraph or text, which might have been useful for displaying some suprasegmental phenomena that were explained during the P-training, although in that case the S-group might arguably been disfavoured. One of the most important functions of nuclear accent placement, for example, is found in conversations through coherence and cohesion (e.g., old vs. new information), which is why the sole use of sentences in the test, however long they are, may not be sufficient to assess the participants' acquired skills. Overall, however, choices had to be made – partly due to time constraints –, and it was difficult to keep a strict balance and equality between the segmental training and the suprasegmental training.

As was discussed in the analysis of the production tests, the refutation of the claim that centring L2 pronunciation teaching on prosodic aspects is more beneficial to learners' perception skills than segment-centred teaching suggests that these two aspects, in addition to being inseparable, should be equally included in L2 teaching.

4.5. General discussion

Rather than aiming at separating L2 segmental teaching and L2 prosodic teaching, which is both impossible and counterproductive, our initial objective was to determine whether native English speakers attach more importance to prosodic accuracy than to segmental accuracy when listening to non-native speech, and whether defining prosodic aspects as priorities in EFL pronunciation teaching would help learners improve their L2 production and perception abilities more than centring teaching on segmental aspects. The outcome of the experiment suggests that neither the segment-based teaching approach, nor the prosody-based teaching approach had a significantly better

impact on the French EFL learners' production skills, although the segmental training did help the students improve their abilities to read target sentences aloud more than the prosodic training. This suggests that teaching both aspects of English phonology is crucial to help non-native speakers enhance their L2 oral skills and be more comprehensible, all the more so as the speech stream is made up of a combination of segmental and suprasegmental phenomena.

Some nuancing remarks are in order. First and foremost, all the analyses and results of the production tests are based on subjective evaluations, in which a group of native English speakers listened to the L2 recordings and gave pronunciation-measure scores. We made this choice over purely acoustic analyses because we considered that the ultimate aim of learning a foreign language is to be able to speak to other speakers, who most of the time are linguistically-inexperienced, in daily situations. Asking such "ordinary" speakers to judge L2 productions resembles a natural communicative situation in which any L2 learner may find himself or herself one day. Moreover, this was the only way to determine whether native listeners attach more importance to prosodic accuracy than to segmental accuracy when listening to non-native speech, as has been claimed in the literature, and therefore whether EFL/ESL teaching methods should prioritise some suprasegmental or segmental features.

Although the instructions given to the listener-judges explicitly required them to measure pronunciation only, the judgements may not have been exclusively based on the learners' oral skills, as is noted by Scheuer (2002) who found that there may be no significant correlation between the frequency of erroneous renditions of such features as dental fricatives and foreign accent scores given by native listeners, contrary to what may be expected. Also, the subjective aspect of the evaluations comprised the risk of mental or physical fatigue from the listeners, and some scores may have been affected in spite of the division into several scoring sessions and the intra- and inter-reliability tests. For that matter, it must be underlined that the raters used in the present study were unpaid to do the scoring task, even though none of them was constrained to complete it. Finally, in comparison with previous comparative studies, the listener-judges only focused on pronunciation measure. The results might have been different if the scores had concerned the degree of comprehensibility of the experimental groups, as was the

case in Derwing et al.'s (1998) experiment, who found significant improvement of the "global" (i.e., prosodic) group when looking at speech comprehensibility rather than foreign-accentedness ratings. As was previously explained, we could not ask the native speakers to rate both aspects, given the considerable amount of voluntary work that it would have implied. Still, future analyses of the data can focus on the level of comprehensibility of the non-native speakers after either type of training.

The two types of training (i.e., the lessons, documents, sample items, etc.) that were designed for this longitudinal study not only included theoretical notions, but also the oral practice of English sounds, syllables, words, and sentences, depending on the focus of the teaching approach, through the repetition of target items after the teacher. However, the methods and contents of both types of training may be put into question and account for the lack of significant impact on the learners' skills. For example, although this was tested before and after the two training sessions, neither approach comprised spontaneous speech practice. Fraser (2001: 17) notes in this respect:

> Pronunciation lessons work best if they involve the students in actually speaking, rather than in just learning facts or rules of pronunciation. Many students of course feel more comfortable learning the rules of the language, because it is less threatening than actually speaking. However, the transfer of explicit knowledge of rules into pronunciation practice is very limited.

The students might have benefited from practising English conversation or continuous speaking during both treatments to try to apply the lessons to their own L2 speech, all the more so as the theoretical notions that were to help them enhance their speaking abilities may not have been sufficient to induce change in their interlanguages. In the case of suprasegmental features, nuclear accent placement, for example, was taught and a few examples were given, and yet its full use is found in natural conversation, which was not practised. Field (2005: 420) gives the example of lexical stress and similarly points out that "mastering a rule is very different from internalizing a stress pattern for a specific item". Generally speaking, we may wonder whether L2 learning is processed at the phonetic level or the phonological level. Moreover, the lessons did not include explicit perception training, through activities such as listening comprehension, even

though some believe that “pronunciation teaching requires thorough preparation through work on the perception of English sounds and contrasts, and the formation of concepts of English phonology” (Fraser, 2001: 18). Speech perception and production form a circle, and should therefore be equally trained in L2 teaching.

Overall, one may wonder whether the length of the training was sufficient to induce change in the learners' interlanguage phonology. Not only is an academic semester not long enough to teach, learn, and understand everything about a specific phonological aspect – especially if the target language is learnt at school in a country where it is not the official language –, but all the participants in the experiment were non-beginners, which means that their English pronunciation skills were already quite affected – and possibly fossilised – with time. Even though we (subjectively and anecdotally) noticed a real motivation and effort from all of them to understand and apply the lessons to their L2 speech during the lessons and tasks, it is uncertain that they were capable of improving specific features of their own L2 pronunciation after so many years of English studies and attendant errors of performance. Taking the example of lexical stress again, Cruttenden (2008: 323) even believes that “the accent of polysyllabic words should be learnt when the word is first acquired”.

The between-groups analyses of the perception tests revealed that neither the segment-based teaching approach, nor the prosody-based teaching approach had a better impact on the French EFL learners' L2 perception skills. In previous studies comparing the effect of suprasegmental teaching with the effect of segmental teaching on non-native speakers' abilities in a foreign or second language, perception has seldom been tested. More often than not, the effects of different teaching approaches are exclusively assessed through the testing of participants' L2 productive skills and their improved foreign-accentedness and comprehensibility. Nevertheless, both Ueno's (1998) and Akita's (2005) experiments, conducted on Japanese learners of English as a foreign language, revealed that neither type of teaching approach had a better impact on L2 perceptual skills, if it ever had one, confirming the outcome of the present study. No previous study concerned French learners of English as a foreign language.

Even though the within-groups analyses showed significant improvement in both treated groups, the length and contents of the two treatments are an important factor in

the learners' performance in both the production and perception tests. First of all, the students' perception skills in English may have been enhanced had the training been longer, thus allowing for a more accurate comparison of the (long-term) effects of the two teaching approaches in the students' interlanguage phonology. Moreover, it is crucial to bear in mind that L2 perception was not directly practised in either of the training conditions; the objective was to observe whether one of the approaches would have a positive impact on the learners' perception skills even though they would focus on theoretical knowledge and repetition. Hence, a future experiment should to test the importance of prosody in comparison with segments in L2 learners' ability to understand spoken English through explicit perceptual training. Concerning the perception tasks that the different groups did, it seems that using a cloze test and a dictation test was not sufficient to optimally compare their performances. Although it was difficult to impose such an amount of work to the participants of the study, it is necessary to further develop the protocol in order to determine whether non-native speakers can understand native speech better if they are trained in L2 segmentals or suprasegmentals.

As a conclusion, our experimental study suggests that, even though training French EFL learners in segmentals and suprasegmentals does help them improve their oral skills at the production and perception levels, neither aspect has a stronger effect than the other. Accordingly, native English speakers may attach as much importance to prosodic accuracy as to segmental accuracy when listening to non-native speech. Our general hypothesis that prosody should be prioritised over segments in EFL teaching in France is therefore not confirmed. In fact, as was regularly pointed out in this thesis, speech perception and production necessarily involve both segmental and suprasegmental features, and these two aspects are intertwined, interdependent, and inseparable, particularly in perspectives of language acquisition and learning. The acquisitions of segments and prosody therefore occur simultaneously, and the exclusive teaching of one aspect while overlooking the other is both impossible and counterproductive. The question of pronunciation teaching focus that we have raised, however, may still be addressed in future revised versions of our experimental protocol on EFL teaching in France, based on the aforementioned suggestions, in order to

contribute to helping French speakers improve their oral skills in English and be more comprehensible to native speakers and other non-native speakers.

5. CONCLUSION

In the present thesis, we have attempted to address the following question:

Is the role of suprasegmentals more important than the role of segmentals in the learning of English by French speakers?

First, it is crucial to remember that segmental features and suprasegmental features are inseparable and interdependent. Segmental phenomena are greatly influenced by suprasegmental phenomena, and it is the combination of these two aspects that forms the speech stream and makes communication possible, and teaching both aspects equally will enable learners to acquire the target language properly and accurately. Although more and more researchers have claimed that suprasegmental features have a major role to play in language and language acquisition, and accordingly L2 teaching approaches should prioritise prosody rather than consonants and vowels as is often the case (see Section 2), no previous study has investigated the impact of a prosody-centred teaching approach and that of a segment-centred teaching approach on French learners' oral skills in English.

Through a comparative experiment, we have addressed the aforementioned research question and put forward the hypothesis that training French speakers in English prosody would help them enhance both their L2 production and perception skills more significantly than training them in English segments, especially because English and French have different prosodic systems and prosodic errors have a detrimental effect,

while segmental errors can often be alleviated by the context (see Section 3). In the same light, we hypothesised that native English speakers attach more importance to prosodic accuracy than to segmental accuracy when listening to non-native speech. As detailed in Section 4, we first conducted a small-scale pilot study so as to detect and avoid methodological problems. Then, we selected a number of university French-speaking EFL learners from France; they had all been studying English since primary school, and that was their exclusive contact with the language. We divided them into three experimental groups: a Segmental group in which the participants were trained in English consonants and vowels, a Prosodic group in which the participants were trained in English prosodic aspects (stress, rhythm, and intonation), and a control group who did not receive any extra training in addition to the usual English classes at university, also followed by the others. Before the 10-week courses, which we had previously designed prioritising segmentals in one course and suprasegmentals in the other, all three groups took production tasks (testing their read speech and spontaneous speech skills) and perception tasks (through a cloze test and a dictation test) which we had elaborated. Those tasks included segmental and suprasegmental difficulties for French speakers, and the stimulus items were different from those used in the two types of training. The students took the same tasks again after the training period, in order to observe which group would have improved most, and which teaching approach would have a better effect. The participants' randomised productions were evaluated for pronunciation accuracy by a homogeneous group of linguistically-inexperienced native English speakers in a blind rating task, using a 5-point Likert scale. We similarly scored the randomised perception tests using a common scoring system for all the students. Finally, the means of each participant and the means of each group were calculated to perform statistical tests. While the control group was not expected to improve in either type of tasks as they did not receive any specific training, we hypothesised that the prosodic group would show a stronger improvement than the segmental group, confirming the major role of prosody in the acquisition of English phonology and supporting the necessity to prioritise prosodic aspects in L2 learning and L2 teaching methods.

The results of the tests did not confirm the hypothesis; although both the prosodic training and the segmental training enabled the French learners to improve their oral skills, neither of the approaches had a better impact. Some similar studies conducted on different L2 speakers led to the same conclusion (e.g., Akita, 2005 and Ueno, 1998 who examined the impact of two types of training on Japanese non-beginner learners of English as a foreign language), although Derwing et al. (1998) found that training adult L2 learners of English as a second language, from various L1 backgrounds, in suprasegmental aspects did help them improve their spontaneous speech abilities more significantly. However, as is noted by Jenkins (1998), prosody may not have quite the same impact depending on the non-native speaker's linguistic background and their contact with the L2. Learning English as a foreign language – as concerned in the present study –, usually in an academic context and limited to a few hours of exposure per week, is different from learning English as a second language, which is usually based on linguistic immersion in a country where the L2 is the official language.

In the discussion part of Section 4, we raised a number of methodological limitations of our experimental design on the production tasks and the perception tasks, despite the conducting of a pilot study. Particularly, both the learners' productive and perceptual skills were tested even though the two conditions included theory and repetitions, but no listening activity as only the teacher served as a model for imitation and repetition. However, as is claimed in Cruttenden (2008: 5), "[…] it must not be forgotten that a large part of language acquisition depends on listening, both listening to understand and listening to imitate". Speech perception and speech production form a circle, and proper language acquisition can only be completed if this circle is retained. In our study, time and human constraints had to be taken into account, and choices had to be made; hence, the training sessions could not be based on all language skills, nor could they include all linguistic aspects. In this respect, we may question the content choices that we made for the two experimental treatments (see Section 4); in addition to theoretical knowledge which should still be included, more oral practice may have had a positive impact on the learners, and it is undeniable that extending the segmental and suprasegmental sessions with even more aspects and examples would have allowed for a more accurate comparison of the teaching approaches and their effects. Nevertheless,

a longer period of time than an academic semester would have been necessary to ensure that a change in the learners' interlanguage phonology would occur, but once again external constraints led to shorter training periods, which may partly account for the results. Furthermore, all the participants continued receiving external weekly English classes at the time of the experiment, which may explain why the learners of the control group, receiving no experimental treatment, also improved in the perception tasks. Finally, the learners that we used were non-beginners for various reasons, including practical reasons and above all the possibility for them to take pre-tests – which would have been impossible with beginners – and make subsequent within-groups and between-groups comparisons possible. Nonetheless, the best way to compare a segment-based teaching approach and a prosody-based teaching approach on learners' L2 pronunciation and listening skills in the long term should be by using learners who have never been exposed to the target language before, ideally children. In our case, not only had the participants been learning English for many years, but their oral skills had probably been quite affected by time and experience. The use of pre-training tests was meant to counter this problem, although there is a chance that the participants did not quite manage to assimilate the lessons of the different types of training. In addition to the contents of the two types of training and the methodology of the experiment, the outcome of the present study also depended on the participants themselves, in that extra-linguistic factors such as motivation are closely related to L2 learning accuracy and teaching efficacy (Krashen, 1981; Nagle, 2013), although "[…] motivating learners to develop their pronunciation is not easy" (Wong, 1987: 12). All language teachers thus face recurrent difficulties and problems, in the same way as L2 learners do. Consequently, the question of determining which features to prioritise when helping learners improve in foreign-accentedness, comprehensibility, or listening skills, is a tricky one.

Through the experiment conducted in the scope of the present doctoral project, we have intended to open the door to future analyses. First, the data collected from the participants' production tests and perception tests can be analysed differently. We decided to ask native speakers from England to rate the read speech and spontaneous speech samples using a 5-point scale based on pronunciation measure. Future analyses

can use other non-native speakers, specialists in phonology, or native English speakers from other English-speaking countries to assess the degree of foreign-accentedness and/or the degree of comprehensibility of the participants' productions. The results may also be different depending on the listeners' backgrounds. Furthermore, the evaluation of the participants' productions can be done on a more objective basis using acoustic analyses, so as to observe the consistency between listeners' scores and reality.

Addressing such a complex question as that of the segmentals vs. suprasegmentals comparison cannot solely be based on one experimental study. That is why future research should involve replication studies of our work. Even though the same protocol could be used to confirm or refute the results that we have obtained, it would be wiser to conduct another experiment on French EFL learners taking into consideration and correcting the above-mentioned limitations, and involving more participants and listener-judges. An alternative study could involve the inclusion of all kinds of language activities in teaching approaches – focusing either on L2 prosody, or on L2 segments, depending on the experimental condition –, but such a longitudinal experiment, albeit more reliable, would require a much longer period of time and more human resources. In fact, the two teaching approaches should ideally be tested in a longitudinal study on the oral skills of two groups of early beginner learners over several years, so as to compare the efficacy of the two methods with other non-treated children who would follow a usual method. Also, the present study has involved French learners of English as a foreign language, but future studies should be conducted on French learners of English as a second language who have lived in an English-speaking country for a certain amount of time, as was the case in some previous studies, in order to observe whether the outcome would be different and whether that is due to a greater amount of language exposure. Finally, the limited aspect of our study must be highlighted, in so far as the participants were exclusively from the north region of France. Future experimental studies should involve other French speakers, from different French-speaking regions such as Southern France, Belgium, or Canada, so as to determine whether prosody has a different impact and importance according to the French learner's background.

Our ultimate goal was to highlight the considerable importance of prosody, particularly in language learning and teaching. As was explored in the theoretical section (Sections 2 and 3), English phonology and French phonology are different, both at the segmental level and at the suprasegmental level, which explains why French speakers who learn English as a foreign language face a number of difficulties and make typical (and predictable) pronunciation errors. The detection of a French accent, for example, is not exclusively based on segmental cues, as English speakers may well identify French speakers' L2 speech – or at least non-native speech – through suprasegmental cues only (Horgues, 2010). Although our personal teaching experience has led us to observe that many teachers and learners tend to associate pronunciation with consonants and vowels only, prosody also has a major role to play, and it is closely intertwined with segmental aspects and greatly contributes to foreign-accentedness, intelligibility, and comprehensibility – through both L2 production and L2 perception –, and therefore suprasegmental aspects should not be overlooked in L2 acquisition, learning, and teaching.

The objective of our experiment was to compare the role of suprasegmental features with that of segmental features in the learning of English by French speakers. The two different teaching approaches that we developed were intended for a clear comparison, contributing to both the field of linguistics and the field of teaching. Indeed, while prosody is frequently claimed to be neglected by teachers in their classroom practices, it is also believed to be more important than segments in theory and English speakers are often claimed to attach more importance to prosodic accuracy. This is the idea that we pursue, in so far as L2 prosodic errors often have a more detrimental effect than L2 segmental errors. Even though our experimental study failed to find a more significant impact of either aspect in French EFL learners' skills, it is crucial to remember that both segmentals and suprasegmentals have considerable roles to play and bring their own contributions to communication, in different yet complementary ways. As a consequence, non-native speakers – be they learners or teachers – must be made aware that it is the combination of the two aspects that will lead to more accuracy and the success of communication, and as is claimed by Fraser (2001: 30), "[…] yes, it is true

that we should concentrate on prosody in teaching ESL, though not at the expense of phonemes. Learners certainly need both, and preferably not separately".

Thus, the segmental features of speech greatly contribute to meaning, and thereby communication, and should be neither overlooked, nor exclusive in L2 learning and teaching methods. Nevertheless, suprasegmental features must never be neglected, because more often than not, "it's not what you say, but how you say it".

REFERENCES

Abercrombie, D. (1967). *Elements of general phonetics*. Edinburgh: Edinburgh University Press.

Akita, M. (2005). The effectiveness of a prosody-oriented approach in L2 perception and pronunciation training. *Gakujyutsu Kenkyuu, 53*, 1-22.

Alazard, C., Astésano, C., Billières, M., & Espesser, R. (2011). Rôle de la prosodie dans la structuration du discours – Proposition d'une méthodologie d'enseignement de l'oral vers l'écrit en français langue étrangère. In H.-Y. Yoo & E. Delais-Roussarie (Eds.), *Actes d'IDP* 2009 (pp. 49-61). Paris.

Albright, A., & Hayes, B. (2011). Learning and learnability in phonology. In J. Goldsmith, J. Riggle & A. Yu (Eds.), *The handbook of phonological theory – 2nd edition* (pp. 661-690). Blackwell/Wiley.

Ali, S. (2010). *Étude de la relation entre l'annotation des formes et des fonctions prosodiques en anglais britannique contemporain* (Doctoral thesis, University of Aix-Marseille I, France).

Alliaume, J. (1989). Prosodie et apprentissage des langues. *Cahiers de L'APLIUT, 32* (3), 96-104.

Anderson-Hsieh, J., Johnson, R., & Koehler, K. (1992). The relationship between native speaker judgements of non-native pronunciation and deviance in segmentals, prosody, and syllable structure. *Language Learning, 42* (4), 529-555.

Archibald, J. (1994). A formal model of learning L2 prosodic phonology. *Second Language Research, 10*, 215-240.

Astésano, C. (2001). *Rythme et accentuation en français: Invariance et variabilité stylistique*. Paris: L'Harmattan.

Atoye, R. O. (2005). Non-native perception and interpretation of English intonation. *Nordic Journal of African Studies, 14* (1), 26-42.

Auer, P. (1993). Is a rhythm-based typology possible? A study of the role of prosody in phonological typology. *KontRI Working Paper 21*, University Konstanz.

Avery, P., & Ehrlich, S. (1992). Problems of selected language groups. In P. Avery & S. Ehrlich (Eds.), *Teaching American English pronunciation* (pp. 111-157). Oxford: Oxford University Press.

Baker, W., & Trofimovich, P. (2005). Interaction of native- and second-language vowel system(s) in early and late bilinguals. *Language and Speech, 48* (1), 1-27.

Ballier, N., Delais-Roussarie, E., Herment, S., & Tortel, A. (2014). Modélisation de l'intonation interlangue : le cas des questions. *Actes des XXXèmes Les Journées d'Etudes sur la Parole*, Le Mans.

Beckman, M. E. (1986). *Stress and non-stress accent*. Dordrecht: Foris.

Bertrán, A. P. (1999). Prosodic typology: on the dichotomy between stress-timed and syllable-timed languages. *Language Design, 2*, 103-130.

Best, C. T. (1995). A direct realist view of cross-language speech perception. In W. Strange (Ed.), *Speech perception and linguistic experience: issues of cross-language research* (pp. 171-204). Baltimore, IN: New York Press, Inc.

Best, C. T., Levitt, A. G., & McRoberts, G. W. (1991). Examination of language-specific influences in infants' discrimination of prosodic categories. *Actes du XIIème Congrès International des Sciences Phonétiques*, Aix-en-Provence, France: Université de Provence Service des Publications, 162-165.

Best, C., & McRoberts, G. (1989) Phonological influences in infants' discrimination of two non-native speech contrasts. *Society for Research in Child Development*, Kansas City, Kansas, April 1989.

Best, C. T., McRoberts, G. W., & Goodell, E. (2001). Discrimination of non-native consonant contrasts varying in perceptual assimilation to the listener's native phonological system. *Journal of the Acoustical Society of America, 109* (2), 775-794.

Beyssade, C., Hemforth, B, Marandin, J.-M., & Portes, C. (2010). Prosodic markings of information focus in French. *Proceedings of IDP 09*, 109-122.

Birdsong, D. (2003). Authenticité de prononciation en français L2 chez des apprenants tardifs anglophones : Analyses segmentales et globales. *Acquisition et Interaction en Langue Étrangère, 18*, 17-36.

Bolinger, D. (1958). A theory of pitch accent in English. *Word, 14*, 109-149.

Bolinger, D. (1972). Accent is predictable (if you're a mind-reader). *Language, 48* (3), 633-644.

Bongaerts, T., Van Summeren, C., Planken, B., & Schils, E. (1997). Age and ultimate attainment in the pronunciation of a foreign language. *Studies in Second Language Acquisition, 19*, 447-465.

Bouzon, C. (2004). *Rythme et structuration prosodique en anglais britannique contemporain* (Doctoral thesis, University of Aix-Marseille I, France).

Bouzon, C., & Hirst, D. J. (2004). Isochrony and prosodic structure in British English. In Bel & Marlien (Eds.), *Proceedings of Speech Prosody 2004.*

Brazil, D. (1984). The intonation of sentences read aloud. In D. Gibbon & H. Richter (Eds.), *Intonation, accent and rhythm: Studies in discourse phonology* (pp. 46-66). Berlin: Walter de Gruyter.

Brown, A. (1988). Functional load and the teaching of pronunciation. *TESOL Quarterly, 22* (4), 593-606.

Brown, A. (1995). Minimal pairs: Minimal importance? *ELT Journal, 49* (2), 169-175.

Brown, C. (2000). The interrelation between speech perception and phonological acquisition from infant to adult. In J. Archibald (Ed.), *Second language acquisition and linguistic theory* (pp. 4-63). Oxford: Blackwell.

Brown, G. (1974). Practical phonetics and phonology. In J. P. B. Allen & S. P. Corder (Eds.), *The Edinburgh course in applied linguistics: Vol. 3. Techniques in applied linguistics* (pp. 24-58). Oxford: Oxford University Press.

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

Busà, M. G. (2008). Teaching prosody to Italian learners of English: Working towards a new approach. In C. Taylor (Ed.). *eCcolingua: The role of e-corpora in translation, language learning and testing* (pp. 113-126).

Calciu, R. (2009). The Teaching of Pronunciation in some Recent EFL textbooks, in the light of the CEF. *Proceedings of the Acedle Conference, Université Lille 3 – "Recherches en didactique des langues – Les langues tout au long de la vie"*, 39-55.

Capliez, M. (2011a). *Experimental research into the acquisition of English rhythm and prosody by French speakers* (Unpublished M.A. dissertation, University of Lille III, France).

Capliez, M. (2011b). Typologie des erreurs de production d'anglais des francophones : segments vs. suprasegments. *Recherches et pratiques pédagogiques en langues de spécialité, 30* (3), 44-60.

Capliez, M. (2015). Aperçu de l'enseignement de l'anglais oral en France : statut, perspectives et étude de cas. *Recherches en didactiques, 19*, 109-128.

Carr, P. (2008). *A glossary of phonology*. Edinburgh: Edinburgh University Press.

Cebrian, J. (2002). *Phonetic similarity, syllabification and phonotactic constraints in the acquisition of a second language contrast* (Doctoral thesis, University of Toronto).

Celce-Murcia, M., Brinton, D. M., & Goodwin, J. M. (1996). *Teaching pronunciation: A reference for teachers of English to speakers of other languages*. Cambridge: Cambridge University Press.

Chomsky, N., & Halle, M. (1968). *The sound pattern of English*. New York: Harper & Row.

Christophe, A., Gout, A., Peperkamp, S., & Morgan, J. (2003). Discovering words in the continuous speech stream: The role of prosody. *Journal of Phonetics, 31*, 585-598.

Christophe, A., Mehler, J., & Sebastián-Gallés, N. (2001). Perception of prosodic boundary correlates by newborn infants. *INFANCY, 2* (3), 385-394.

Collins, B., & Mees, I. M. (2008). *Practical Phonetics and Phonology: A resource book for students*. London: Routledge.

Corder, S. P. (1967). The significance of learner's errors. *International Review of Applied Linguistics in Language Teaching (IRAL), 5* (4), 162-169.

Couper, G. (2006). The short and long-term effects of pronunciation instruction. *Prospect, 21* (1), 46-66.

Cruttenden, A. (1997). *Intonation*. Cambridge: Cambridge University Press.

Cruttenden, A. (2008). *Gimson's pronunciation of English – 7th edition*. London: Hodder Education.

Crystal, D. (1969). *Prosodic systems and intonation in English*. Cambridge: Cambridge University Press.

Crystal, D. (1970). Prosodic systems and language acquisition. *Prosodic Feature Analysis*, 77-90.

Crystal, D. (1973). Non-segmental phonology in language acquisition: a review of the issues. *Lingua, 32*, 1-45.

Cummins, F., & Port, R. F. (1998). Rhythmic constraints on stress-timing in English. *Journal of Phonetics, 26* (2), 145-171.

Cutler, A. (1980). Errors of stress and intonation. In V. A. Fromkin (Ed.), *Errors in linguistic performance: Slips of the tongue, ear, pen and hand* (pp. 67-80). New York: Academic Press.

Cutler, A. (1982). Prosody and sentence perception in English. In J. Mehler & E. C. T. Walker, M. F. Garrett (Eds.), *Perspectives on mental representation: Experimental and theoretical studies of cognitive processes and capacities* (pp. 201-216). Hillsdale, NJ: Erlbaum.

Cutler, A. (1984). Stress and accent in language production and understanding. In D. Gibbon & H. Richter (Eds.), *Intonation, accent and rhythm: Studies in discourse phonology* (pp. 77-90). Berlin: Walter de Gruyter.

Cutler, A., & Carter, D. M. (1987). The predominance of strong initial syllables in the English vocabulary. *Computer Speech and Language, 2*, 133-142.

Cutler, A., & Clifton, C. (1984). The use of prosodic information in word recognition. In H. Bouma & D. G. Bouwhuis (Eds.), *Attention and performance X* (pp. 183-196). Hillsdale, NJ: Lawrence Erlbaum.

Cutler, A., Oahan, D., & Van Donselaar, W. (1997). Prosody in the comprehension of spoken language: A literature review. *Language and Speech, 40* (2), 141-201.

Darwin, C. J. (1975). On the dynamic use of prosody in speech perception. In A. Cohen & S. G. Nooteboom (Eds.), *Structure and process in speech perception* (pp. 103-115). Berlin: Springer-Verlag.

Dauer, R. M. (1983). Stress-timing and syllable-timing reanalyzed. *Journal of Phonetics, 11* (1), 51-62.

De Launay, P. (1993). The English 'h' problem. *ELT Journal, 47* (2), 132-135.

Delais-Roussarie, E., B. Post, M. Avanzi, C. Buthke, A. Di Cristo, I. Feldhausen, S-A. Jun, P. Martin, T. Meisenburg, A. Rialland, R. Sichel-Bazin, & H. Yoo (2015). Chapter 3 - Intonational phonology of French: Developing a ToBI system for French. In S. Frota & P. Prieto (Eds.), *Intonation in Romance*. Oxford University Press.

Delais-Roussarie, E., Post, B., & Portes, C. (2006). Annotation prosodique et typologie. *Travaux Interdisciplinaires du Laboratoire Parole et Langage, Vol. 25*, 61-95.

Delais-Roussarie, E., & Yoo, H.-Y. (2011). Transcrire la prosodie : un préalable à l'échange et à l'analyse de données. *French Language Studies, 21*, 13-37.

Delattre, P. (1961). La leçon d'intonation de Simone de Beauvoir, étude d'intonation déclarative comparée. *The French Review, 35* (1), 59-67.

Delattre, P. (1966a). A comparison of syllable length conditioning among languages. *International Review of Applied Linguistics in Language Teaching, 4*, 183-198.

Delattre, P. (1966b). Les dix intonations de base du français. *The French Review, 40* (1), 1-14.

Dell, F. (1984). L'accentuation dans les phrases en français. In F. Dell, D. J. Hirst, & J. R. Vergnaud (Eds.), *Forme sonore du langage : Structure des représentations en phonologie* (pp. 65-122). Paris: Hermann.

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* (pp. 24-37). Ames, IA: Iowa State University.

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

Derwing, T. M., Munro, M. J., & Wiebe, G. (1998). Evidence in favor of a broad framework for pronunciation instruction. *Language Learning, 48* (3), 393-410.

Derwing, T. M., & Rossiter, M. J. (2003). The effects of pronunciation instruction on the accuracy, fluency, and complexity of L2-accented speech. *Applied Language Learning, 13*, 1-18.

Derwing, T. M., Thomson, R. I., Foote, J. A., & Munro, M. J. (2012). A longitudinal study of listening perception in adult learners of English: Implications for teachers. *The Canadian Modern Language Review, 68* (3), 247-266.

Deschamps, A., Fournier, J.-M., Duchet, J.-L., & O'Neil, M. (2004). *English phonology and graphophonemics*. Paris: Ophrys.

Di Cristo, A. (2004). La prosodie au carrefour de la phonétique, de la phonologie et de l'articulation formes-fonctions. *Travaux Interdisciplinaires du Laboratoire Parole et Langage, 23*, 67-211.

Diana, A. (2010). La phonétique dans l'enseignement de l'anglais aux spécialistes d'autres disciplines : Enjeux et priorités. *Recherche et pratiques pédagogiques en langues de spécialité, Vol. XXIX*, N° 3, 10-21.

Dimitrov, D. M., & Rumrill, P. D. (2003). Pretest-posttest designs and measurement of change. *Work, 20*, 159-165.

Duběda, T. (2002). Structural and quantitative properties of stress units in Czech and French. In A. Braun & H. R. Masthoff (Eds.), *Festschrift for Jens-Peter Köster on the Occasion of his 60th Birthday, Phonetics and its Applications* (pp. 338-350). Stuttgart: Steiner.

Durand, J. (2005). Tense/lax, the vowel system of English and phonological theory. In P. Carr, J. Durand, & C. Ewen (Eds.), *Headhood, Elements, Specification and Contrastivity* (pp. 77-98). Amsterdam: John Benjamins.

Durand, J., & Lynche, C. (2004). Structure et variation dans quelques systèmes vocaliques du français : l'enquête *Phonologie du français contemporain (PFC)*. In A. Coveney & C. Sanders (Eds.), *Variation et francophonie* (pp. 217-240). Paris: L'Harmattan.

Eckman, F. R. (2008). Typological markedness and second language acquisition. In J. G. H. Edwards & M. L. Zampini (Eds.), *Phonology and Second Language Acquisition* (pp. 95-115). Amsterdam: John Benjamins Publishing Company.

Eckman, F., & Iverson, G. (2013). The role of native language phonology in the production of L2 contrasts. *Studies in Second Language Acquisition, 35*, 67-92.

Eilers, R., Gavin, W., & Oller, D. (1982). Cross-linguistic perception in infancy: Early effects of linguistic experience. *Journal of Child Language, 9*, 289-302.

Eimas, P., Siqueland, E., Jusczyk, P., & Vigorito, J. (1971). Speech perception in infants. *Science, 171*, 303-306.

Field, J. (2005). Intelligibility and the listener: The role of lexical stress. *TESOL Quarterly, 39* (3), 399-423.

Finch, D. F., & Ortiz Lara, H. (1982). *A course in English phonetics for Spanish speakers.* London: Heinemann Education Books.

Firth, S. (1992). Pronunciation syllabus design: A question of focus. In P. Avery & S. Ehrlich (Eds.), *Teaching American English Pronunciation* (pp. 173-183). Oxford: Oxford University Press.

Flege, J. E. (1981). The phonological basis of foreign accent. *TESOL Quarterly, 15* (4), 443-455.

Flege, J. E. (1984). The detection of French accent by American listeners. *Journal of the Acoustical Society of America, 76* (3), 692-707.

Flege, J. E. (1987). The production of new and similar phones in a foreign language: Evidence for the effect of equivalence classification. *Journal of Phonetics, 15*, 47-65.

Flege, J. E. (1992). Speech learning in a second language. In C. A. Ferguson & L. Menn, C. Stoel-Gammon (Eds.), *Phonological Development: Models, Research, Implications* (pp. 565-604). Timonium, MD: York Press.

Flege, J. E., Bohn, O.-S., & Jang, S. (1997). Effects of experience on non-native speakers' production and perception of English vowels. *Journal of Phonetics, 25*, 437-470.

Flege, J., Frieda, E., & Nozawa, T. (1997). Amount of native language (L1) use affects the pronunciation of an L2. *Journal of Phonetics, 25*, 169-186.

Flege, J. E., Schirru, C., & MacKay, I. R. A. (2003). Interaction between the native and second language phonetic subsystems. *Speech Communication, 40*, 467-491.

Fodor, J. (2002). Prosodic disambiguation in silent reading. *Proceedings of NELS, 32*, 113-132.

Fougeron, C., & Smith, C. L. (1999). French. In J. H. Esling (Ed.), *Handbook of the International Phonetic Association: A guide to the use of the International Phonetic Alphabet* (pp. 78-81). Cambridge: Cambridge University Press.

Fournier, J.-M. (2007). From a Latin syllable-driven stress system to a Romance versus Germanic morphology-driven dynamics: In honour of Lionel Guierre. *Language Sciences, 29*, 218-236.

Fraser, H. (2001). *Teaching pronunciation – A handbook for teachers and trainers*. Sydney: TAFE Access Division.

Frodden, C., & McNulty, M. (1996). A new look at suprasegmentals. *Íkala, 1* (1-2), 101-116.

Frost, D. (2004). L'enseignement de l'accent lexical dans le secteur LANSAD : Quelques notes sur une expérience de recherche-action en auto-apprentissage. *Anglais de spécialité et milieux professionnels, 43-44*, 99-106.

Frost, D. (2011). Stress and cues to relative prominence in English and French: A perceptual study. *Journal of the International Phonetic Association, 41*, 67-84.

Gattegno, C. (1976). *The common sense of teaching foreign languages*. New York: Educational Solutions.

Gendrot, C., & Adda-Decker, M. (2005). Impact of duration on F1/F2 formant values of oral vowels: an automatic analysis of large broadcast news corpora in French and German. *Proceedings of Interspeech 2005*, 2453-2456.

Georgeton, L., Paillereau, N., Landron, S., Gao, J., & Kamiyama, T. (2012). Analyse formantique des voyelles orales du français en contexte isolé : À la recherche d'une

référence pour les apprenants de FLE. *Actes de la conférence conjointe JEP-TALN-RECITAL, vol. 1: JEP*, 145-152.

Gerken, L. A. (1996). Prosody's role in language acquisition and adult parsing. *Journal of Psycholinguistic Research, 25* (2), 345-356.

Gilbert, J. B. (1984). *Clear speech: Pronunciation and listening comprehension in American English.* New York: Cambridge University Press.

Gilbert, J. B. (2008). *Teaching pronunciation using the prosody pyramid*. New-York: Cambridge University Press.

Gilner, L. (2008). Pronunciation instruction: A review of methods and techniques. *Journal of School of Foreign Languages, 35*, 93-108.

Ginésy, M. (2001). *Mémento de phonétique anglaise*. Paris: Nathan.

Grabe, E., & Low, E. L. (2002). Durational variability in speech and the rhythm class hypothesis. In N. Warner & C. Gussenhoven (Eds.), *Papers in Laboratory Phonology 7* (pp. 515-546). Berlin: Mouton de Gruyter.

Gray, M. (2001). *Place et rôle de l'intonation dans l'apprentissage de l'anglais* (Doctoral thesis, University of Paris XII – Val de Marne, France).

Gray, M. (2013). Training French-speaking learners to interpret accentually-signalled focus in English declarative utterances. *Proceedings of the 3rd International Conference on English Pronunciation: Issues and Practices*, University of Murcia, Spain, 32-35.

Greenwood, J. (2002). The role of teaching English pronunciation: Issues and approaches. *International Conference IPBA*, 24-26.

Grice, M., & Baumann, S. (2007). An introduction to intonation – Functions and models. In J. Trouvain & U. Gut (Eds.), *Non-Native Prosody: Phonetic Description and Teaching Practice* (pp. 25-52). Berlin: Mouton de Gruyter.

Grice, M., Ladd, D. R., & Arvaniti, A. (2000). On the place of phrase accents in intonational phonology. *Phonology, 17*, 143-185.

Grosjean, F., & Deschamps, A. (1975). Analyse contrastive des variables temporelles de l'anglais et du français : Vitesse de parole et variables composantes, phénomènes d'hésitation. *Phonetica, 31*, 144-184.

Guberina, P. (1965). La Méthode audio-visuelle structuro-globale. *Revue de Phonétique Appliquée 1*, 35-64.

Guierre, L. (1979). *Essai sur l'accentuation en anglais contemporain*. Paris: Université Paris VII.

Gussenhoven, C. (1984). Focus, mode and nucleus. In Carlos Gussenhoven (Ed.), *On the Grammar and Semantics of Sentence Accents* (pp. 11-62). Dordrecht: Foris.

Gussenhoven, C. (1991). The English rhythm rule as an accent deletion rule. *Phonology, 8*, 1-35.

Gut, U. (2009). *Non-native speech – A Corpus-based analysis of phonological and phonetic properties of L2 English and German*. Francfort : Peter Lang.

Hahn, L. D. (2004). Primary stress and intelligibility: Research to motivate the teaching of suprasegmentals. *TESOL Quarterly, 38* (2), 201-223.

Halliday, M. A. K. (1967). *Intonation and grammar in British English*. The Hague: Mouton.

Hayes, B. (1984). The phonology of rhythm in English. *Linguistic Inquiry, 15* (1), 33-74.

Henry, G., Bonneau, A., & Colotte, V. (2007). Tools devoted to the acquisition of the prosody of a foreign language. *Proceedings of the International Congress of Phonetic Sciences*, Saarbrücken, Germany, 1593-1596.

Herment-Dujardin, S. (2001). *L'emphase dans le discours spontané anglais : Corrélats acoustiques et prosodiques* (Doctoral thesis, University of Aix-Marseille I, France).

Herry, N. (2001). *Évaluation objective et subjective de la prosodie anglaise parlée par des Français : Apport de l'enseignement assisté par ordinateur* (Doctoral thesis, University of Aix-Marseille I, France).

Herry-Bénit, N. (2008). Apprendre à parler l'anglais à l'école primaire : Récit d'une expérience. *Travaux Interdisciplinaires du Laboratoire Parole et Langage, 27*, 75-91.

Herry-Bénit, N. (2011). *Didactique de la phonétique anglaise*. Rennes: Presses Universitaires de Rennes.

Herry-Bénit, N. (2012). Analyses d'erreurs prosodiques d'étudiants francophones apprenant l'anglais. *Laboratoire inter-universitaire de recherche en didactique des langues (LAIRDIL), vol. 19*, 33-58.

Hirsh-Pasek, K., Nelson, D. G. K., Jusczyk, P. W., Cassidy, K. W., Druss, B., & Kennedy, L. (1987). Clauses are perceptual units for young infants. *Cognition, 26*, 269-286.

Hirst, D. J. (1998). Intonation in British English. In D. J. Hirst & A. Di Cristo (Eds.), *Intonation systems: A survey of twenty languages* (pp. 56-77).

Hirst, D. J. (2004). The phonology and phonetics of speech prosody: Between acoustics and interpretation. *Proceedings of Speech Prosody 2004*, Nara, Japan, 163-169.

Hirst, D., & Di Cristo, A. (1998). A survey of intonation systems. In D. Hirst & A. Di Cristo (Eds.), *Intonation systems: A survey of twenty languages* (pp. 1-44).

Hirst, D., Di Cristo, A., & Espesser, R. (2000). Levels of representation and levels of analysis for the description of intonation systems. In M. Horne (Ed.), *Prosody: Theory and Experiment* (pp. 51-87). Dordrecht: Kluwer Academic Publishers.

Hodges, B. A. (2006). An EFL pronunciation course for French university students. *AL 8320 Sound System of English*, Georgia State University.

Horgues, C. (2010). *Prosodie de l'accent français en anglais et perception par des auditeurs anglophones* (Doctoral thesis, University of Paris-Diderot Paris 7, France).

Huart, R. (1997). La simplicité trompeuse de la terminologie en anglais oral. In *Linx, n°37, Métadiscours… Langues. Actes du colloque international du Groupe Recherche Jan Comenuis en Linguistiques et Didactique des Langues* (pp. 77-85).

Huart, R. (2002). *Grammaire orale de l'anglais*. Paris: Ophrys.

Huart, R. (2010). *Nouvelle grammaire de l'anglais oral.* Paris: Ophrys.

Jakobson, R. (1968). *Child language, aphasia, and phonological universals.* The Hague: Mouton.

Jassem, W., Hill, D. R., & Witten, I. H. (1984). Isochrony in English speech: Its statistical validity and linguistic relevance. In D. Gibbon & H. Richter (Eds.), *Intonation, Accent and Rhythm: Studies in Discourse Phonology* (pp. 203-225). Berlin: Walter de Gruyter.

Jenkins, J. (1998). Which Pronunciation Norms and Models for English as an international language? *ELT Journal, 52* (2), 119-126.

Jenkins, J. (2002). A sociolinguistically based, empirically researched pronunciation syllabus for English as an international language. *Applied Linguistics, 23* (1), 83-103.

Jenner, B. (1976). Interlanguage and foreign accent. *Interlanguage Studies Bulletin, 1* (2-3), 166-195.

Jilka, M. (2000). *The contribution of intonation to the perception of foreign accent* (Doctoral thesis, University of Stuttgart).

Johnson, W., Reimers, P. (2010). *Patterns in child phonology*. Edinburgh: Edinburgh University Press.

Jones, D. (1922). *An outline of English phonetics*. New-York: G. E. Stechert & Co.

Jun, S.-A., & Fougeron, C. (2002). Realizations of accentual phrase in French intonation. *Probus, 14*, 147-172.

Jusczyk, P. W. (1992). Developing phonological categories from the speech signal. In C. A. Ferguson, L. Menn, & C. Stoel-Gammon (Eds.), *Phonological development: Models, research, implications* (pp. 17-64). Timonium, MD: York Press.

Jusczyk, P. W., Cutler, A., & Redanz, N. J. (1993). Infants' preference for the predominant stress patterns of English words. *Child Development, 64*, 675-687.

Jusczyk, P. W., Friederici, A. D., Wessels, J. M. I., Svenkerud, V. Y., & Jucszyk, A. M. (1993). Infants' sensitivity to the sound patterns of native language words. *Journal of Memory and Language, 32*, 402-420.

Jusczyk, P. W., Kemler-Nelson, D. G., Hirsh-Pasek, K., Kennedy, L., Woodward, A., & Piwoz, J. (1992). Perception of acoustic correlates of major phrasal units by young infants. *Cognitive Psychology, 24*, 252-293.

Kamiyama, T., & Shinohara, S. (2010). Role of prosody in segmental perception in L2. *Sophia University Working Papers in Phonetics 2010*, 10-18.

Kaplan, E., & Kaplan, G. (1971). The prelinguistic child. In J. Eliot (Ed.), *Development and cognitive processes* (pp. 358-381). New York: Holt, Rinehart, Winston.

Kelly, L. G. (1969). *25 centuries of language teaching*. Rowley, MA: Newbury House.

Kijak, A. (2009). *How stressful is L2 stress? A cross-linguistic study of L2 perception and production metrical systems* (Doctoral thesis, Netherlands Graduate School of Linguistics).

Kim, E., Gold, K., & Scassellati, B. (2008). What prosody tells infants to believe. *Proceedings of the 7th Conference on Development and Learning*, Monterey, CA.

Kingdon, R. (1958). *The groundwork of English intonation*. London: Longman.

Kjellin, O. (1999). Accent addition: Prosody and perception facilitate second language acquisition. In O. Fujimura, B. D. Joseph, & B. Palek (Eds.), *Proceedings of LP'98 (Linguistics and Phonetics Conference) at Ohio State University, 2* (pp. 373-398). Prague: The Karolinum Press.

Klein, W. (1998). The contribution of second language acquisition research. *Language Learning, 48*, 527-550.

Konopczynski, G. (1990). *Le langage émergent : caractéristiques rythmiques*. Hamburg: Buske.

Konopczynski, G. (1999). L'acquisition du système prosodique de la langue maternelle et ses implications pour l'apprentissage d'une L2. In P. Delcloque (Ed.), *Speech Technology Applications in CALL* (pp.62-70).

Krashen, S. (1981). *Second Language Acquisition and Second Language Learning.* Oxford: Pergamon Press.

Kristiansen, G. (2015). How the French perceive – and are perceived by – their European peers. *6th International AFLiCo conference*, Grenoble, France, 26-28 May.

Kuhl, P. K. (1991). Human adults and human infants show a “perceptual magnet effect” for the prototypes of speech categories, monkeys do not. *Perception & Psychophysics, 50* (2), 93-107.

Ladd, D. R. (1983). Even, focus, and normal stress. *Journal of Semantics, 2* (2), 157-170.

Ladd, D. R. (1996). *Intonational phonology*. Cambridge: Cambridge University Press.

Ladefoged, P. (2001). *A course in English phonetics – Fourth edition*. Boston: Heinle & Heinle.

Lado, R. (1957). *Linguistics across cultures: Applied linguistics for language teachers*. Ann Arbor: The University of Michigan Press.

Larson-Hall, J. (2010). *A guide to doing statistics in second language research using SPSS*. New York and London: Routledge.

Lehn, W., & Slager, W. (1959). A contrastive study of Egyptian Arabic and American English: The segmental phonemes. *Language Learning, 9*, 25-33.

Lemmens, M. (2010). *A short introduction to English phonetics*. Compendium for English Phonetics in *Licence 1*, University of Lille III.

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

Lepage, A., & Busa, M. G. (2014). Intelligibility of English L2: The effects of incorrect word stress placement and incorrect vowel reduction in the speech of French and Italian learners of English. *Concordia Working Papers in Applied Linguistics, 5*, 387-400.

Levis, J. M. (1999). Intonation in theory and practice, revisited. *TESOL Quarterly, 33*, 37-63.

Levis, J., & Cortes, V. (2008). Minimal pairs in spoken corpora: Implications for pronunciation assessment and teaching. In C. A. Chapelle, Y.-R. Chung, & J. Xu (Eds.), *Towards Adaptive CALL: Natural Language Processing for Diagnostic Language Assessment* (pp. 197-208). Ames, IA: Iowa State University.

Levitt, A. G. (1993). The acquisition of prosody: Evidence from French- and English-learning infants. *Haskins Laboratories Status Report on Speech Research, SR-113*, 41-50.

Levitt, A. G., & Utman, J. G. A. (1991). From babbling towards the sound systems of English and French: A longitudinal two-case study. *Haskins Laboratories Status Report on Speech Research, SR-107/108*, 41-62.

Liberman, M., & Prince, A. (1977). On stress and linguistic rhythm. In J. A. Goldsmith (Ed.), *Phonological Theory – The Essential Readings* (pp. 392-404). Malden, M1 and Oxford: Blackwell.

Lloyd James, A. (1940). *Speech signals in telephony*. London: Pitman & Sons.

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

Major, R. C., & Kim, E. (1999). The similarity differential rate hypothesis. *Language Learning, 49*, 151-183.

Marandin, J.-M., Beyssade, C., Delais-Roussarie, E., Rialland, A., & de Fornel, M. (2004). The meaning of final contours in French. Retrieved from: www.llf.cnrs.fr/Gens/Marandin/ MeaningFinalContours.doc

Marsaleix, N. (2005). *Phonétique de l'anglais – Exercices corrigés*. Nantes: Éditions du Temps.

Martin, P. (2006). Intonation du français : parole spontanée et parole lue. *Estudios de Fonética Experimental, Vol. XV*, 133-162.

Mattock, K., Amitay, S., & Moore, D. R. (2010). Auditory development and learning. In C. Plack (Ed.), *Oxford handbook of auditory science, Vol. III Hearing* (pp. 297-324). Oxford: Oxford University Press.

McNerney, M., & Mendelsohn, D. (1992). Suprasegmentals in the pronunciation class: Setting priorities. In P. Avery & S. Ehrlich (Eds.), *Teaching American English pronunciation* (pp. 185-196). Oxford: Oxford University Press.

Mehler, J., Bertoncini, J., Dupoux, E., & Pallier, C. (1996). The role of suprasegmentals in speech perception and acquisition. In T. Okate & A. Cutler (Eds.), *Phonological Structure and Language Processing. Crosslinguistic Studies* (pp. 145-169). Berlin: Mouton de Gruyter.

Mennen, I. (2006). Phonetic and phonological influences in non-native intonation: an overview for language teachers. *QMUC Speech Science Research Centre Working Paper, 9*, 1-18.

Mertens, P. (1993). Accentuation, intonation et morphosyntaxe. *Travaux de linguistique, 26*, 21-69.

Meunier, C. (2007). Phonétique acoustique. In P. Auzou, V. Rolland-Monnoury, S. Pinto, & C. Ozsancak (Eds.), *Les dysarthries* (pp. 164-173). Marseille: Solal.

Missaglia, F. (1999). Contrastive prosody in SLA – An empirical study with adult Italian learners of German. *Proceedings of the 14th Congress of Phonetic Sciences, 1*, 551-554.

Moedjito, M. (2008). Priorities in English pronunciation teaching in EFL classrooms. *K@ta, 10* (2), 129-142.

Moffit, A. R. (1971). Consonant cue perception by 20- to 24-week-old infants. *Child Development, 42*, 505-511.

Montero, D. (2007). *The perception of the acoustic correlates of stress: A cross-linguistic study of English, French and Spanish* (Unpublished Master's dissertation, University of Washington).

Moore-Mauroux, S. (2010). Quelques outils méthodologiques pour aider l'étudiant francophone face à la prononciation de l'anglais. *Recherche et pratiques pédagogiques en langues de spécialité, Vol. XXIX*, N° 3, 36-49.

Morley, J. (1994). *Pronunciation pedagogy and theory: new views, new directions*. Alexandria, VA: TESOL.

Mortreux, S. (2008). *La production des consonnes coronales en anglais par des apprenants francophones* (Doctoral thesis, University of Aix-Marseille I, France).

Motulsky, H. (2010). *Intuitive biostatistics – A nonmathematical guide to statistical thinking*. New York: Oxford University Press.

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

Moyer, A. (2007). Empirical considerations on the age factor in L2 phonology. *Issues in Applied Linguistics, 15* (2), 109-127.

Munro, M. J., & Derwing, T. M. (2006). The Functional Load Principle in ESL Pronunciation Instruction: An Exploratory Study. *System, 34*, 520-531.

Nagle, C. (2013). A reexamination of ultimate attainment in L2 phonology: Length of immersion, motivation, and phonological short-term memory. In E. Voss, S.-J. D. Tai, & Z. Li (Eds.), *Selected proceedings of the 2011 second language research forum* (pp. 148-161). Somerville, MA: Cascadilla Proceedings Project.

Nakashima, T. (2006). Intelligibility, Suprasegmentals, and L2 pronunciation instruction for EFL Japanese learners. *Fukuoka Kyoiku Daigaku Kiyo, 55* (1), 27-42.

Nakatani, L. H., & Schaffer, J. A. (1978). Hearing "words" without words: Prosodic cues for word perception. *Journal of the Acoustical Society of America, 63* (1), 234-245.

Nava, E., & Zubizarreta, M. L. (2009). Order of L2 acquisition prosodic prominence patterns: Evidence from L1 Spanish/L2 English speech. In J. Crawford et al. (Eds.), *Proceedings of the 3rd Conference on Generative Approaches to Language Acquisition North America 2008* (pp. 175-187). Somerville, MA: Cascadilla Proceedings Projects.

Nazzi, T., Bertoncini, J., & Mehler, J. (1998). Language discrimination by newborns: Toward an understanding of the role of rhythm. *Journal of Experimental Psychology: Human Perception and Performance, 24* (3), 756-766.

O'Connor, J. D., & Arnold, G. F. (1973). *Intonation of colloquial English – Second edition*. London: Longman.

O'Connor, K. M. (2002). Hidden rankings in optimality theory: Evidence from second language acquisition. *Generative Linguistics in the Old World: Workshop on Phonological Acquisition*, University of Utrecht.

Ohala, J. J., & Gilbert, J. B. (1981). Listeners' ability to identify languages by their prosody. In P. Léon & M. Rossi (Eds.), *Problèmes de prosodie, II : Expérimentations, modèles et fonctions* (pp. 123-131). Ottawa: Didier.

Patel, A. (2008). *Music, language, and the brain*. New York: Oxford University Press.

Pennock, B., & Vickers, P. (2000). Some notes on the teaching of English pronunciation. In H. Ferrer Mora, B. Pennock Speck, P. Bou Franch, C. Gregorii Signes, & M. Martí Viaño (Eds.), (2001) *Teaching English in a Spanish setting* (pp. 231-241). Valencia: Departamiento de Filologia Inglesa y Alemana, Universidad de Valencia.

Peperkamp, S., & Dupoux, E. (2002). A typological study of stress deafness. In C. Gussenhoven & N. Warner (Eds.), *Laboratory phonology 7* (pp. 203-240). Berlin: Mouton de Gruyter.

Phan, H., & Sonca, V. (2012). Pronunciation errors and perceptual judgements of accented speech by native speakers of English. *TESOL in Context, Special Edition S3*.

Pica, T. (1994). Questions from the language classroom: Research perspectives. *TESOL Quarterly, 28* (1), 49-79.

Pickering, L. (2001). The role of tone choice in improving ITA communication in the classroom. *TESOL Quarterly, 35* (2), 233-255.

Pierrehumbert, J. B. (1980). *The phonology and phonetics of English intonation* (Doctoral thesis, MIT).

Pierrehumbert, J., & Hirschberg, J. (1990). The meaning of intonational contours in the interpretation of discourse. In P. R. Cohen, J. Morgan, & M. E. Pollack (Eds.), *Intentions in communication* (pp. 271-311). Cambridge: MIT Press.

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

Piske, T., MacKay, I. R. A., & Flege, J. E. (2001). Factors affecting degree of foreign accent in an L2: a Review. *Journal of Phonetics, 29*, 191-215.

Ploquin, M. (2009). *Phonological issues in the production of prosody by Francophone and Sinophone learners of English as a second language* (Doctoral thesis, University of Québec, Montréal).

Portes, C., Bertrand, R., & Espesser, R. (2007). Contribution to a grammar of intonation in French – Form and function of three rising patterns. *Nouveaux cahiers de linguistique française, 28*, 155-162.

Puren, C. (2004). L'évolution historique des approches en didactique des langues-cultures, ou comment faire l'unité des « unités didactiques ». *Congrès annuel de l'Association pour la Diffusion de l'Allemand en France (ADEAF)*, École Supérieure de Commerce de Clermont-Ferrand, 40-51.

Querleu, D., Renard, X., Versyp, F., Paris-Delrue, L., & Crèpin, G. (1988). Fetal hearing. *European Journal of Obstetrics & Gynecology and Reproduction Biology, 29*, 191-212.

Ramus, F. (1999a). *Rythme des langues et acquisition du langage* (Doctoral thesis, École des Hautes Études en Sciences Sociales).

Ramus, F. (1999b). La discrimination des langues par la prosodie : Modélisation linguistique et études comportementales. Laboratoire de Sciences Cognitives et Psycholinguistique (EHESS/CNRS).

Ramus, F., Nespor, M., & Nehler, J. (1999). Correlates of linguistic rhythm in the speech signal. *Cognition, 73* (3), 265-292.

Rasier, L., & Hiligsmann, P. (2007). Prosodic transfer from L1 to L2 – Theoretical and methodological issues. *Nouveaux cahiers de linguistique française, 28*, 41-66.

Reed, M. (2012). Pronunciation tools for fostering intelligibility and communication success. *ATESOL ACT Professional Development Workshop*, Canberra, Australia.

Roach, P. (1982). On the distinction between "stress-timed" and "syllable-timed" languages. In D. Crystal (Ed.), *Linguistic Controversies* (pp. 73-79). London: Edward Arnold.

Roach, P. (2009). *English phonetics and phonology – A practical course. 4th edition*. Cambridge: Cambridge University Press.

Rose, Y., & Wauquier-Gravelines, S. (2007). French speech acquisition. In S. McLeod (Ed.), *The international guide to speech acquisition* (pp. 364-385). Clifton Park, NY: Thomson Delmar Learning.

Saalfeld, A. (2011). Acquisition of L2 Phonology in Advanced Learners: Does instruction make a difference? In J. Levis & K. LeVelle (Eds.), *Proceedings of the 2nd Pronunciation in Second Language Learning and Teaching Conference* (pp. 144-152). Ames, IA: Iowa State University.

Saito, K., & Lyster, R. (2011). Effects of form-focused instruction and corrective feedback on L2 pronunciation development of /ɹ/ by Japanese learners of English. *Language Learning, 62* (2), 1-39.

Santiago, F. (2014). *Systèmes prosodiques et acquisition d'une L2 : production et perception des mouvements mélodiques en français et en espagnol* (Doctoral thesis, University of Paris-Diderot Paris 7, France).

Scheuer, S. (2002). What makes foreign accent sound foreign? In A. James & J. Leather (Eds.), *New Sounds 2000: Proceedings of the 4th International Symposium on the acquisition of second-language speech* (pp. 306-314). Klagenfurt: University of Klagenfurt.

Scheuer, S. (2010). How sure are judges about their foreign accent judgements? *In*: K. Dziubalska-Kołaczyk, M. Wrembel, & M. Kul (Eds.), *New sounds 2010: Proceedings of the 6th international symposium on the acquisition of second language speech.* Poznań: AMU Publishing House.

Schmerling, S. F. (1976). *Aspects of English sentence stress*. Austin: Texas University Press.

Selinker, L. (1972). Interlanguage. *International Review of Applied Linguistics, 10*, 219-223.

Selkirk, E. (1995). Sentence prosody: Intonation, stress, and phrasing. In J. Goldsmith (Ed.), *The handbook of phonological theory* (pp. 550-569). Cambridge: Blackwell.

Silveira, R. (2002). Pronunciation instruction – Classroom practice and empirical research. *Linguagem & Ensino, 5* (1), 93-126.

Snow, D. (1994). Phrase-final syllable lengthening and intonation in early child speech. *Journal of Speech and Hearing Research, 37*, 831–840.

Southwood, M. H., & Flege, J. E. (1999). Scaling foreign accent: Direct magnitude estimation versus interval scaling. *Clinical Linguistics and Phonetics, 13* (5), 335-349.

Speer, S. R., & Ito, K. (2008). Prosody in first language acquisition – Acquiring intonation as a tool to organize information in conversation. *Language and Linguistics Compass, 3* (1), 90-110.

Stevick, E. (1957). *Helping people learn English: A manual for teachers of English as a second language.* Nashville, TE: Abington Press.

Stockwell, R., & Bowen, J. (1965). *The Sounds of English and Spanish*. Chicago: University of Chicago Press.

Swan, M., & Smith, B. (2001). *Leaner English: A teacher's guide to interference and other problems*. Cambridge: Cambridge University Press.

Tajima, K., Port, R., & Dalby, J. (1997). Effects of temporal correction on intelligibility of foreign-accented English. *Journal of Phonetics, 25*, 1-24.

Taylor, D.S. (1981). Non-native speakers and the rhythm of English. *International Review of Applied Linguistics in Language Teaching ,19*, 219-226.

Taylor, D.S. (1993). Intonation and accent in English: What teachers need to know. *International Review of Applied Linguistics, XXI/1*, 2-21.

Thomson, R. I., & Derwing, T. M. (2014). The effectiveness of L2 pronunciation instruction: A narrative review. *Applied Linguistics*, Advanced online access, DOI: 10.1093/applin/amu076.

Thorén, B. (2008). *The priority of temporal aspects in L2-swedish prosody: Studies in perception and production* (Doctoral thesis, Stockholm University).

Toivanen, J. (2005). ToBI or not ToBI? Testing Two Models in Teaching English intonation to finns. *Proceedings of Phonetics Teaching and Learning Conference, 2005*.

Tortel, A. (2009). *Évaluation qualitative de la prosodie d'apprenants français : apports de paramétrisations prosodiques* (Doctoral thesis, University of Aix-Marseille, France).

Trask, R. L. (1996). *A dictionary of phonetics and phonology*. London: Routledge.

Trofimovich, P., & Baker, W. (2006). Learning second language suprasegmentals: Effect of L2 experience on prosody and fluency characteristics of L2 speech. *Studies in Second Language Acquisition, 28*, 1-30.

Trofimovich, P., & Isaacs, T. (2012). Disentangling accent from comprehensibility. *Bilingualism: Language and cognition, 15*, 905-916.

Tubach, J.-P. (1989). *La parole et son traitement automatique*. Paris: Masson.

Truckenbrodt, H. (2006). Phrasal stress. In K. Brown (Ed.), *The Encyclopedia of Languages and Linguistics, 2nd edition, Vol. 9* (pp. 572-579). Amsterdam: Elsevier.

Truss, L. (2006). *Eats, shoots & leaves: The zero tolerance approach to punctuation*. New York: Gotham Books.

Ueno, N. (1998). Teaching English pronunciation to Japanese English majors: A comparison of a suprasegmental-oriented and a segmental-oriented teaching approach. *JACET Bulletin, 29*, 207-225.

Ur, P. (1984). *Teaching listening comprehension*. Cambridge: Cambridge University Press.

Vaissière, J. (1983). Language-independent prosodic features. In A. Culter & D.-R. Ladd (Eds.), *Prosody: Models and measurements in the study of prosody* (pp. 53-66). Berlin: Springer-Verlag.

Vaissière, J. (1991). Rhythm, accentuation and final lengthening in French. In J. Sundberg, L Nord, & R. Carlson (Eds.), *Music, language, speech and brain* (pp. 108-120). Basinstoke: Macmillan.

Vaissière, J. (2002). Cross-linguistic prosodic transcription: French versus English. In N. B. Volskaya, N. D. Svetozarova, & P. A. Skrelin (Eds.), *Problems and methods in experimental phonetics. In honour of the 70th anniversary of Prof. L.V. Bondarko* (pp. 147-164). St Petersburg: St Petersburg State University Press.

Vaissière, J. (2011). On the acoustic and perceptual characterization of reference vowels in a cross-language perspective. *Proceedings of the 17th ICPhS*, Hong-Kong, 52-59.

Vaissière, J., & Boula de Mareüil, P. (2004). Identifying a language or an accent: From segments to prosody. *Proceedings of the Modelling for the IDentification of Languages (MIDL) Workshop*, Paris, 1-5.

Vallduví, E. (1991). *The informational component*. New-York: Garland.

Vergun, A. (2006). *A longitudinal study of the acquisition of American English vowels* (Unpublished M.A. dissertation, Portland State University, Portland, Oregon).

Watson, I., Grabe, E., & Post, B. (1998). *The acquisition of prosody in speech production: English and French*. Project Report, University of Cambridge.

Wells, J. C. (1962). *A study of the formants of the pure vowels of British English* (Unpublished M.A. dissertation, University of London).

Wells, J. C. (2006). *English intonation – An introduction*. Cambridge: Cambridge University Press.

Wells, J. C. (2008). *Longman pronunciation dictionary – 3rd edition*. Harlow: Longman.

Wenk, B., & Wioland, F. (1982). Is French really syllable-timed? *Journal of Phonetics, 10*, 193-216.

Werker, J. F. (1995). Exploring developmental changes in cross-language speech perception. In L. Gleitman & M. Liberman (Eds.), *An invitation to cognitive science. Part I: Language* (pp. 87-106). Cambridge, MA: The MIT Press.

Werker, J., Gilbert, J., Humphrey, K., & Tees, R. (1981). Developmental aspects of cross-language speech perception. *Child Development, 52*, 349-353.

Whalen, D. H., Levitt, A. G., & Wang, Q. (1991). Intonational differences between the reduplicative babbling of French- and English-learning infants. *Haskins Laboratories Status Reports on Speech Research, 107/108*, 31-40.

Wightman, C. (2002). ToBI or not ToBI? *Proceedings of Speech Prosody 2002*, Aix-en-Provence.

Wioland, F. (1985). *Les structures rythmiques du français.* Paris: Slatkine-Champion.

Wong, R. (1987). *Teaching pronunciation: Focus on English rhythm and intonation*. NJ: Prentice Hall Regents.

Yates, K. (2003). *Teaching linguistic mimicry to improve second language pronunciation* (Unpublished M.A. dissertation, University of North Texas, Denton).

Zafar, M. (2009). Monitoring the "monitor": A critique of Krashen's five hypotheses. *The Dhaka University Journal of Linguistics, 2* (4), 139-146.

INDEX

A

accent(uation)

30, 43, 46, 48, 54, 57, 60, 62, 63, 67, 69, 73, 85, 93, 108, 134, 136, 140

acquisition

1, 7, 8, 12, 19, 21, 29, 32, 37, 47, 76, 87, 96, 102, 109, 119, 127, 153, 196, 200

approach

3, 32, 34, 38, 114, 115, 125, 130, 134, 138, 153, 167, 180, 189, 193, 195, 199

B

between-groups

154, 159, 166, 180, 186, 190, 196

C

cloze

138, 170, 172, 175, 176, 178, 180, 181, 185, 189, 191

condition

117, 121, 126, 129, 138, 157, 160, 168, 188, 191, 197, 201, 203

consonant

1, 9, 13, 26, 43, 54, 64, 82, 89, 99, 100, 104, 116, 130, 132, 142

critical period

26, 27, 38, 50, 196

D

dictation

35, 138, 170, 173, 175, 178, 180, 187, 189, 191, 197

E

EFL

3, 34, 41, 44, 46, 51, 76, 87, 91, 93, 96, 107, 109, 114, 117, 121, 128, 153, 169, 191, 193, 197, 200

error
4, 20, 21, 24, 27, 32, 46, 49, 53, 59, 87, 91, 93, 96, 100, 102, 103, 105, 107, 109, 114, 129, 131, 138, 146, 168, 196, 199
ESL
35, 40, 45, 49, 87, 128, 194, 205
evaluation
117, 119, 139, 145, 146, 149, 151, 153, 162, 165, 170, 194, 203

F
first language
5, 8, 13, 50
foreign accent
4, 27, 33, 56, 87, 106, 108, 109, 147, 163, 169, 194
foreign language
2, 3, 10, 21, 23, 27, 29, 32, 35, 47, 50, 59, 61, 102, 109, 114, 119, 120, 146, 169, 194, 196, 201
functional load
105, 127, 132

G
group
6, 33, 34, 50, 94, 116, 118, 119, 120, 122, 123, 124, 125, 128, 130, 134, 138, 145, 153, 155, 157, 159, 161, 166, 168, 174, 177, 179, 181, 182, 187, 189, 191, 194, 196, 200

H
hypothesis(-es)
6, 24, 26, 37, 58, 74, 113, 114, 138, 153, 161, 166, 167, 179, 181, 189, 191, 197, 199

I
intelligibility
3, 18, 32, 36, 39, 46, 50, 106, 114, 127, 196, 201
interference
10, 21, 80, 87, 95, 109, 127
inter-rater reliability
118, 147, 150, 152, 163
intonation
1, 2, 8, 11, 15, 30, 32, 41, 43, 46, 54, 55, 57, 60, 69, 70, 86, 89, 93, 94, 107, 134, 136, 137, 142
intra-rater reliability
149

L
L1
2, 7, 8, 11, 12, 13, 15, 18, 19, 21, 23, 25, 26, 30, 37, 46, 49, 50, 57, 87, 91, 95, 100, 103, 109, 16
L2
2, 5, 7, 8, 10, 17, 19, 21, 23, 26, 27, 29, 32, 34, 37, 38, 41, 46, 48, 50, 57, 70, 80, 87, 91, 93, 95, 96, 100, 102, 105, 107, 109, 114, 119, 127, 130, 138, 143, 146, 150,

153, 155, 163, 166, 168, 175, 180, 189, 193, 196, 199
learning
1, 2, 4, 8, 16, 24, 30, 36, 37, 46, 49, 58, 60, 76, 102, 110, 114, 122, 162, 175, 180, 194, 197, 199, 200
listener
18, 19, 24, 32, 70, 102, 117, 118, 146, 150, 152, 163, 168, 194, 203

M
minimal pair
40, 46, 50, 86, 103, 105, 108, 132
mother tongue
2, 5, 8, 12, 19, 23, 38, 53, 120

N
native-likeness
20, 26, 27, 29, 39, 50, 196
native speaker
3, 7, 22, 24, 26, 28, 32, 34, 36, 70, 81, 87, 94, 119, 127, 146, 150, 151, 162, 166, 168, 174, 195, 202
non-native speaker
3, 7, 8, 21, 23, 27, 30, 43, 45, 51, 53, 61, 94, 99, 101, 102, 106, 109, 194, 196, 201

P
participant
34, 113, 115, 117, 119, 120, 122, 126, 129, 134, 138, 143, 149, 151, 154, 159, 161, 170, 176, 180, 192, 200
perception
4, 8, 11, 12, 17, 19, 24, 27, 29, 31, 33, 35, 46, 102, 109, 114, 119, 138, 170, 174, 179, 181, 187, 189, 193, 195, 199, 200
production
4, 9, 12, 13, 15, 18, 19, 21, 24, 27, 32, 34, 38, 51, 57, 76, 87, 88, 91, 93, 96, 98, 100, 102, 107, 109, 114, 115, 117, 119, 127, 130, 134, 138, 139, 146, 151, 153, 158, 161, 166, 189, 193, 199, 201
pronunciation
2, 7, 20, 27, 38, 43, 48, 50, 96, 100, 103, 106, 114, 116, 126, 132, 148, 169, 193, 200
prosody
1, 9, 16, 18, 29, 32, 34, 36, 39, 46, 49, 50, 54, 60, 85, 89, 102, 114, 119, 128, 130, 134, 138, 154, 164, 180, 193, 196, 199

R
rater
118, 147, 150, 152
read speech
24, 34, 65, 75, 88, 94, 109, 119, 139, 144, 150, 154, 155, 167, 200, 202

rhythm
1, 10, 17, 31, 39, 43, 48, 54, 62, 67, 73, 85, 93, 108, 116, 131, 134, 135, 165, 200

S

scale
34, 117, 148, 151, 176, 178, 183, 191
score
117, 148, 151, 156, 159, 165, 176, 182, 187,
second language
7, 21, 23, 28, 30, 36, 37, 169, 196, 201, 203
segment(al)
1, 4, 7, 8, 13, 15, 18, 23, 26, 32, 34, 36, 38, 42, 46, 50, 53, 54, 56, 58, 59, 77, 85, 87, 96, 102, 103, 105, 108, 110, 114, 119, 121, 123, 127, 130, 138, 139, 146, 154, 162, 167, 170, 180, 189, 193, 196, 199
spontaneous speech
24, 34, 71, 81, 95, 109, 119, 139, 143, 145, 149, 154, 159, 162, 168, 195, 200
stress
1, 8, 16, 18, 19, 22, 31, 32, 40, 43, 45, 54, 56, 58, 60, 61, 63, 67, 69, 73, 76, 85, 91, 93, 103, 107, 110, 116, 118, 130, 134, 140, 165, 170, 195
stress-timed
10, 31, 73, 85, 110, 116
suprasegment(al)
1, 4, 7, 8, 15, 18, 29, 32, 35, 36, 38, 42, 46, 50, 53, 54, 57, 59, 60, 85, 87, 109, 114, 121, 127, 134, 138, 148, 163, 168, 171, 189, 193, 196, 199
syllable-timed
17, 31, 73, 75, 93, 165

T

task
116, 118, 119, 121, 126, 138, 139, 143, 150, 156, 159, 162, 168, 170, 173, 181, 190, 192, 196, 200
teacher
2, 4, 7, 22, 39, 41, 46, 48, 50, 95, 103, 115, 118, 127, 146, 175, 189, 201
teaching
1, 4, 7, 20, 31, 34, 36, 38, 46, 48, 50, 58, 105, 113, 114, 115, 120, 125, 130, 134, 138, 153, 166, 180, 189, 193, 199, 202
test
6, 33, 34, 59, 113, 115, 117, 119, 120, 125, 129, 138, 139, 153, 155, 159, 161, 166, 170, 172, 176, 178, 180, 187, 194, 200
transcription
41, 56, 82, 84, 88, 136, 140, 173
transfer
21, 24, 87, 91, 95, 97, 100

treatment
6, 35, 113, 115, 119, 121, 125, 130, 138, 153, 157, 159, 162, 167, 169, 175, 184, 187, 190, 201

V

vowel
1, 5, 13, 18, 23, 28, 40, 43, 48, 51, 54, 63, 74, 77, 78, 81, 84, 92, 96, 98, 109, 116, 129, 130, 132, 142, 199, 204

W

within-groups
117, 153, 156, 159, 161, 166, 169, 180, 183, 189, 192, 197, 202

APPENDICES

APPENDIX A: QUESTIONNAIRE FOR EFL TEACHERS

---

1. Vous êtes : ❑ certifié ❑ agrégé.

2. Depuis combien de temps enseignez-vous l'anglais ?

3. À quels niveaux avez-vous déjà enseigné (*6ème, 4ème, 2nde*, etc.) ?

4. Dans votre méthode d'enseignement, quel(s) aspect(s) de la langue occupe(nt) la plus grande place ?
   ❑ Vocabulaire/lexique.
   ❑ Grammaire.
   ❑ Prononciation.
   ❑ Écoute de documents sonores/vidéos en anglais.

5. Parmi les choix suivants, y a-t-il des éléments que vous ne faites que très rarement, voire jamais, en cours, ou des éléments que vous considérez moins essentiels ?
   ❑ Vocabulaire/lexique.
   ❑ Grammaire.
   ❑ Prononciation.
   ❑ Écoute de documents sonores/vidéos en anglais.

6. Vous enseignez la prononciation et/ou reprenez la prononciation des apprenants :
   - ❑ À chaque cours/systématiquement.
   - ❑ Souvent.
   - ❑ De temps en temps.
   - ❑ Rarement.
   - ❑ Jamais.

7. (*Si vous faites de la prononciation*) Y a-t-il un élément que vous enseignez peu, voire jamais ?
   - ❑ Prononciation des consonnes (*th*, *r*, *h*, etc.).
   - ❑ Prononciation des voyelles (voyelles longues, voyelles brèves, etc.).
   - ❑ Accentuation des mots et des syllabes.
   - ❑ Rythme.
   - ❑ Tons (montants, descendants).
   - ❑ Accents toniques (syllabe accentuée portant l'information principale de l'énoncé).
   - ❑ Autre : ….....

8. (*Si vous avez coché une ou plusieurs case(s) de la question 7*) Pourquoi ?

9. Y a-t-il un aspect de la langue orale que vous pensez maîtriser moins, ou pas du tout ?
   - ❑ Consonnes.
   - ❑ Voyelles.
   - ❑ Accents lexicaux (primaires, secondaires).
   - ❑ Rythme.
   - ❑ Tons (montants, descendants).
   - ❑ Accents toniques (syllabe portant l'information principale de l'énoncé).
   - ❑ Autre : ….....

APPENDIX B: QUESTIONNAIRE OF SELECTION

---

1. Nom et prénom :
2. Date de naissance :
3. Pays de résidence :
4. Nationalité :
5. Langue maternelle :
6. Avez-vous une seconde langue maternelle ?
7. Quelles études faites-vous ?
8. Combien de langues étrangères étudiez-vous/avez-vous étudiées ? Quel niveau avez-vous pour chacune d'entre elles ?
9. À quel âge avez-vous commencé l'anglais ?
10. Au total, pendant combien d'années avez-vous fait de l'anglais ?
11. En général, quelle est votre moyenne d'anglais (sur 20) ? Vous pouvez indiquer une moyenne basée sur vos résultats scolaires habituels, votre note au Baccalauréat, etc.
12. Pensez-vous avoir un accent anglais spécifique (Angleterre, écossais, américain, etc.) ? Si vous ne savez pas, précisez-le.
13. Comment évalueriez-vous votre propre prononciation de l'anglais ?
    ❑ Très bonne. ❑ Bonne. ❑ Moyenne. ❑ Faible.
14. Comment évalueriez-vous vos capacités de compréhension orale (vidéos, extraits sonores) ?
    ❑ Très bonne. ❑ Bonne. ❑ Moyenne. ❑ Faible.

15. Avez-vous déjà fait de la phonétique anglaise ? Si oui, qu'avez-vous étudié (alphabet phonétique, accentuation des mots, rythme, intonation, etc.) ?
16. Avez-vous déjà séjourné dans un pays anglophone pendant plus de deux semaines (Angleterre, Irlande, États-Unis, etc.) ? Si oui, où et combien de temps ?
17. Regardez-vous et/ou écoutez-vous souvent de l'anglais (films, radio, etc.) ? Si oui, à quelle fréquence (par exemple, une fois par semaine) ?

APPENDIX C: QUESTIONNAIRE FOR LISTENERS

---

1. Name:
2. Gender:
3. Date of birth:
4. Nationality:
5. Country of residence:
6. Which part/region of the country are you from?
7. Mother tongue:
8. Second language:
9. Occupation:
10. Do you think that you have a regional accent? Which? How strong?
11. What language do you use in your everyday life?
12. Do you speak any foreign languages? Level of proficiency?
13. How often do you use it/them? In what context (work, friends, etc.)?
14. Have you ever lived in a foreign country? Which? When? How long?

15. Have you ever studied linguistics? Phonetics? Phonology?

16. Do you have any hearing problems?

APPENDIX D: DETAILED SCORES OF THE PRODUCTION TASKS

Read speech task

General means

Pre means		*Post means*	
Mean S01	2.46	Mean S01	2.64
Mean S02	2.54	Mean S02	2.86
Mean S03	2.64	Mean S03	3.18
Mean S04	2.67	Mean S04	2.69
Mean S05	3.06	Mean S05	3.06
Mean S06	2.91	Mean S06	2.82
Mean S07	3.41	Mean S07	3.49
Mean S08	3.13	Mean S08	3.31
Mean S09	3.11	Mean S09	3.16
Mean S10	3.11	Mean S10	3.24
Mean S11	2.74	Mean S11	3.02
Mean S12	2.87	Mean S12	3.13
Mean	2.89	Mean	3.05

Table 29. Mean scores of the S-group in the read speech tests

Pre means		*Post means*	
Mean P01	3.52	Mean P01	3.41
Mean P02	2.83	Mean P02	2.81
Mean P03	3.23	Mean P03	3.44
Mean P04	3.7	Mean P04	3.75
Mean P05	3.26	Mean P05	3.61
Mean P06	3.19	Mean P06	3.32
Mean P07	3.08	Mean P07	3.31
Mean P08	3.66	Mean P08	3.62
Mean P09	3.09	Mean P09	2.91
Mean P10	3.18	Mean P10	3.34
Mean P11	3.07	Mean P11	3.21
Mean P12	3.82	Mean P12	3.55
Mean	3.3	Mean	3.36

Table 30. Mean scores of the P-group in the read speech tests

Pre means		*Post means*	
Mean C01	2.46	Mean C01	2.2
Mean C02	3.34	Mean C02	3.26
Mean C03	2.47	Mean C03	2.43
Mean C04	2.69	Mean C04	2.31
Mean C05	2.7	Mean C05	3.08
Mean C06	3.05	Mean C06	2.42
Mean C07	2.51	Mean C07	2.26
Mean C08	2.99	Mean C08	2.95
Mean C09	2.3	Mean C09	2.76
Mean C10	2.71	Mean C10	3.08
Mean C11	3.17	Mean C11	3.27
Mean C12	2.69	Mean C12	2.64
Mean	2.76	Mean	2.72

Table 31. Mean scores of the C-group in the read speech tests

Means for words

Pre word means		*Post word means*	
Mean S01	2.24	Mean S01	2.41
Mean S02	2.41	Mean S02	2.9
Mean S03	2.56	Mean S03	3.21
Mean S04	2.91	Mean S04	2.63
Mean S05	3.41	Mean S05	3.06
Mean S06	2.86	Mean S06	2.64
Mean S07	3.56	Mean S07	3.67
Mean S08	3.27	Mean S08	3.43
Mean S09	3.4	Mean S09	3.3
Mean S10	3.36	Mean S10	3.51
Mean S11	2.53	Mean S11	2.83
Mean S12	2.76	Mean S12	2.97
Mean	2.94	Mean	3.05

Table 32. Mean scores of the S-group in the read speech tests (words)

Pre word means		*Post word means*	
Mean P01	3.7	Mean P01	3.17
Mean P02	2.64	Mean P02	2.64
Mean P03	3.31	Mean P03	3.29
Mean P04	3.6	Mean P04	3.54
Mean P05	3.31	Mean P05	3.77
Mean P06	3.31	Mean P06	3.41
Mean P07	3.33	Mean P07	3.44
Mean P08	4.04	Mean P08	3.91
Mean P09	3.31	Mean P09	3.04
Mean P10	2.94	Mean P10	3.21
Mean P11	3.06	Mean P11	3.1
Mean P12	3.87	Mean P12	3.54
Mean	3.37	Mean	3.34

Table 33. Mean scores of the P-group in the read speech tests (words)

Pre word means		*Post word means*	
Mean C01	2.17	Mean C01	1.86
Mean C02	3.29	Mean C02	3.26
Mean C03	2.73	Mean C03	2.37
Mean C04	2.61	Mean C04	2.53
Mean C05	2.64	Mean C05	3.17
Mean C06	3.1	Mean C06	2.41
Mean C07	2.51	Mean C07	2.23
Mean C08	3.06	Mean C08	2.93
Mean C09	2.01	Mean C09	2.81
Mean C10	2.61	Mean C10	3.04
Mean C11	3.31	Mean C11	3.37
Mean C12	2.7	Mean C12	2.64
Mean	2.73	Mean	2.72

Table 34. Mean scores of the C-group in the read speech tests (words)

Means for sentences

Pre sentence means		*Post sentence means*	
Mean S01	2.69	Mean S01	2.87
Mean S02	2.66	Mean S02	2.81
Mean S03	2.71	Mean S03	3.14
Mean S04	2.43	Mean S04	2.74
Mean S05	2.7	Mean S05	3.06
Mean S06	2.97	Mean S06	3
Mean S07	3.26	Mean S07	3.31
Mean S08	2.99	Mean S08	3.2
Mean S09	2.83	Mean S09	3.01
Mean S10	2.87	Mean S10	2.96
Mean S11	2.96	Mean S11	3.21
Mean S12	2.99	Mean S12	3.29
Mean	2.84	Mean	3.05

Table 35. Mean scores of the S-group in the read speech tests (sentences)

Pre sentence means		*Post sentence means*	
Mean P01	3.34	Mean P01	3.64
Mean P02	3.01	Mean P02	2.97
Mean P03	3.14	Mean P03	3.59
Mean P04	3.8	Mean P04	3.96
Mean P05	3.21	Mean P05	3.44
Mean P06	3.07	Mean P06	3.23
Mean P07	2.83	Mean P07	3.19
Mean P08	3.29	Mean P08	3.33
Mean P09	2.87	Mean P09	2.77
Mean P10	3.41	Mean P10	3.47
Mean P11	3.09	Mean P11	3.33
Mean P12	3.77	Mean P12	3.56
Mean	3.24	Mean	3.37

Table 36. Mean scores of the P-group in the read speech tests (sentences)

Pre sentence means		*Post sentence means*	
Mean C01	2.74	Mean C01	2.54
Mean C02	3.4	Mean C02	3.27
Mean C03	2.21	Mean C03	2.49
Mean C04	2.77	Mean C04	2.1
Mean C05	2.76	Mean C05	2.99
Mean C06	3	Mean C06	2.43
Mean C07	2.51	Mean C07	2.3
Mean C08	2.93	Mean C08	2.97
Mean C09	2.59	Mean C09	2.7
Mean C10	2.8	Mean C10	3.11
Mean C11	3.03	Mean C11	3.17
Mean C12	2.69	Mean C12	2.64
Mean	2.79	Mean	2.73

Table 37. Mean scores of the C-group in the read speech tests (sentences)

Detailed scores of the S-group

Time Partici Item	*Rater 1*	*Rater 2*	*Rater 3*	*Rater 4*	*Rater 5*	*Rater 6*	*Rater 7*	*Rater 8*	*Rater 9*	*Rater 10*
Pre S01 01	1	1	2	1	1	1	1	2	3	1
Pre S01 02	2	2	3	3	3	2	2	3	3	3
Pre S01 03	2	2	1	3	3	3	3	2	3	2
Pre S01 04	3	3	4	3	2	1	2	4	4	2
Pre S01 05	1	1	1	2	1	1	1	2	1	2
Pre S01 06	2	3	2	1	1	1	2	1	3	2
Pre S01 07	3	4	4	4	2	3	3	3	4	4
Pre S01 08	4	3	3	3	3	2	3	4	3	4
Pre S01 09	3	1	2	3	1	2	2	2	2	1
Pre S01 10	3	1	2	2	2	1	2	4	2	2
Pre S01 11	3	3	2	3	2	3	3	3	3	3
Pre S01 12	4	3	2	2	4	2	3	4	3	2
Pre S01 13	4	4	3	4	4	4	4	4	4	3
Pre S01 14	2	2	2	2	3	2	2	2	3	1
Pre S02 01	1	1	1	1	2	1	2	1	2	3
Pre S02 02	2	2	2	1	2	1	2	2	3	2
Pre S02 03	3	1	3	2	3	2	3	4	3	2
Pre S02 04	4	4	4	3	4	3	3	4	4	4
Pre S02 05	1	2	2	2	2	3	3	2	3	3
Pre S02 06	3	3	2	2	3	2	2	2	4	3
Pre S02 07	3	2	2	2	2	2	2	2	3	3
Pre S02 08	3	3	4	2	4	4	3	3	3	3
Pre S02 09	3	1	2	2	3	1	2	3	2	1
Pre S02 10	3	1	2	2	2	2	2	3	2	2
Pre S02 11	2	2	2	2	2	2	2	3	3	2
Pre S02 12	3	3	2	4	3	4	3	3	4	4
Pre S02 13	3	3	2	4	4	4	4	3	4	4
Pre S02 14	3	2	2	2	2	2	2	2	3	3
Pre S03 01	2	1	1	2	1	1	2	2	2	1
Pre S03 02	2	4	4	1	1	4	4	3	4	4
Pre S03 03	3	3	3	1	2	2	2	3	3	3
Pre S03 04	4	3	4	2	3	3	3	4	3	4
Pre S03 05	2	2	2	2	2	1	2	3	2	2
Pre S03 06	3	2	1	3	4	2	3	3	4	3
Pre S03 07	3	3	2	3	1	3	3	3	3	3
Pre S03 08	3	2	2	2	3	2	2	3	3	3
Pre S03 09	4	1	2	4	3	2	2	4	2	1
Pre S03 10	3	2	3	3	2	2	2	3	3	1
Pre S03 11	3	3	3	4	3	2	2	4	3	3
Pre S03 12	4	3	2	3	3	2	2	3	3	5
Pre S03 13	3	4	2	4	3	3	3	3	3	3
Pre S03 14	4	2	2	2	3	2	2	3	3	2
Pre S04 01	2	2	1	3	3	3	3	3	2	3
Pre S04 02	3	3	4	1	3	3	3	3	3	4
Pre S04 03	3	2	2	2	3	3	3	3	3	2
Pre S04 04	5	3	4	3	3	3	3	4	4	4

Pre S04 05	3	2	1	2	1	1	1	3	2	1
Pre S04 06	4	3	2	3	4	3	3	3	4	4
Pre S04 07	4	3	4	4	4	3	3	4	4	4
Pre S04 08	3	2	2	1	1	2	3	3	4	3
Pre S04 09	3	1	2	3	2	1	2	3	2	1
Pre S04 10	3	1	2	2	2	1	2	3	2	3
Pre S04 11	3	2	2	2	3	2	2	2	3	3
Pre S04 12	4	3	3	3	3	3	3	3	3	4
Pre S04 13	3	4	4	2	3	3	3	4	3	2
Pre S04 14	2	2	2	1	1	2	2	1	2	3
Pre S05 01	3	1	5	3	3	2	2	5	3	2
Pre S05 02	4	2	4	2	3	2	2	3	3	2
Pre S05 03	3	5	4	4	4	4	4	5	4	5
Pre S05 04	4	4	3	3	2	4	4	3	3	4
Pre S05 05	3	4	3	3	4	3	3	3	3	3
Pre S05 06	3	3	3	3	4	4	4	4	4	3
Pre S05 07	4	3	4	4	4	4	4	4	4	5
Pre S05 08	3	4	4	4	4	3	3	3	3	3
Pre S05 09	2	2	2	3	2	1	1	3	3	2
Pre S05 10	3	2	3	3	3	2	2	3	3	3
Pre S05 11	2	1	1	2	1	1	1	2	2	1
Pre S05 12	3	3	2	3	2	2	2	3	3	4
Pre S05 13	3	2	3	4	2	4	3	2	4	2
Pre S05 14	4	4	3	3	4	4	4	4	3	4
Pre S06 01	3	2	2	3	2	1	1	4	3	4
Pre S06 02	2	3	3	4	4	2	3	3	3	3
Pre S06 03	3	1	2	1	1	1	2	2	4	4
Pre S06 04	4	2	3	3	2	3	3	3	3	3
Pre S06 05	4	3	3	4	3	4	3	2	3	4
Pre S06 06	3	2	3	3	3	2	2	3	3	3
Pre S06 07	3	4	4	4	3	3	3	4	3	4
Pre S06 08	3	3	3	4	4	3	3	3	3	4
Pre S06 09	3	2	2	4	3	1	2	3	2	2
Pre S06 10	4	2	3	4	3	3	3	4	3	3
Pre S06 11	3	3	2	3	3	2	3	4	3	3
Pre S06 12	3	3	3	5	3	3	3	2	4	3
Pre S06 13	4	4	4	5	4	3	4	4	4	4
Pre S06 14	2	1	2	2	2	1	1	3	2	2
Pre S07 01	4	4	1	3	3	4	4	3	4	3
Pre S07 02	4	4	4	2	4	4	3	5	5	4
Pre S07 03	4	4	4	2	3	3	3	4	5	3
Pre S07 04	5	4	4	4	4	4	4	4	5	4
Pre S07 05	3	2	4	3	2	4	3	3	3	3
Pre S07 06	3	3	3	2	3	3	3	3	4	3
Pre S07 07	4	4	4	4	3	4	4	4	5	4
Pre S07 08	4	3	4	3	3	3	4	4	5	3
Pre S07 09	3	2	2	3	2	2	3	3	2	2
Pre S07 10	4	2	3	2	2	4	3	5	4	3

Pre S07 11	3	3	3	2	3	4	3	4	3	3
Pre S07 12	4	4	3	3	3	5	4	5	5	4
Pre S07 13	4	3	4	3	3	3	3	4	4	3
Pre S07 14	4	3	3	2	2	3	3	4	4	3
Pre S08 01	1	1	1	2	1	1	1	4	1	1
Pre S08 02	2	4	4	3	3	4	4	5	4	3
Pre S08 03	4	2	2	3	2	3	4	3	4	3
Pre S08 04	4	3	5	2	3	4	4	4	5	4
Pre S08 05	4	3	5	3	3	4	4	4	4	4
Pre S08 06	4	4	4	3	3	3	3	4	4	3
Pre S08 07	4	3	4	4	4	4	3	4	4	4
Pre S08 08	4	3	3	3	2	4	3	4	4	3
Pre S08 09	3	2	2	2	2	3	3	3	2	2
Pre S08 10	3	2	3	2	2	3	2	4	2	2
Pre S08 11	4	2	3	3	3	4	3	4	3	3
Pre S08 12	3	2	3	4	3	3	3	3	4	3
Pre S08 13	4	3	3	3	4	4	4	5	4	4
Pre S08 14	3	2	2	2	2	3	3	4	3	2
Pre S09 01	3	2	3	3	3	3	2	4	2	3
Pre S09 02	3	2	3	2	3	3	3	4	3	3
Pre S09 03	4	4	5	3	3	4	3	4	5	4
Pre S09 04	5	3	4	2	3	4	3	4	3	3
Pre S09 05	4	3	4	3	3	5	4	3	4	4
Pre S09 06	3	3	3	3	4	4	4	4	5	4
Pre S09 07	3	3	4	3	3	3	3	4	5	3
Pre S09 08	3	4	3	3	3	3	3	4	4	3
Pre S09 09	3	2	2	2	2	2	2	3	2	2
Pre S09 10	3	3	3	3	3	2	2	3	2	3
Pre S09 11	3	3	2	2	3	2	2	2	3	2
Pre S09 12	3	2	2	2	3	3	3	4	3	3
Pre S09 13	4	3	4	3	3	3	4	5	5	4
Pre S09 14	4	2	2	2	2	3	3	2	3	3
Pre S10 01	4	2	1	3	1	3	2	3	3	2
Pre S10 02	4	3	3	2	2	3	3	5	4	3
Pre S10 03	2	3	4	2	3	3	3	3	4	3
Pre S10 04	4	4	4	3	3	4	4	5	3	4
Pre S10 05	4	4	5	2	2	4	4	3	4	4
Pre S10 06	4	4	3	3	3	3	3	4	5	3
Pre S10 07	4	4	4	3	3	4	4	5	5	4
Pre S10 08	3	3	3	3	2	3	2	3	4	3
Pre S10 09	3	3	2	3	2	2	3	3	2	2
Pre S10 10	3	3	3	2	2	3	2	3	2	2
Pre S10 11	3	3	2	4	3	3	3	3	3	3
Pre S10 12	3	4	3	3	2	3	3	3	3	3
Pre S10 13	4	3	3	3	4	3	3	5	4	3
Pre S10 14	3	3	3	2	1	3	3	2	4	3
Pre S11 01	1	1	1	2	1	1	1	3	1	1
Pre S11 02	2	1	1	1	3	2	2	4	1	2

Pre S11 03	1	2	2	2	1	2	3	3	3	2
Pre S11 04	5	3	3	2	3	4	4	5	3	3
Pre S11 05	2	1	2	1	1	1	1	3	2	2
Pre S11 06	3	4	3	2	4	3	4	4	5	3
Pre S11 07	5	4	4	3	4	3	3	4	5	3
Pre S11 08	4	3	4	3	3	3	3	4	5	3
Pre S11 09	3	2	3	3	3	2	1	4	4	3
Pre S11 10	3	2	2	2	2	3	2	4	2	2
Pre S11 11	4	3	3	2	2	4	3	4	4	3
Pre S11 12	3	2	2	3	2	2	2	4	3	2
Pre S11 13	4	2	3	3	3	3	3	5	4	3
Pre S11 14	4	2	2	2	2	3	3	4	4	4
Pre S12 01	2	3	3	2	2	1	1	2	2	2
Pre S12 02	3	3	3	3	2	3	3	4	3	3
Pre S12 03	3	4	3	2	2	4	3	1	4	3
Pre S12 04	4	4	5	3	3	4	4	4	3	3
Pre S12 05	1	2	1	2	1	2	2	1	3	2
Pre S12 06	3	3	2	2	2	3	2	2	4	2
Pre S12 07	3	4	4	4	2	3	3	4	4	4
Pre S12 08	3	3	3	2	2	3	3	4	5	3
Pre S12 09	4	4	3	3	2	3	3	3	4	3
Pre S12 10	3	2	2	2	3	2	2	4	2	2
Pre S12 11	3	3	2	3	3	4	4	5	4	3
Pre S12 12	3	3	3	2	2	3	3	3	3	3
Pre S12 13	3	3	3	3	3	4	4	5	4	3
Pre S12 14	3	3	2	3	1	3	3	1	3	3
Post S01 01	2	1	1	1	1	1	1	3	2	1
Post S01 02	4	2	3	1	3	2	2	3	2	2
Post S01 03	2	2	1	3	2	1	2	4	4	4
Post S01 04	3	2	3	2	2	2	4	2	2	3
Post S01 05	3	2	1	2	1	1	2	3	2	1
Post S01 06	3	2	2	2	2	2	2	3	3	4
Post S01 07	4	4	4	4	4	3	3	4	4	4
Post S01 08	3	3	3	3	3	2	3	3	4	4
Post S01 09	4	3	3	3	3	4	3	4	4	4
Post S01 10	3	1	3	2	2	1	1	4	2	2
Post S01 11	3	1	2	3	2	3	3	2	3	3
Post S01 12	4	3	3	4	2	4	4	4	4	4
Post S01 13	4	4	5	3	2	4	4	3	3	4
Post S01 14	1	2	2	2	1	1	1	3	2	2
Post S02 01	1	1	2	1	1	2	2	2	2	1
Post S02 02	4	3	3	3	4	4	3	5	3	3
Post S02 03	2	3	1	3	3	3	3	4	3	2
Post S02 04	3	3	3	5	3	4	4	4	4	4
Post S02 05	1	2	3	3	3	3	2	3	3	2
Post S02 06	3	4	3	3	4	4	4	4	4	3
Post S02 07	3	2	2	3	3	3	3	4	3	2
Post S02 08	3	4	2	3	3	3	3	4	4	4
Post S02 09	3	1	2	4	2	1	1	4	2	2
Post S02 10	3	3	2	3	2	2	2	3	3	3

Post S02 11	4	5	3	4	4	5	4	3	4	4
Post S02 12	2	2	2	2	1	1	2	2	2	2
Post S02 13	3	3	3	5	4	4	4	2	4	4
Post S02 14	3	1	2	2	2	2	2	3	3	2
Post S03 01	2	2	1	1	1	1	1	2	2	2
Post S03 02	4	4	4	3	3	3	3	3	3	4
Post S03 03	2	3	3	3	3	3	3	4	4	4
Post S03 04	4	4	4	4	4	3	4	5	4	4
Post S03 05	4	3	4	4	3	4	4	3	3	3
Post S03 06	4	3	3	3	4	3	3	4	3	4
Post S03 07	4	3	3	4	3	4	3	4	4	3
Post S03 08	4	3	3	3	3	3	3	4	3	4
Post S03 09	4	2	3	4	2	1	2	3	3	2
Post S03 10	4	3	3	3	3	4	3	4	4	5
Post S03 11	3	2	2	3	3	3	3	3	3	4
Post S03 12	3	3	3	3	2	3	3	4	3	3
Post S03 13	4	3	4	3	3	4	3	4	3	5
Post S03 14	4	3	2	3	2	3	3	4	3	3
Post S04 01	2	2	3	3	1	1	1	3	2	4
Post S04 02	3	3	2	2	3	2	2	3	3	3
Post S04 03	2	3	2	2	2	3	4	3	2	3
Post S04 04	3	3	3	2	3	3	3	3	3	4
Post S04 05	3	2	2	2	1	1	2	2	2	2
Post S04 06	3	2	2	2	3	3	3	3	3	3
Post S04 07	3	3	3	3	3	3	3	5	4	4
Post S04 08	3	3	3	3	3	3	3	4	3	5
Post S04 09	3	1	2	2	2	1	2	2	2	1
Post S04 10	3	2	3	2	2	2	3	3	3	2
Post S04 11	4	2	3	3	3	2	2	3	3	4
Post S04 12	3	3	2	3	2	3	3	2	3	3
Post S04 13	3	3	4	4	3	3	3	4	3	4
Post S04 14	3	2	2	2	2	3	3	3	3	3
Post S05 01	2	2	1	3	2	3	3	4	3	3
Post S05 02	4	2	3	3	3	2	3	4	3	3
Post S05 03	3	5	4	4	4	3	4	4	4	4
Post S05 04	4	3	4	3	2	3	3	4	3	4
Post S05 05	3	2	2	3	1	3	3	3	3	3
Post S05 06	2	3	2	3	3	3	3	2	3	3
Post S05 07	4	3	3	3	3	3	3	4	3	4
Post S05 08	3	3	3	3	3	2	2	4	3	4
Post S05 09	3	2	2	3	3	2	2	2	2	1
Post S05 10	3	2	3	4	2	2	2	2	3	2
Post S05 11	4	3	3	3	3	3	4	3	4	4
Post S05 12	4	3	3	4	3	4	4	3	4	4
Post S05 13	4	3	3	4	3	3	4	4	3	3
Post S05 14	4	3	2	4	3	3	3	3	4	4
Post S06 01	2	2	1	2	2	1	2	2	2	1
Post S06 02	3	3	4	3	3	3	3	4	3	4
Post S06 03	2	2	1	2	2	2	2	3	3	3
Post S06 04	4	3	2	3	4	3	3	3	3	4
Post S06 05	3	3	2	1	3	3	3	2	3	3

Post S06 06	2	3	2	2	1	2	2	2	3	3
Post S06 07	3	4	3	3	3	3	3	4	3	4
Post S06 08	3	3	2	3	4	3	3	4	3	4
Post S06 09	3	1	2	2	2	1	2	2	3	2
Post S06 10	3	3	2	4	3	4	4	3	4	4
Post S06 11	4	3	3	3	3	3	3	3	3	5
Post S06 12	4	3	3	2	4	4	3	4	3	4
Post S06 13	4	4	2	3	3	3	3	3	3	4
Post S06 14	3	2	2	3	2	2	2	3	3	3
Post S07 01	3	5	3	4	2	3	2	4	4	4
Post S07 02	3	5	4	4	3	5	5	4	5	5
Post S07 03	3	4	4	3	2	3	4	4	5	4
Post S07 04	5	4	4	4	4	4	4	4	5	5
Post S07 05	2	3	3	3	2	3	4	3	4	3
Post S07 06	3	4	4	3	3	3	3	4	4	4
Post S07 07	4	4	4	3	3	3	3	4	4	4
Post S07 08	3	4	4	2	2	4	4	4	4	4
Post S07 09	3	3	3	2	3	1	3	2	2	3
Post S07 10	4	3	2	3	3	4	4	4	4	4
Post S07 11	3	2	2	2	3	2	2	4	3	3
Post S07 12	4	3	4	2	4	4	3	5	5	4
Post S07 13	4	4	3	4	3	3	4	2	4	4
Post S07 14	4	4	4	3	3	4	4	3	5	4
Post S08 01	4	5	3	3	3	4	3	3	5	3
Post S08 02	3	4	5	2	3	3	3	4	2	3
Post S08 03	3	3	5	2	2	3	3	1	3	3
Post S08 04	4	3	4	2	3	3	4	3	3	4
Post S08 05	3	3	4	2	3	4	4	4	4	4
Post S08 06	3	4	3	2	3	3	4	4	5	3
Post S08 07	4	4	4	4	4	5	4	4	5	4
Post S08 08	4	3	5	3	3	4	4	4	5	5
Post S08 09	3	3	3	3	2	1	3	3	2	3
Post S08 10	3	3	4	2	3	1	2	3	3	3
Post S08 11	4	3	3	2	3	4	4	4	4	4
Post S08 12	3	3	3	3	3	4	3	3	4	4
Post S08 13	4	3	3	3	4	3	4	5	5	4
Post S08 14	3	2	3	2	2	2	2	3	3	3
Post S09 01	4	3	4	3	4	3	4	5	4	4
Post S09 02	4	3	3	3	3	3	3	3	4	3
Post S09 03	3	4	4	2	2	3	3	4	4	4
Post S09 04	4	4	4	2	3	4	4	4	3	4
Post S09 05	2	1	3	4	2	1	1	3	2	2
Post S09 06	4	4	3	3	3	4	3	2	5	4
Post S09 07	3	3	4	3	4	3	3	4	5	4
Post S09 08	4	3	3	3	2	4	4	3	4	4
Post S09 09	4	3	3	4	2	4	3	3	5	4
Post S09 10	3	2	4	2	2	2	2	3	2	3
Post S09 11	3	2	2	2	3	2	2	3	2	3
Post S09 12	4	3	3	3	3	2	3	3	3	3
Post S09 13	4	3	4	3	3	3	3	5	4	4
Post S09 14	4	2	2	2	2	2	3	4	3	3

Post S10 01	4	4	1	2	3	3	3	3	3	3
Post S10 02	4	4	5	2	3	3	3	4	4	4
Post S10 03	3	4	5	1	3	3	3	4	4	3
Post S10 04	4	4	4	3	3	4	4	4	4	4
Post S10 05	3	4	4	3	3	3	4	3	5	4
Post S10 06	4	4	4	2	3	3	4	3	5	4
Post S10 07	4	4	5	4	3	3	3	4	4	4
Post S10 08	4	4	5	3	3	4	4	4	5	4
Post S10 09	3	2	3	2	2	1	2	3	2	3
Post S10 10	3	3	3	2	3	2	2	3	2	3
Post S10 11	3	3	4	3	3	2	2	4	3	3
Post S10 12	3	3	2	2	3	3	2	2	4	3
Post S10 13	4	4	3	2	3	3	4	3	4	4
Post S10 14	4	2	2	3	2	2	2	2	4	4
Post S11 01	1	1	1	2	1	1	1	2	1	2
Post S11 02	4	3	4	1	3	3	3	4	4	4
Post S11 03	2	2	2	2	3	3	3	2	3	3
Post S11 04	3	2	4	3	3	4	3	3	3	4
Post S11 05	2	2	3	1	3	3	2	3	3	3
Post S11 06	3	3	3	2	3	4	4	3	5	3
Post S11 07	4	4	4	4	3	3	3	4	4	4
Post S11 08	4	3	3	3	3	3	4	4	5	4
Post S11 09	3	3	3	3	2	3	2	3	3	3
Post S11 10	3	3	3	3	3	2	2	3	3	3
Post S11 11	3	2	4	3	3	4	3	4	4	4
Post S11 12	4	3	3	2	3	4	4	5	3	4
Post S11 13	4	3	4	3	3	3	3	4	4	4
Post S11 14	3	2	3	2	2	4	3	2	4	4
Post S12 01	1	2	1	2	1	1	1	1	3	2
Post S12 02	3	5	5	3	3	3	4	3	4	3
Post S12 03	3	4	4	2	1	3	3	3	5	4
Post S12 04	4	4	5	3	3	4	4	4	3	4
Post S12 05	2	3	2	3	2	3	3	3	3	3
Post S12 06	2	3	2	2	2	4	3	1	4	3
Post S12 07	3	4	3	3	3	3	3	4	4	4
Post S12 08	4	4	3	3	3	3	3	4	4	4
Post S12 09	3	3	3	4	3	4	3	3	4	4
Post S12 10	3	2	3	2	2	2	2	3	2	3
Post S12 11	4	3	2	3	3	3	3	4	4	4
Post S12 12	3	3	4	3	3	3	3	3	3	3
Post S12 13	4	4	3	4	3	3	4	4	5	4
Post S12 14	4	4	3	2	3	3	4	4	4	4

Table 38. Detailed scores of the S-group in the read speech tests

Detailed scores of the P-group

Pre P01 01	3	3	3	1	3	3	2	2	2	3
Pre P01 02	4	4	4	3	4	5	4	5	5	4
Pre P01 03	4	4	5	5	4	5	4	5	5	4
Pre P01 04	5	5	4	4	4	4	4	4	4	4
Pre P01 05	3	4	5	4	4	4	4	3	4	4
Pre P01 06	3	4	3	4	4	4	4	5	4	3
Pre P01 07	3	3	4	2	3	3	3	2	3	2
Pre P01 08	4	4	4	4	4	4	4	5	4	4
Pre P01 09	3	3	2	4	3	4	4	3	3	4
Pre P01 10	5	4	3	4	3	4	3	4	4	3
Pre P01 11	4	4	4	4	4	3	3	3	3	4
Pre P01 12	3	2	2	3	3	3	3	2	3	2
Pre P01 13	3	4	4	4	4	4	4	4	3	4
Pre P01 14	3	2	3	2	2	2	2	3	3	1
Pre P02 01	1	2	1	2	1	1	2	2	2	2
Pre P02 02	2	2	3	1	2	1	1	4	3	2
Pre P02 03	4	3	4	3	3	3	3	4	3	4
Pre P02 04	2	3	3	4	3	4	4	4	3	4
Pre P02 05	1	1	1	1	1	1	2	2	2	3
Pre P02 06	3	3	3	2	3	3	3	3	3	4
Pre P02 07	3	3	3	5	4	3	3	5	3	3
Pre P02 08	3	3	3	4	4	4	4	4	3	5
Pre P02 09	2	1	2	2	2	1	2	3	2	1
Pre P02 10	3	2	3	4	3	2	2	3	4	2
Pre P02 11	2	3	3	3	4	4	3	3	3	4
Pre P02 12	2	2	2	2	2	4	3	3	3	2
Pre P02 13	4	4	3	4	4	4	4	4	4	3
Pre P02 14	3	4	3	4	3	4	3	3	3	3
Pre P03 01	3	2	3	3	2	4	3	4	3	3
Pre P03 02	2	2	4	2	4	3	3	3	3	2
Pre P03 03	3	3	4	3	3	3	4	4	4	4
Pre P03 04	4	3	4	3	3	4	4	3	3	5
Pre P03 05	4	4	4	3	3	3	2	3	3	4
Pre P03 06	4	4	3	3	4	4	4	3	3	3
Pre P03 07	4	3	4	4	3	3	3	4	3	4
Pre P03 08	4	3	4	4	3	3	3	4	4	4
Pre P03 09	3	2	2	2	2	1	2	3	3	3
Pre P03 10	2	2	2	3	3	1	2	3	3	3
Pre P03 11	4	3	4	4	4	3	3	4	4	4
Pre P03 12	4	3	4	2	3	4	3	4	3	3
Pre P03 13	4	4	4	4	3	3	4	4	4	4
Pre P03 14	4	2	2	3	2	3	3	3	3	4
Pre P04 01	3	5	4	2	1	5	4	4	4	5
Pre P04 02	3	4	2	1	2	3	3	3	3	2
Pre P04 03	4	5	4	4	3	5	5	4	4	4
Pre P04 04	4	5	4	5	4	4	4	4	5	4
Pre P04 05	4	5	5	4	4	5	4	3	3	3

Pre P04 06	4	2	3	4	2	3	4	3	4	4
Pre P04 07	3	2	4	4	3	2	2	4	3	4
Pre P04 08	4	4	5	5	4	4	4	4	4	4
Pre P04 09	3	1	3	4	3	3	3	4	2	2
Pre P04 10	4	4	4	4	2	4	4	4	4	4
Pre P04 11	4	5	5	5	4	5	4	4	4	4
Pre P04 12	4	4	4	4	3	3	4	3	5	4
Pre P04 13	4	4	5	5	4	4	4	4	4	4
Pre P04 14	4	4	3	4	3	3	2	4	3	4
Pre P05 01	3	2	2	2	3	1	2	2	2	4
Pre P05 02	5	4	4	3	4	4	4	4	3	3
Pre P05 03	3	2	2	3	2	2	3	3	3	3
Pre P05 04	3	4	4	5	4	4	4	4	4	3
Pre P05 05	3	3	3	3	3	4	4	3	3	3
Pre P05 06	3	3	3	4	3	3	3	4	4	4
Pre P05 07	4	4	5	5	4	3	3	4	4	4
Pre P05 08	5	4	4	4	4	3	3	4	4	4
Pre P05 09	3	2	2	3	3	2	3	3	2	1
Pre P05 10	4	3	3	4	4	3	3	3	2	2
Pre P05 11	3	2	3	3	4	2	2	4	3	3
Pre P05 12	3	2	1	4	4	3	3	4	4	3
Pre P05 13	4	4	4	4	4	4	4	4	4	5
Pre P05 14	3	3	2	3	4	2	3	4	3	3
Pre P06 01	3	4	4	3	3	3	3	3	3	3
Pre P06 02	3	4	4	1	3	3	3	3	4	4
Pre P06 03	3	2	2	2	3	2	3	4	3	4
Pre P06 04	4	3	4	4	4	4	4	4	3	3
Pre P06 05	3	2	4	4	3	4	4	2	3	5
Pre P06 06	4	3	2	4	3	3	3	2	4	4
Pre P06 07	4	4	4	4	4	3	3	4	3	4
Pre P06 08	3	4	3	3	3	4	4	3	4	4
Pre P06 09	4	1	2	4	3	2	2	3	2	2
Pre P06 10	3	3	2	4	3	3	3	3	3	3
Pre P06 11	4	3	3	4	4	3	2	3	3	3
Pre P06 12	3	2	2	3	2	2	2	3	2	2
Pre P06 13	4	4	4	4	4	4	4	4	3	4
Pre P06 14	4	3	3	3	3	3	3	3	3	3
Pre P07 01	4	4	4	4	3	4	3	5	4	4
Pre P07 02	3	3	1	2	3	3	3	5	3	3
Pre P07 03	4	3	4	3	3	3	3	5	4	3
Pre P07 04	4	4	4	3	3	4	3	2	4	4
Pre P07 05	3	2	3	2	2	4	3	1	4	2
Pre P07 06	2	3	3	3	2	4	3	3	5	3
Pre P07 07	4	4	4	4	3	3	3	4	5	4
Pre P07 08	3	3	3	3	3	2	3	3	3	3
Pre P07 09	3	2	2	3	2	2	3	3	2	2
Pre P07 10	3	3	3	3	2	2	2	3	2	3
Pre P07 11	2	2	2	2	1	2	1	2	2	2
Pre P07 12	3	4	3	3	3	4	4	4	5	3
Pre P07 13	4	3	3	3	2	4	3	3	4	3
Pre P07 14	3	3	3	3	3	3	4	3	5	3

Pre P08 01	5	5	5	3	4	5	5	5	5	5
Pre P08 02	5	4	4	3	3	4	4	4	5	4
Pre P08 03	4	5	5	4	4	5	4	4	5	4
Pre P08 04	5	4	5	3	3	5	4	3	5	4
Pre P08 05	5	5	5	3	2	5	4	3	5	4
Pre P08 06	3	5	3	2	3	4	4	3	5	4
Pre P08 07	3	3	4	3	3	4	3	3	5	3
Pre P08 08	5	4	4	4	3	4	4	4	5	4
Pre P08 09	3	2	2	2	2	2	2	3	2	2
Pre P08 10	3	2	4	2	2	3	2	3	2	2
Pre P08 11	4	4	3	2	3	4	3	3	3	3
Pre P08 12	4	4	5	3	3	3	4	3	5	3
Pre P08 13	4	4	4	4	3	5	4	3	4	4
Pre P08 14	4	2	3	3	2	4	4	4	5	3
Pre P09 01	4	3	3	2	3	3	4	3	4	3
Pre P09 02	3	3	2	2	2	3	3	5	3	3
Pre P09 03	3	4	4	2	3	4	4	5	5	3
Pre P09 04	3	3	5	3	3	4	4	4	3	3
Pre P09 05	2	3	3	2	2	4	3	3	4	3
Pre P09 06	3	4	3	3	2	3	4	3	4	3
Pre P09 07	3	4	5	3	3	5	3	4	5	3
Pre P09 08	4	3	5	3	3	3	4	4	4	3
Pre P09 09	3	2	2	2	2	1	2	3	2	2
Pre P09 10	3	3	3	2	3	1	1	2	3	2
Pre P09 11	3	2	2	2	3	2	2	4	1	2
Pre P09 12	4	2	1	2	3	4	3	5	4	3
Pre P09 13	5	2	3	3	3	3	4	5	4	3
Pre P09 14	4	2	3	2	2	3	4	4	5	3
Pre P10 01	2	1	1	1	2	1	1	3	1	1
Pre P10 02	2	3	1	1	2	2	2	3	3	2
Pre P10 03	1	2	2	2	2	3	2	4	4	2
Pre P10 04	5	4	5	3	4	4	4	5	4	4
Pre P10 05	3	4	4	2	3	4	3	2	3	3
Pre P10 06	4	4	3	3	3	4	4	4	5	4
Pre P10 07	4	4	4	4	3	3	2	4	4	4
Pre P10 08	4	5	5	4	4	5	4	4	5	4
Pre P10 09	4	4	3	4	3	3	3	3	5	3
Pre P10 10	4	3	3	2	2	3	4	4	4	4
Pre P10 11	3	4	3	3	4	3	4	4	3	3
Pre P10 12	3	2	3	2	3	2	2	4	3	2
Pre P10 13	4	4	5	3	3	2	3	5	4	3
Pre P10 14	4	2	4	3	2	3	4	2	4	3
Pre P11 01	3	1	1	2	3	3	4	3	2	2
Pre P11 02	3	1	2	2	2	1	1	4	2	2
Pre P11 03	3	2	4	2	1	3	2	4	3	2
Pre P11 04	3	3	5	3	4	4	4	4	4	3
Pre P11 05	3	2	4	2	3	4	3	3	4	3
Pre P11 06	4	4	4	3	4	4	4	5	5	4
Pre P11 07	3	4	4	3	2	4	3	4	5	3
Pre P11 08	4	3	5	4	4	3	2	4	4	4
Pre P11 09	3	3	3	3	2	4	2	3	4	3

Pre P11 10	3	3	4	3	2	3	2	4	2	3
Pre P11 11	3	3	2	2	3	3	3	4	4	3
Pre P11 12	4	3	3	3	3	4	3	4	3	3
Pre P11 13	4	3	4	4	3	4	4	4	4	3
Pre P11 14	2	2	1	2	1	2	2	3	3	2
Pre P12 01	4	4	1	3	3	4	4	4	4	4
Pre P12 02	5	5	5	5	3	4	4	3	5	4
Pre P12 03	3	4	5	2	3	3	4	4	5	3
Pre P12 04	4	4	5	3	4	4	4	5	5	4
Pre P12 05	3	4	4	4	4	4	4	3	4	4
Pre P12 06	3	4	4	3	3	4	4	4	5	4
Pre P12 07	3	4	5	4	3	4	4	4	4	4
Pre P12 08	4	4	4	4	3	4	4	4	5	4
Pre P12 09	3	3	2	3	2	2	3	3	2	3
Pre P12 10	4	4	4	3	3	4	4	5	5	4
Pre P12 11	4	4	4	3	4	4	3	5	4	3
Pre P12 12	4	3	4	3	4	4	3	5	5	4
Pre P12 13	4	4	4	4	4	4	4	5	5	4
Pre P12 14	4	4	4	4	3	4	4	4	4	4
Post P01 01	3	3	1	2	3	3	3	3	3	4
Post P01 02	4	3	3	2	3	3	3	4	4	4
Post P01 03	3	2	2	4	2	3	2	2	4	4
Post P01 04	4	4	4	4	4	3	3	4	3	3
Post P01 05	3	4	4	3	4	4	4	4	4	3
Post P01 06	3	4	2	2	3	3	3	4	4	3
Post P01 07	3	2	3	3	3	3	3	4	3	2
Post P01 08	3	2	4	4	4	4	4	4	3	4
Post P01 09	4	4	4	3	4	4	4	5	4	4
Post P01 10	4	5	4	5	4	4	4	4	4	4
Post P01 11	3	4	4	3	3	3	3	4	4	4
Post P01 12	3	4	3	2	3	3	3	3	3	4
Post P01 13	3	4	4	4	4	4	4	4	3	3
Post P01 14	4	2	4	4	3	2	4	3	4	4
Post P02 01	1	2	2	1	1	2	2	3	2	2
Post P02 02	2	2	2	1	3	1	3	3	3	2
Post P02 03	2	3	3	2	3	3	3	5	4	4
Post P02 04	2	4	3	4	3	4	4	4	3	4
Post P02 05	2	1	1	1	1	1	2	2	2	1
Post P02 06	3	1	3	3	4	3	4	4	4	4
Post P02 07	3	3	3	3	2	2	3	4	4	4
Post P02 08	3	3	4	2	4	4	4	4	3	4
Post P02 09	3	2	3	3	3	3	3	4	2	1
Post P02 10	3	2	2	3	3	3	3	3	3	3
Post P02 11	2	2	4	4	4	3	2	2	3	4
Post P02 12	3	3	4	3	3	4	3	3	3	4
Post P02 13	3	3	4	4	4	5	4	3	4	4
Post P02 14	1	1	1	2	1	1	2	3	2	3
Post P03 01	4	2	4	4	3	4	3	4	3	3
Post P03 02	3	1	2	1	1	1	2	2	2	2
Post P03 03	3	4	4	4	3	3	3	5	4	4
Post P03 04	4	3	5	3	3	4	4	4	3	4

Post P03 05	4	4	4	2	3	3	3	3	3	4
Post P03 06	4	3	4	3	4	2	3	4	4	4
Post P03 07	4	4	4	5	3	2	3	4	4	4
Post P03 08	4	4	4	3	4	4	4	4	3	4
Post P03 09	4	3	4	3	3	4	3	4	5	4
Post P03 10	4	3	4	4	2	4	4	3	3	3
Post P03 11	4	4	4	5	4	4	4	4	4	4
Post P03 12	3	3	3	4	2	4	4	4	4	4
Post P03 13	5	4	4	4	3	4	4	3	4	5
Post P03 14	3	2	2	2	2	3	3	2	4	3
Post P04 01	5	5	1	3	5	5	5	2	4	5
Post P04 02	4	4	4	3	3	3	4	5	3	4
Post P04 03	4	5	4	4	3	4	4	3	4	5
Post P04 04	5	5	5	3	4	4	4	4	4	5
Post P04 05	2	3	2	2	4	1	3	3	3	2
Post P04 06	3	3	2	3	2	3	3	3	3	3
Post P04 07	3	3	4	4	4	3	3	4	3	4
Post P04 08	3	4	5	4	4	4	4	4	3	5
Post P04 09	4	2	3	4	3	3	4	5	2	2
Post P04 10	4	4	4	5	4	4	4	4	3	4
Post P04 11	4	4	5	4	4	4	4	5	4	5
Post P04 12	3	4	3	3	3	5	4	3	3	5
Post P04 13	4	4	5	5	3	4	4	4	5	5
Post P04 14	4	4	5	4	3	5	5	4	4	5
Post P05 01	3	3	4	4	2	4	4	3	3	5
Post P05 02	2	5	4	3	4	3	3	3	3	3
Post P05 03	4	3	4	3	3	4	4	5	3	5
Post P05 04	5	4	5	4	4	4	4	5	3	5
Post P05 05	3	4	5	3	2	5	4	5	3	5
Post P05 06	4	2	2	3	4	3	4	4	4	4
Post P05 07	3	4	4	4	4	5	5	4	4	5
Post P05 08	4	3	3	1	4	4	4	3	4	4
Post P05 09	3	2	2	4	3	2	3	4	3	1
Post P05 10	3	3	3	4	1	3	2	3	3	2
Post P05 11	4	4	4	5	4	3	3	4	4	5
Post P05 12	4	3	4	4	4	3	3	3	4	5
Post P05 13	4	4	4	4	4	4	4	4	4	4
Post P05 14	4	3	3	4	3	4	4	3	3	5
Post P06 01	4	4	3	3	3	4	3	4	4	5
Post P06 02	3	4	4	3	3	3	3	4	3	4
Post P06 03	3	3	3	3	3	4	4	5	3	3
Post P06 04	4	4	4	3	4	3	3	4	3	5
Post P06 05	3	4	3	3	3	3	3	3	2	4
Post P06 06	3	4	4	3	3	4	3	3	4	5
Post P06 07	3	2	4	4	3	2	2	3	3	4
Post P06 08	2	3	4	3	4	2	3	4	4	4
Post P06 09	3	2	2	4	2	2	2	3	2	1
Post P06 10	3	3	3	3	3	2	2	4	3	2
Post P06 11	4	3	3	3	4	3	3	4	4	5
Post P06 12	3	4	4	4	3	3	4	3	4	4

Post P06 13	5	4	4	5	4	4	4	4	4	5
Post P06 14	3	2	3	3	3	2	2	3	3	3
Post P07 01	4	4	2	2	2	3	2	2	2	3
Post P07 02	3	4	3	2	2	3	3	2	3	3
Post P07 03	3	4	4	3	4	3	3	5	5	4
Post P07 04	4	3	5	3	3	4	4	5	3	4
Post P07 05	4	4	4	2	3	4	4	3	4	4
Post P07 06	4	3	4	3	3	3	4	4	5	4
Post P07 07	4	3	4	4	2	4	4	4	5	4
Post P07 08	4	4	4	4	3	3	4	3	5	4
Post P07 09	3	2	2	2	2	1	2	3	2	3
Post P07 10	3	3	3	2	2	3	2	3	2	3
Post P07 11	4	3	4	2	2	4	3	2	4	4
Post P07 12	4	4	4	3	3	4	4	4	5	4
Post P07 13	4	4	4	4	3	3	4	4	5	4
Post P07 14	3	2	3	2	2	3	3	2	4	3
Post P08 01	4	5	4	4	3	4	4	4	5	4
Post P08 02	3	4	3	4	3	3	4	3	4	4
Post P08 03	3	5	5	3	4	5	4	5	5	5
Post P08 04	4	4	5	4	4	4	4	5	4	5
Post P08 05	2	4	3	4	2	4	4	4	4	4
Post P08 06	3	4	4	2	3	4	4	3	4	4
Post P08 07	4	4	4	4	4	4	4	4	5	4
Post P08 08	3	3	3	4	2	2	3	4	5	4
Post P08 09	3	2	3	3	2	2	3	2	2	3
Post P08 10	4	4	4	4	4	4	4	3	5	4
Post P08 11	3	3	2	3	1	4	3	4	5	3
Post P08 12	3	3	4	3	2	4	3	3	5	4
Post P08 13	4	4	5	4	3	4	5	4	5	5
Post P08 14	4	2	3	2	2	2	3	3	3	3
Post P09 01	3	4	1	2	1	4	3	3	3	3
Post P09 02	2	4	2	2	2	3	3	3	3	3
Post P09 03	3	4	3	3	2	4	4	2	5	4
Post P09 04	3	2	2	2	2	3	4	4	3	3
Post P09 05	3	3	3	3	2	2	4	3	4	4
Post P09 06	4	3	4	2	2	3	3	3	4	4
Post P09 07	4	3	4	3	2	3	3	4	4	4
Post P09 08	3	3	4	4	3	4	4	3	4	4
Post P09 09	3	2	2	2	1	1	2	2	2	2
Post P09 10	3	2	2	2	2	2	2	2	2	3
Post P09 11	3	2	3	2	2	2	1	3	3	3
Post P09 12	2	2	2	3	2	3	3	4	3	3
Post P09 13	2	3	3	4	3	4	3	3	4	4
Post P09 14	4	2	3	3	2	4	3	4	4	4
Post P10 01	1	1	2	2	1	2	1	1	2	2
Post P10 02	3	3	3	2	3	3	3	4	4	3
Post P10 03	3	3	3	3	2	3	3	2	4	4
Post P10 04	5	4	5	3	4	4	4	5	4	5
Post P10 05	2	4	2	2	2	3	3	2	4	3
Post P10 06	2	4	3	3	3	4	4	4	5	4
Post P10 07	4	4	5	3	4	5	4	4	5	5

Post P10 08	4	4	5	4	4	5	4	4	5	5
Post P10 09	4	4	4	4	3	3	3	3	5	4
Post P10 10	4	4	4	4	2	4	4	3	2	4
Post P10 11	3	3	4	2	3	3	3	4	4	4
Post P10 12	2	2	2	3	3	3	3	2	4	3
Post P10 13	4	3	4	2	3	4	4	5	4	4
Post P10 14	3	3	4	2	2	4	3	2	4	3
Post P11 01	3	2	1	3	1	2	1	3	2	2
Post P11 02	3	1	2	1	2	1	2	3	2	2
Post P11 03	3	3	3	2	3	3	3	4	4	4
Post P11 04	4	4	5	3	3	5	4	4	5	5
Post P11 05	3	4	4	3	1	3	3	2	3	3
Post P11 06	3	4	3	3	4	3	4	4	5	4
Post P11 07	3	4	4	3	3	3	4	4	5	5
Post P11 08	4	3	4	3	3	4	4	4	5	4
Post P11 09	4	3	3	4	1	3	3	3	4	4
Post P11 10	3	3	4	3	2	3	3	4	2	3
Post P11 11	4	2	4	3	3	2	2	4	4	4
Post P11 12	4	4	4	4	3	4	3	3	4	4
Post P11 13	3	3	4	3	2	4	4	4	4	4
Post P11 14	3	2	3	2	2	4	3	4	3	3
Post P12 01	3	5	4	4	3	3	3	1	4	4
Post P12 02	5	5	3	5	3	5	4	4	5	5
Post P12 03	3	4	4	3	2	3	3	4	4	4
Post P12 04	3	2	3	3	3	4	4	4	3	4
Post P12 05	4	4	4	3	3	4	4	3	5	4
Post P12 06	3	3	3	2	3	4	4	3	4	3
Post P12 07	4	3	4	2	3	3	3	3	4	4
Post P12 08	5	4	4	3	4	4	4	4	5	5
Post P12 09	3	2	3	2	2	1	2	3	2	3
Post P12 10	4	3	3	3	3	4	4	4	5	4
Post P12 11	4	4	4	4	3	4	4	4	4	4
Post P12 12	2	4	4	3	3	3	4	3	3	4
Post P12 13	3	3	5	4	3	3	5	4	4	4
Post P12 14	4	3	4	3	4	3	4	4	4	4

Table 39. Detailed scores of the P-group in the read speech tests

Detailed scores of the C-group

Pre C01 01	2	1	1	1	1	1	1	3	2	3
Pre C01 02	4	3	4	3	3	2	3	4	3	3
Pre C01 03	2	2	2	2	1	2	2	4	3	2
Pre C01 04	1	1	2	1	1	2	2	2	1	1
Pre C01 05	1	1	2	1	1	1	1	3	2	2
Pre C01 06	1	1	2	1	2	1	2	2	3	3
Pre C01 07	3	3	4	3	3	4	3	4	4	4
Pre C01 08	3	3	3	3	3	3	3	4	3	5
Pre C01 09	3	2	2	3	2	3	2	4	4	4
Pre C01 10	3	2	3	3	2	3	3	4	3	3
Pre C01 11	3	2	2	3	2	1	1	3	2	3
Pre C01 12	3	2	2	2	1	3	2	4	2	3
Pre C01 13	4	3	4	3	3	3	3	3	4	3
Pre C01 14	3	2	2	2	2	2	2	2	3	2
Pre C02 01	4	4	3	4	3	4	3	3	3	4
Pre C02 02	3	3	4	2	3	3	3	3	3	3
Pre C02 03	3	2	3	3	2	3	3	4	3	3
Pre C02 04	4	4	4	4	3	5	4	3	4	4
Pre C02 05	3	2	4	2	3	2	2	4	4	3
Pre C02 06	4	4	4	3	4	4	3	3	3	4
Pre C02 07	3	2	3	4	3	3	3	3	4	4
Pre C02 08	4	4	3	4	4	3	3	4	3	5
Pre C02 09	3	2	3	3	2	2	2	4	3	2
Pre C02 10	3	2	3	3	2	3	3	4	3	3
Pre C02 11	4	3	3	4	3	3	2	4	3	4
Pre C02 12	4	4	4	5	3	4	3	4	4	4
Pre C02 13	4	3	3	4	3	4	4	4	3	4
Pre C02 14	4	4	4	4	4	4	4	4	3	3
Pre C03 01	3	4	3	4	3	3	3	3	3	2
Pre C03 02	3	2	2	1	3	2	3	2	2	2
Pre C03 03	3	2	2	2	2	3	3	4	3	4
Pre C03 04	3	2	3	4	3	3	4	4	3	4
Pre C03 05	3	1	3	2	2	1	1	2	2	3
Pre C03 06	3	2	1	1	2	1	2	2	3	2
Pre C03 07	4	4	4	5	3	3	3	4	4	4
Pre C03 08	4	3	4	2	3	2	2	4	4	4
Pre C03 09	3	1	1	2	2	1	2	2	2	1
Pre C03 10	3	1	1	2	2	1	2	3	2	2
Pre C03 11	3	1	2	2	2	3	2	3	2	2
Pre C03 12	3	3	2	3	3	2	3	3	3	2
Pre C03 13	3	2	2	2	2	2	2	3	3	3
Pre C03 14	2	1	1	1	1	1	1	1	3	2
Pre C04 01	3	3	2	1	3	2	2	1	3	3
Pre C04 02	4	3	3	1	2	2	3	3	3	3
Pre C04 03	2	2	2	2	1	1	2	3	3	1
Pre C04 04	4	2	1	1	4	3	3	4	3	3

Pre C04 05	2	1	1	3	1	1	2	3	2	2
Pre C04 06	3	3	3	3	4	3	3	4	3	3
Pre C04 07	3	3	4	5	4	3	3	3	4	4
Pre C04 08	3	3	2	2	2	3	3	2	4	4
Pre C04 09	4	3	2	4	3	3	3	3	4	3
Pre C04 10	3	3	2	3	3	2	2	3	2	2
Pre C04 11	3	2	1	1	1	3	2	1	3	3
Pre C04 12	3	2	3	3	2	2	2	2	4	3
Pre C04 13	4	2	2	3	3	4	4	3	3	3
Pre C04 14	4	2	4	3	3	3	3	4	3	3
Pre C05 01	1	1	1	1	1	1	1	2	2	2
Pre C05 02	2	2	2	2	2	1	2	3	5	3
Pre C05 03	3	3	1	3	3	3	3	3	4	4
Pre C05 04	3	2	4	4	2	3	3	3	2	3
Pre C05 05	2	3	2	1	3	1	2	3	3	3
Pre C05 06	4	3	3	3	4	3	3	4	4	3
Pre C05 07	3	4	4	2	4	3	3	3	3	3
Pre C05 08	4	4	4	3	4	3	3	4	4	4
Pre C05 09	3	2	2	2	3	1	2	3	3	2
Pre C05 10	1	3	2	3	3	2	1	2	3	3
Pre C05 11	4	3	4	2	3	3	3	2	3	4
Pre C05 12	3	3	3	2	1	2	2	3	3	2
Pre C05 13	3	4	3	3	3	3	3	2	3	5
Pre C05 14	3	2	2	2	2	1	2	3	3	3
Pre C06 01	3	2	2	1	2	2	2	3	4	3
Pre C06 02	3	2	3	3	4	2	3	3	2	2
Pre C06 03	4	4	4	4	3	4	4	4	4	5
Pre C06 04	5	4	4	4	4	4	3	4	3	3
Pre C06 05	3	3	3	1	1	1	2	2	3	2
Pre C06 06	2	3	3	5	2	4	2	3	2	2
Pre C06 07	4	4	4	4	4	3	3	5	4	4
Pre C06 08	3	4	3	4	5	3	3	4	5	4
Pre C06 09	3	2	4	4	2	3	3	3	2	2
Pre C06 10	3	3	3	4	3	1	2	3	4	2
Pre C06 11	3	2	3	2	2	1	2	3	2	2
Pre C06 12	3	4	3	4	2	4	3	3	4	4
Pre C06 13	4	3	3	3	4	3	3	4	4	3
Pre C06 14	3	2	2	3	3	2	2	3	3	3
Pre C07 01	1	1	1	2	1	1	1	3	1	1
Pre C07 02	2	1	2	1	2	2	2	3	2	2
Pre C07 03	3	2	4	3	2	2	1	4	4	4
Pre C07 04	4	3	4	2	3	3	4	5	2	3
Pre C07 05	3	2	2	2	2	1	2	3	3	2
Pre C07 06	1	2	2	2	2	2	2	1	4	2
Pre C07 07	3	4	5	4	3	4	4	4	5	4
Pre C07 08	3	2	3	4	4	3	2	4	4	3
Pre C07 09	3	2	2	3	1	1	1	3	2	3
Pre C07 10	3	2	3	2	2	2	2	3	2	2
Pre C07 11	2	1	2	2	2	1	1	2	2	2
Pre C07 12	3	2	2	2	1	1	2	4	3	2
Pre C07 13	4	3	4	3	3	3	4	4	5	4

Pre C07 14	3	1	2	2	2	2	2	4	3	3
Pre C08 01	1	2	1	2	1	1	1	2	2	2
Pre C08 02	3	2	3	2	3	2	3	5	3	3
Pre C08 03	3	3	4	3	2	3	3	3	3	3
Pre C08 04	4	3	4	3	3	4	3	3	4	4
Pre C08 05	3	3	5	3	2	4	4	3	4	4
Pre C08 06	4	3	2	3	3	4	4	4	5	4
Pre C08 07	3	3	4	3	3	3	4	4	4	3
Pre C08 08	4	4	4	4	3	3	3	4	5	4
Pre C08 09	3	2	2	2	2	2	3	3	2	3
Pre C08 10	3	3	2	2	3	2	2	3	2	3
Pre C08 11	3	3	3	2	2	4	3	4	4	3
Pre C08 12	3	2	2	2	3	3	3	2	3	3
Pre C08 13	4	3	3	3	3	3	4	5	3	3
Pre C08 14	3	2	2	4	1	3	3	2	4	3
Pre C09 01	3	1	2	3	1	2	3	3	2	3
Pre C09 02	1	2	1	2	1	2	3	3	2	2
Pre C09 03	1	2	1	1	1	2	3	2	3	1
Pre C09 04	2	1	1	1	1	1	1	3	1	1
Pre C09 05	2	1	2	2	1	1	1	2	2	2
Pre C09 06	1	2	2	1	1	3	3	3	3	3
Pre C09 07	3	3	2	2	3	3	3	4	5	3
Pre C09 08	3	2	2	3	2	2	2	3	4	3
Pre C09 09	3	1	2	2	2	1	1	3	2	2
Pre C09 10	3	2	2	2	2	2	2	3	2	2
Pre C09 11	3	3	2	2	2	3	3	2	3	3
Pre C09 12	3	3	3	3	3	3	3	3	4	3
Pre C09 13	2	3	3	2	2	3	3	3	4	3
Pre C09 14	4	2	2	2	2	3	3	4	4	3
Pre C10 01	1	1	1	2	1	1	1	2	1	1
Pre C10 02	3	3	3	2	3	3	3	5	3	3
Pre C10 03	3	2	2	2	3	3	3	2	3	3
Pre C10 04	4	3	4	2	3	3	3	4	3	4
Pre C10 05	2	2	2	1	1	1	1	2	2	2
Pre C10 06	3	3	3	2	3	3	3	2	4	3
Pre C10 07	3	3	4	3	3	4	4	4	4	4
Pre C10 08	4	3	5	4	3	4	3	4	4	4
Pre C10 09	3	1	2	2	1	2	2	3	2	3
Pre C10 10	3	2	3	2	2	2	2	3	2	3
Pre C10 11	4	3	3	2	2	3	2	3	3	3
Pre C10 12	3	2	2	2	2	3	3	3	4	3
Pre C10 13	4	3	4	3	2	3	3	4	4	3
Pre C10 14	3	2	2	2	2	2	3	4	3	2
Pre C11 01	2	2	1	2	2	3	2	3	3	3
Pre C11 02	4	4	3	2	3	4	4	4	5	4
Pre C11 03	3	3	1	2	1	3	3	1	3	3
Pre C11 04	5	4	4	3	3	5	4	2	4	4
Pre C11 05	3	3	3	3	2	4	4	5	4	3
Pre C11 06	4	5	4	3	3	4	4	4	5	4
Pre C11 07	4	3	4	4	3	3	3	4	5	4
Pre C11 08	3	4	4	4	3	4	4	4	4	4

Pre C11 09	3	2	2	2	2	1	2	3	2	3
Pre C11 10	3	3	3	2	3	2	2	3	3	3
Pre C11 11	3	2	4	3	3	4	2	4	4	4
Pre C11 12	4	3	3	3	3	3	3	4	4	3
Pre C11 13	4	2	4	3	3	3	4	4	4	3
Pre C11 14	3	2	3	2	2	2	2	3	4	2
Pre C12 01	2	1	1	1	1	1	1	3	2	2
Pre C12 02	3	3	3	3	3	3	4	3	4	3
Pre C12 03	3	2	3	2	2	3	3	4	4	2
Pre C12 04	3	4	5	4	3	4	4	4	5	4
Pre C12 05	1	1	1	1	1	2	1	3	1	1
Pre C12 06	3	2	2	3	3	2	2	4	4	3
Pre C12 07	2	4	5	2	2	3	3	4	4	4
Pre C12 08	3	3	3	3	3	3	3	3	4	3
Pre C12 09	3	2	2	2	2	1	2	2	2	2
Pre C12 10	3	2	2	2	2	2	1	3	2	2
Pre C12 11	3	2	2	2	3	3	2	4	3	3
Pre C12 12	3	2	3	3	2	3	3	2	3	3
Pre C12 13	3	3	3	3	3	3	3	3	4	3
Pre C12 14	3	2	2	3	2	4	3	4	5	3
Post C01 01	1	1	1	1	2	1	1	2	4	2
Post C01 02	3	2	1	2	2	1	2	1	2	4
Post C01 03	2	2	2	2	1	2	2	2	1	2
Post C01 04	2	1	1	1	1	1	1	2	2	1
Post C01 05	3	1	1	1	1	1	1	1	1	2
Post C01 06	1	2	2	2	1	1	1	4	1	3
Post C01 07	3	3	3	4	4	2	3	3	3	4
Post C01 08	3	3	2	3	3	3	3	2	4	3
Post C01 09	3	1	3	2	3	4	2	3	4	4
Post C01 10	3	2	2	2	2	1	2	3	2	2
Post C01 11	3	2	2	2	2	3	2	2	2	2
Post C01 12	3	2	3	2	3	2	2	4	4	4
Post C01 13	3	2	3	2	3	3	2	3	3	4
Post C01 14	1	2	2	3	2	2	1	2	3	2
Post C02 01	3	4	3	4	3	3	3	3	4	4
Post C02 02	3	3	4	3	3	3	4	3	3	4
Post C02 03	3	2	4	3	2	3	3	3	3	3
Post C02 04	4	4	3	4	3	5	4	4	4	3
Post C02 05	3	3	3	2	3	2	2	3	3	3
Post C02 06	4	4	4	3	4	4	3	3	3	4
Post C02 07	3	3	3	3	3	3	3	3	4	3
Post C02 08	4	4	3	4	4	3	4	4	3	3
Post C02 09	2	2	3	3	3	2	2	3	3	2
Post C02 10	3	2	3	3	2	3	3	3	3	3
Post C02 11	4	3	3	3	3	3	3	4	3	3
Post C02 12	4	4	4	4	3	4	3	4	4	3
Post C02 13	3	3	3	4	3	4	3	4	3	4
Post C02 14	3	4	4	4	4	3	4	4	3	4
Post C03 01	2	1	1	1	1	1	1	2	3	1
Post C03 02	3	2	2	1	1	1	2	1	2	3
Post C03 03	1	2	1	2	3	2	3	2	3	3

Post C03 04	3	2	2	1	2	2	3	1	3	3
Post C03 05	3	3	2	3	2	3	3	2	3	4
Post C03 06	3	2	2	2	3	2	2	3	3	3
Post C03 07	4	4	4	4	3	4	3	3	4	4
Post C03 08	3	3	3	2	3	2	3	3	4	4
Post C03 09	2	1	1	2	2	2	2	1	2	2
Post C03 10	3	1	2	3	3	2	2	2	3	3
Post C03 11	3	2	3	3	2	2	2	4	4	3
Post C03 12	3	2	3	3	3	2	2	3	3	3
Post C03 13	3	2	3	3	3	3	3	3	3	4
Post C03 14	3	1	2	2	1	1	2	2	3	1
Post C04 01	3	3	1	2	3	3	3	3	3	3
Post C04 02	4	2	2	2	2	1	2	3	3	3
Post C04 03	1	1	1	1	2	1	2	1	2	3
Post C04 04	4	3	2	3	2	2	3	4	3	3
Post C04 05	2	3	3	1	2	1	1	3	2	2
Post C04 06	4	3	2	4	4	3	3	4	4	3
Post C04 07	3	3	3	1	3	2	2	4	4	3
Post C04 08	2	2	1	1	2	1	3	1	2	3
Post C04 09	3	3	1	2	2	3	2	4	3	3
Post C04 10	1	1	2	1	2	1	2	3	2	2
Post C04 11	2	1	1	1	1	1	1	2	2	2
Post C04 12	3	2	2	2	2	2	2	2	3	3
Post C04 13	3	3	1	2	3	3	3	3	3	3
Post C04 14	3	2	1	2	2	2	2	3	3	2
Post C05 01	1	1	1	1	1	1	1	3	2	2
Post C05 02	4	3	3	4	4	4	4	2	3	4
Post C05 03	4	3	4	4	3	2	2	4	3	4
Post C05 04	4	3	4	3	4	4	3	4	3	5
Post C05 05	3	2	3	2	4	4	3	3	3	3
Post C05 06	3	2	3	4	4	3	3	4	4	4
Post C05 07	4	3	4	5	4	4	4	3	4	4
Post C05 08	3	3	3	3	4	3	3	3	3	3
Post C05 09	3	2	2	4	3	3	3	4	2	2
Post C05 10	3	3	3	4	2	2	2	3	3	2
Post C05 11	3	2	2	2	3	2	2	3	2	2
Post C05 12	3	2	3	3	2	2	2	3	4	5
Post C05 13	3	4	4	5	3	3	4	4	4	4
Post C05 14	3	2	3	4	3	4	3	3	4	4
Post C06 01	2	1	1	1	1	1	2	2	2	2
Post C06 02	4	3	4	3	4	3	3	2	3	3
Post C06 03	2	3	3	3	2	3	2	1	3	2
Post C06 04	3	2	2	2	2	2	3	2	3	4
Post C06 05	1	2	2	2	2	2	3	3	3	2
Post C06 06	2	2	1	1	1	2	3	2	3	3
Post C06 07	3	3	4	3	3	3	3	2	4	3
Post C06 08	4	3	3	2	3	2	2	3	3	3
Post C06 09	3	1	2	4	3	2	2	2	2	1
Post C06 10	3	3	1	2	2	2	2	2	3	2
Post C06 11	3	2	2	2	3	1	1	3	3	4
Post C06 12	3	3	1	3	3	3	3	3	4	3

Post C06 13	4	3	3	3	3	3	3	2	3	4
Post C06 14	2	1	1	1	2	1	1	1	2	2
Post C07 01	1	1	1	1	1	2	1	1	2	1
Post C07 02	2	1	3	2	3	2	2	4	3	2
Post C07 03	1	2	4	2	1	2	2	3	2	2
Post C07 04	3	2	3	3	2	4	4	4	2	3
Post C07 05	4	4	4	2	3	4	3	2	3	4
Post C07 06	1	1	1	1	2	1	2	1	3	2
Post C07 07	1	3	2	2	2	1	3	3	2	2
Post C07 08	3	3	2	2	3	3	3	3	5	3
Post C07 09	3	3	3	2	2	3	2	3	4	3
Post C07 10	3	2	2	2	2	1	1	2	2	3
Post C07 11	2	2	2	2	1	2	2	2	3	2
Post C07 12	2	1	1	2	2	1	1	1	2	1
Post C07 13	4	3	3	3	3	3	4	4	4	3
Post C07 14	2	1	1	1	1	2	1	1	3	2
Post C08 01	1	1	2	2	1	1	1	2	2	1
Post C08 02	4	3	3	3	3	2	3	4	3	3
Post C08 03	2	2	3	1	2	3	3	4	4	2
Post C08 04	4	2	3	3	3	4	4	4	4	4
Post C08 05	4	4	4	3	3	5	4	3	5	4
Post C08 06	3	3	2	2	2	3	4	2	4	3
Post C08 07	3	3	2	4	3	3	3	3	5	3
Post C08 08	4	4	5	4	3	4	3	4	5	4
Post C08 09	3	2	2	2	1	1	3	3	2	2
Post C08 10	3	3	3	3	2	2	2	2	2	3
Post C08 11	4	3	4	3	2	4	4	3	3	3
Post C08 12	4	3	4	3	3	3	3	4	4	3
Post C08 13	2	1	3	2	1	4	3	3	4	3
Post C08 14	4	3	3	2	2	3	3	3	3	3
Post C09 01	3	3	3	2	1	2	1	2	2	3
Post C09 02	3	3	4	2	3	3	3	5	3	3
Post C09 03	3	3	1	3	3	3	3	4	4	3
Post C09 04	3	3	3	2	2	3	3	4	4	3
Post C09 05	2	2	1	3	2	1	2	4	2	2
Post C09 06	2	2	1	3	2	2	3	3	3	3
Post C09 07	4	4	4	4	4	3	3	4	4	4
Post C09 08	3	2	2	3	3	3	3	3	4	3
Post C09 09	3	2	2	2	2	1	2	3	2	2
Post C09 10	3	2	3	2	2	3	3	3	2	2
Post C09 11	3	2	3	2	2	3	3	3	3	3
Post C09 12	3	3	2	2	3	3	2	3	3	3
Post C09 13	3	3	4	3	3	3	3	3	5	3
Post C09 14	3	3	2	2	2	2	3	3	4	3
Post C10 01	1	3	2	1	1	1	1	3	2	2
Post C10 02	3	3	2	2	3	3	3	4	3	3
Post C10 03	3	3	4	3	2	3	4	4	3	3
Post C10 04	3	3	3	2	2	4	3	3	3	3
Post C10 05	3	3	4	4	2	3	4	4	4	3
Post C10 06	3	4	3	2	3	3	4	3	5	4
Post C10 07	3	4	5	4	3	4	4	3	5	3

Post C10 08	3	4	5	4	3	4	3	4	4	4
Post C10 09	3	2	2	2	2	2	2	3	2	3
Post C10 10	3	2	3	3	3	2	2	3	2	2
Post C10 11	3	4	4	3	3	3	3	3	4	3
Post C10 12	4	3	3	2	2	4	3	5	4	4
Post C10 13	4	3	4	3	3	3	4	5	4	4
Post C10 14	4	2	3	2	2	2	3	4	3	3
Post C11 01	1	1	1	1	2	1	1	3	1	1
Post C11 02	4	4	4	3	3	4	4	4	5	4
Post C11 03	4	3	3	2	2	3	3	4	4	3
Post C11 04	4	3	5	4	3	4	4	5	4	4
Post C11 05	3	3	4	4	3	4	4	4	5	3
Post C11 06	5	4	3	2	3	4	4	4	5	4
Post C11 07	4	4	4	4	3	3	4	4	4	4
Post C11 08	4	4	5	4	3	4	4	4	5	5
Post C11 09	3	3	2	2	2	2	3	3	2	2
Post C11 10	3	3	3	3	2	2	2	3	2	2
Post C11 11	3	3	4	3	4	3	2	4	4	3
Post C11 12	3	4	3	4	3	4	3	3	4	3
Post C11 13	4	3	3	3	3	4	4	4	5	4
Post C11 14	4	2	2	2	2	3	3	4	3	2
Post C12 01	2	1	2	1	1	2	1	2	2	1
Post C12 02	3	3	4	3	3	3	3	3	4	4
Post C12 03	2	2	3	2	3	3	2	2	4	2
Post C12 04	4	3	5	4	3	4	5	3	5	4
Post C12 05	1	2	2	1	1	2	1	2	1	1
Post C12 06	2	2	2	2	3	2	2	3	4	3
Post C12 07	3	2	5	2	3	3	3	4	4	4
Post C12 08	3	3	3	4	3	3	3	3	4	3
Post C12 09	3	2	3	2	2	1	1	2	2	2
Post C12 10	2	2	2	3	3	2	1	2	2	2
Post C12 11	3	2	2	2	3	3	2	4	3	3
Post C12 12	2	2	2	3	3	3	2	2	3	3
Post C12 13	3	3	2	3	3	4	4	3	3	3
Post C12 14	2	2	3	3	2	3	3	3	5	3

Table 40. Detailed scores of the C-group in the read speech tests

Spontaneous speech task

General means

Pre means		*Post means*	
Mean S01	3.2	Mean S01	2.9
Mean S02	2.7	Mean S02	3.3
Mean S03	2.8	Mean S03	3.4
Mean S04	2.5	Mean S04	2.9
Mean S05	2.8	Mean S05	3.2
Mean S06	3.5	Mean S06	3
Mean S07	3.9	Mean S07	4
Mean S08	3.4	Mean S08	2.7
Mean S09	3.4	Mean S09	4.1
Mean S10	3.4	Mean S10	3.8
Mean S11	2.4	Mean S11	3.2
Mean S12	3.4	Mean S12	3.1
Mean	3.12	Mean	3.3

Table 41. Mean scores of the S-group in the spontaneous speech tests

Pre means		*Post means*	
Mean P01	4.3	Mean P01	4.3
Mean P02	3.3	Mean P02	3.4
Mean P03	3.4	Mean P03	3.1
Mean P04	4	Mean P04	4.2
Mean P05	3.5	Mean P05	3.5
Mean P06	3.5	Mean P06	2.9
Mean P07	3.6	Mean P07	3.7
Mean P08	3.6	Mean P08	4
Mean P09	2.8	Mean P09	2.6
Mean P10	3.9	Mean P10	3.8
Mean P11	2.9	Mean P11	3.3
Mean P12	2.9	Mean P12	4
Mean	3.48	Mean P01	3.57

Table 42. Mean scores of the P-group in the spontaneous speech tests

Pre means		*Post means*	
Mean C01	3.3	Mean C01	2.9
Mean C02	3.9	Mean C02	3.7
Mean C03	2.8	Mean C03	2.6
Mean C04	2.9	Mean C04	2.6
Mean C05	2.6	Mean C05	3
Mean C06	3.5	Mean C06	2.7
Mean C07	3.5	Mean C07	2.7
Mean C08	3.5	Mean C08	3.4
Mean C09	2.6	Mean C09	2.7
Mean C10	2.7	Mean C10	2.7
Mean C11	3	Mean C11	3.5
Mean C12	2.8	Mean C12	2.5
Mean	3.09		2.92

Table 43. Mean scores of the C-group in the spontaneous speech tests

Detailed scores of the S-group

Time Partic	*Rater 1*	*Rater 2*	*Rater 3*	*Rater 4*	*Rater 5*	*Rater 6*	*Rater 7*	*Rater 8*	*Rater 9*	*Rater 10*
Pre S01	4	4	3	3	4	2	2	3	3	4
Pre S02	3	3	1	2	3	3	3	3	3	3
Pre S03	3	4	1	3	3	2	2	3	4	3
Pre S04	3	2	2	3	2	2	3	2	3	3
Pre S05	3	2	2	3	3	3	3	3	3	3
Pre S06	4	3	3	4	3	3	3	4	4	4
Pre S07	4	3	4	4	4	4	3	4	5	4
Pre S08	3	3	4	4	3	3	3	4	4	3
Pre S09	4	3	3	4	3	3	3	4	4	3
Pre S10	4	4	2	3	4	3	3	3	4	4
Pre S11	3	2	2	2	3	2	2	2	3	3
Pre S12	4	4	2	3	3	3	3	4	5	3
Post S01	3	3	3	2	3	2	2	3	3	5
Post S02	4	4	2	3	3	3	3	4	3	4
Post S03	3	3	2	3	4	4	3	3	4	5
Post S04	3	2	2	3	3	3	3	3	3	4
Post S05	3	3	3	3	4	3	3	3	4	3
Post S06	3	3	3	2	3	3	3	3	4	3
Post S07	4	4	4	4	4	4	4	3	5	4
Post S08	3	3	2	2	3	2	3	3	3	3
Post S09	4	4	4	4	4	4	4	4	5	4
Post S10	4	3	3	3	4	4	4	4	5	4
Post S11	3	2	2	3	4	3	3	5	4	3
Post S12	3	3	2	3	3	4	3	3	4	3

Table 44. Detailed scores of the S-group in the spontaneous speech tests

Detailed scores of the P-group

Pre P01	4	4	4	4	5	5	3	4	5	5
Pre P02	3	5	2	3	4	2	2	4	4	4
Pre P03	3	4	3	3	3	3	3	4	4	4
Pre P04	5	3	4	4	4	4	3	4	5	4
Pre P05	4	3	4	3	4	3	3	3	4	4
Pre P06	4	4	2	4	3	3	3	4	3	5
Pre P07	3	4	3	3	5	3	3	4	4	4
Pre P08	4	4	4	3	3	4	4	3	4	3
Pre P09	3	3	2	2	3	3	3	2	4	3
Pre P10	4	4	3	3	5	4	4	4	4	4
Pre P11	3	3	2	3	3	3	4	2	3	3
Pre P12	3	3	3	3	3	2	2	3	4	3
Post P01	3	5	4	4	5	4	4	4	5	5
Post P02	3	5	3	3	4	2	2	4	4	4
Post P03	3	4	4	2	3	2	2	4	4	3
Post P04	4	4	5	4	4	4	3	4	5	5
Post P05	4	3	3	3	4	3	3	4	4	4
Post P06	3	3	2	3	3	2	2	3	4	4
Post P07	4	4	3	3	4	4	4	3	4	4
Post P08	4	4	3	4	4	4	4	4	5	4
Post P09	3	2	2	2	3	2	2	3	4	3
Post P10	4	4	3	4	4	3	4	3	5	4
Post P11	4	3	3	3	3	3	3	3	4	4
Post P12	4	3	4	4	5	3	4	3	5	5

Table 45. Detailed scores of the P-group in the spontaneous speech tests

Detailed scores of the C-group

Pre C01	3	3	3	4	3	4	3	3	3	4
Pre C02	4	3	3	5	4	4	3	4	4	5
Pre C03	3	2	3	2	3	3	3	3	3	3
Pre C04	4	3	2	3	2	3	3	2	3	4
Pre C05	3	2	3	3	2	2	2	2	3	4
Pre C06	4	3	5	3	4	2	3	3	4	4
Pre C07	4	3	3	3	4	3	3	4	4	4
Pre C08	3	4	4	2	4	3	3	4	4	4
Pre C09	3	2	2	2	3	2	3	2	4	3
Pre C10	3	2	3	2	3	2	3	3	3	3
Pre C11	3	2	3	3	4	2	2	3	4	4
Pre C12	3	3	2	2	3	2	3	3	4	3
Post C01	3	4	2	2	3	2	2	3	3	5
Post C02	4	3	4	4	4	4	3	4	3	4
Post C03	3	3	2	2	2	3	2	3	3	3
Post C04	3	3	2	2	2	2	2	3	3	4
Post C05	4	2	2	4	3	3	3	2	3	4
Post C06	3	3	2	2	3	2	2	2	4	4
Post C07	3	2	3	2	3	2	2	3	4	3
Post C08	3	4	4	3	3	3	3	4	4	3
Post C09	3	2	2	2	2	3	3	3	4	3
Post C10	3	2	2	3	3	2	3	2	4	3
Post C11	3	3	4	3	4	3	3	4	4	4
Post C12	3	3	2	3	2	2	2	3	2	3

Table 46. Detailed scores of the C-group in the spontaneous speech tests

APPENDIX E: DETAILED SCORES OF THE PERCEPTION TASKS

Cloze test

General means

Pre means		*Post means*	
Mean S01	2.32	Mean S01	2.95
Mean S02	2.58	Mean S02	3.26
Mean S03	3.63	Mean S03	3.84
Mean S04	3.11	Mean S04	3.32
Mean S05	3.47	Mean S05	3.68
Mean S06	3.42	Mean S06	3.53
Mean S07	3.74	Mean S07	3.79
Mean S08	3.42	Mean S08	3.47
Mean S09	3.26	Mean S09	3.53
Mean S10	3.42	Mean S10	3.53
Mean S11	3.05	Mean S11	3.37
Mean S12	3.21	Mean S12	3.74
Mean	3.22	Mean	3.5

Table 47. Mean scores of the S-group in the cloze tests

	Pre		*Post*	
	Incorrect (1-3)	*Correct (4)*	*Incorrect (1-3)*	*Correct (4)*
S01	14	5	11	8
S02	11	8	7	12
S03	6	13	3	16
S04	11	8	8	11
S05	6	13	5	14
S06	6	13	7	12
S07	4	15	3	16
S08	8	11	6	13
S09	10	9	6	13
S10	6	13	7	12
S11	10	9	8	11
S12	10	9	4	15
Total	102	126	75	153

Table 48. Number of incorrect and correct answers of the S-group in the close tests

Pre means		*Post means*	
Mean P01	3.42	Mean P01	3.68
Mean P02	2.95	Mean P02	3.37
Mean P03	3.53	Mean P03	3.68
Mean P04	3.89	Mean P04	3.89
Mean P05	3.47	Mean P05	3.58
Mean P06	3.05	Mean P06	3.58
Mean P07	3.47	Mean P07	3.63
Mean P08	3.42	Mean P08	3.74
Mean P09	3.32	Mean P09	3.63
Mean P10	3.21	Mean P10	3.63
Mean P11	2.74	Mean P11	3.26
Mean P12	3.16	Mean P12	3.63
Mean	3.3	Mean	3.61

Table 49. Mean scores of the P-group in the cloze tests

	Pre		*Post*	
	Incorrect (1-3)	*Correct (4)*	*Incorrect (1-3)*	*Correct (4)*
P01	7	12	5	14
P02	13	6	9	10
P03	7	12	5	14
P04	2	17	2	17
P05	6	13	5	14
P06	11	8	6	13
P07	7	12	5	14
P08	8	11	5	14
P09	7	12	5	14
P10	9	10	5	14
P11	14	5	10	9
P12	11	8	5	14
Total	102	126	67	161

Table 50. Number of incorrect and correct answers of the P-group in the cloze tests

Pre means		*Post means*	
Mean C01	2.89	Mean C01	3.37
Mean C02	3.58	Mean C02	3.74
Mean C03	2.89	Mean C03	3.42
Mean C04	3	Mean C04	3.16
Mean C05	2.95	Mean C05	3.21
Mean C06	3.42	Mean C06	3.47
Mean C07	3.32	Mean C07	3.74
Mean C08	3.11	Mean C08	3.37
Mean C09	2.95	Mean C09	3.21
Mean C10	3.68	Mean C10	3.58
Mean C11	3.21	Mean C11	3.26
Mean C12	3.11	Mean C12	3
Mean	3.18	Mean C01	3.38

Table 51. Mean scores of the C-group in the cloze tests

	Pre		*Post*	
	Incorrect (1-3)	*Correct (4)*	*Incorrect (1-3)*	*Correct (4)*
C01	9	10	7	12
C02	5	14	3	16
C03	10	9	8	11
C04	7	12	8	11
C05	10	9	8	11
C06	7	12	7	12
C07	9	10	5	14
C08	8	11	7	12
C09	9	10	10	9
C10	5	14	6	13
C11	8	11	9	10
C12	10	9	12	7
Total	97	131	90	138

Table 52. Number of incorrect and correct answers of the C-group in the cloze tests

Detailed scores of the S-group

Participant	*Group*	*Item*	*Pre-score*	*Post-score*
S01	S	*other*	4	4
	S	*seeking*	1	2
	S	*corruption*	4	4
	S	*contemporary*	2	3
	S	*European*	1	4
	S	*firstly*	1	4
	S	*American*	3	4
	S	*language*	4	4
	S	*half-hour*	1	2
	S	*advertisements*	3	3
	S	*practice*	3	3
	S	*incomprehensibly*	1	2
	S	*favourites*	4	4
	S	*living*	4	1
	S	*original*	1	2
	S	*manner*	1	2
	S	*character*	1	1
	S	*stations*	3	3
	S	*presided*	2	4
S02	S	*other*	4	4
	S	*seeking*	2	2
	S	*corruption*	4	4
	S	*contemporary*	2	3
	S	*European*	4	4
	S	*firstly*	1	4
	S	*American*	3	4
	S	*language*	4	4
	S	*half-hour*	2	2
	S	*advertisements*	1	3
	S	*practice*	4	4
	S	*incomprehensibly*	1	1
	S	*favourites*	4	4
	S	*living*	4	4
	S	*original*	2	2
	S	*manner*	1	4
	S	*character*	1	1
	S	*stations*	4	4
	S	*presided*	1	4
S03	S	*other*	4	4
	S	*seeking*	4	4
	S	*corruption*	4	4
	S	*contemporary*	2	3
	S	*European*	3	4
	S	*firstly*	4	4
	S	*American*	4	4
	S	*language*	4	4

	S	*half-hour*	4	4
	S	*advertisements*	3	3
	S	*practice*	4	4
	S	*incomprehensibly*	3	3
	S	*favourites*	3	4
	S	*living*	4	4
	S	*original*	4	4
	S	*manner*	4	4
	S	*character*	4	4
	S	*stations*	3	4
	S	*presided*	4	4
S04	S	*other*	4	4
	S	*seeking*	2	2
	S	*corruption*	4	4
	S	*contemporary*	2	2
	S	*European*	4	4
	S	*firstly*	1	4
	S	*American*	4	4
	S	*language*	3	4
	S	*half-hour*	2	3
	S	*advertisements*	3	3
	S	*practice*	4	4
	S	*incomprehensibly*	3	2
	S	*favourites*	4	1
	S	*living*	4	4
	S	*original*	4	4
	S	*manner*	3	4
	S	*character*	3	3
	S	*stations*	3	3
	S	*presided*	2	4
S05	S	*other*	4	4
	S	*seeking*	2	2
	S	*corruption*	4	4
	S	*contemporary*	2	3
	S	*European*	4	4
	S	*firstly*	4	4
	S	*American*	4	4
	S	*language*	3	3
	S	*half-hour*	2	4
	S	*advertisements*	2	3
	S	*practice*	4	4
	S	*incomprehensibly*	4	4
	S	*favourites*	4	4
	S	*living*	4	4
	S	*original*	4	4
	S	*manner*	3	3
	S	*character*	4	4
	S	*stations*	4	4
	S	*presided*	4	4

S06	S	*other*	4	4
	S	*seeking*	2	2
	S	*corruption*	4	4
	S	*contemporary*	2	3
	S	*European*	4	4
	S	*firstly*	4	4
	S	*American*	4	4
	S	*language*	4	4
	S	*half-hour*	3	3
	S	*advertisements*	3	3
	S	*practice*	4	4
	S	*incomprehensibly*	2	2
	S	*favourites*	4	3
	S	*living*	4	4
	S	*original*	4	4
	S	*manner*	4	4
	S	*character*	4	4
	S	*stations*	4	3
	S	*presided*	1	4
S07	S	*other*	4	4
	S	*seeking*	4	4
	S	*corruption*	4	4
	S	*contemporary*	3	3
	S	*European*	4	4
	S	*firstly*	4	4
	S	*American*	4	4
	S	*language*	4	4
	S	*half-hour*	4	4
	S	*advertisements*	3	3
	S	*practice*	3	4
	S	*incomprehensibly*	4	4
	S	*favourites*	4	4
	S	*living*	4	4
	S	*original*	4	4
	S	*manner*	4	4
	S	*character*	4	4
	S	*stations*	4	4
	S	*presided*	2	2
S08	S	*other*	4	4
	S	*seeking*	2	2
	S	*corruption*	4	4
	S	*contemporary*	2	2
	S	*European*	4	4
	S	*firstly*	4	4
	S	*American*	4	4
	S	*language*	4	4
	S	*half-hour*	3	4
	S	*advertisements*	3	3
	S	*practice*	4	4
	S	*incomprehensibly*	2	3
	S	*favourites*	4	4

	S	*living*	4	4
	S	*original*	4	4
	S	*manner*	3	3
	S	*character*	3	1
	S	*stations*	3	4
	S	*presided*	4	4
S09	S	*other*	4	4
	S	*seeking*	4	2
	S	*corruption*	3	4
	S	*contemporary*	3	3
	S	*European*	4	4
	S	*firstly*	4	4
	S	*American*	4	4
	S	*language*	4	4
	S	*half-hour*	2	4
	S	*advertisements*	3	3
	S	*practice*	3	4
	S	*incomprehensibly*	2	2
	S	*favourites*	4	4
	S	*living*	4	4
	S	*original*	4	4
	S	*manner*	3	4
	S	*character*	3	4
	S	*stations*	3	3
	S	*presided*	1	2
S10	S	*other*	4	4
	S	*seeking*	2	2
	S	*corruption*	4	4
	S	*contemporary*	1	3
	S	*European*	4	4
	S	*firstly*	4	4
	S	*American*	4	4
	S	*language*	4	4
	S	*half-hour*	4	4
	S	*advertisements*	3	3
	S	*practice*	4	4
	S	*incomprehensibly*	2	3
	S	*favourites*	4	4
	S	*living*	4	4
	S	*original*	4	4
	S	*manner*	4	4
	S	*character*	3	3
	S	*stations*	4	3
	S	*presided*	2	2
S11	S	*other*	4	4
	S	*seeking*	2	2
	S	*corruption*	4	2
	S	*contemporary*	2	2
	S	*European*	3	4
	S	*firstly*	4	4
	S	*American*	4	3

	S	*language*	4	4
	S	*half-hour*	2	2
	S	*advertisements*	2	4
	S	*practice*	1	4
	S	*incomprehensibly*	2	3
	S	*favourites*	3	4
	S	*living*	4	4
	S	*original*	4	4
	S	*manner*	4	4
	S	*character*	4	4
	S	*stations*	3	3
	S	*presided*	2	3
S12	S	*other*	4	4
	S	*seeking*	2	2
	S	*corruption*	3	4
	S	*contemporary*	3	3
	S	*European*	4	4
	S	*firstly*	4	4
	S	*American*	4	4
	S	*language*	4	4
	S	*half-hour*	1	4
	S	*advertisements*	3	4
	S	*practice*	3	4
	S	*incomprehensibly*	3	3
	S	*favourites*	4	4
	S	*living*	4	4
	S	*original*	4	4
	S	*manner*	4	4
	S	*character*	3	4
	S	*stations*	3	3
	S	*presided*	1	4

Table 53. Detailed scores of the S-group in the cloze tests

Detailed scores of the P-group

P01	P	*other*	4	4
	P	*seeking*	2	2
	P	*corruption*	4	4
	P	*contemporary*	2	3
	P	*European*	3	4
	P	*firstly*	4	4
	P	*American*	4	4
	P	*language*	4	4
	P	*half-hour*	1	4
	P	*advertisements*	3	3
	P	*practice*	4	4
	P	*incomprehensibly*	3	3
	P	*favourites*	4	4
	P	*living*	4	4
	P	*original*	4	4
	P	*manner*	4	4
	P	*character*	4	4
	P	*stations*	3	3
	P	*presided*	4	4
P02	P	*other*	4	4
	P	*seeking*	2	3
	P	*corruption*	4	4
	P	*contemporary*	2	3
	P	*European*	2	4
	P	*firstly*	4	4
	P	*American*	4	4
	P	*language*	4	4
	P	*half-hour*	3	3
	P	*advertisements*	3	3
	P	*practice*	4	4
	P	*incomprehensibly*	2	2
	P	*favourites*	3	3
	P	*living*	2	4
	P	*original*	2	2
	P	*manner*	3	4
	P	*character*	3	4
	P	*stations*	3	3
	P	*presided*	2	2
P03	P	*other*	4	4
	P	*seeking*	2	2
	P	*corruption*	4	4
	P	*contemporary*	3	3
	P	*European*	4	4
	P	*firstly*	4	4
	P	*American*	4	4
	P	*language*	4	4
	P	*half-hour*	2	4
	P	*advertisements*	3	3

	P	*practice*	4	4
	P	*incomprehensibly*	4	4
	P	*favourites*	4	3
	P	*living*	4	4
	P	*original*	4	4
	P	*manner*	4	4
	P	*character*	3	3
	P	*stations*	3	4
	P	*presided*	3	4
P04	P	*other*	4	4
	P	*seeking*	4	4
	P	*corruption*	4	4
	P	*contemporary*	4	4
	P	*European*	4	4
	P	*firstly*	4	4
	P	*American*	4	4
	P	*language*	4	4
	P	*half-hour*	4	4
	P	*advertisements*	3	3
	P	*practice*	4	4
	P	*incomprehensibly*	3	3
	P	*favourites*	4	4
	P	*living*	4	4
	P	*original*	4	4
	P	*manner*	4	4
	P	*character*	4	4
	P	*stations*	4	4
	P	*presided*	4	4
P05	P	*other*	4	4
	P	*seeking*	2	2
	P	*corruption*	4	4
	P	*contemporary*	2	2
	P	*European*	4	4
	P	*firstly*	4	4
	P	*American*	4	4
	P	*language*	4	4
	P	*half-hour*	2	2
	P	*advertisements*	3	3
	P	*practice*	4	4
	P	*incomprehensibly*	2	3
	P	*favourites*	4	4
	P	*living*	4	4
	P	*original*	4	4
	P	*manner*	4	4
	P	*character*	4	4
	P	*stations*	4	4
	P	*presided*	3	4
P06	P	*other*	4	4
	P	*seeking*	2	2
	P	*corruption*	3	4
	P	*contemporary*	3	3

	P	*European*	3	4
	P	*firstly*	1	4
	P	*American*	4	4
	P	*language*	4	4
	P	*half-hour*	2	4
	P	*advertisements*	3	3
	P	*practice*	4	4
	P	*incomprehensibly*	2	2
	P	*favourites*	4	4
	P	*living*	4	4
	P	*original*	4	4
	P	*manner*	1	4
	P	*character*	3	3
	P	*stations*	3	3
	P	*presided*	4	4
P07	P	*other*	4	4
	P	*seeking*	2	2
	P	*corruption*	4	4
	P	*contemporary*	3	3
	P	*European*	4	4
	P	*firstly*	4	4
	P	*American*	4	4
	P	*language*	4	4
	P	*half-hour*	2	2
	P	*advertisements*	3	3
	P	*practice*	4	4
	P	*incomprehensibly*	2	4
	P	*favourites*	4	4
	P	*living*	4	4
	P	*original*	4	4
	P	*manner*	3	4
	P	*character*	3	4
	P	*stations*	4	3
	P	*presided*	4	4
P08	P	*other*	4	4
	P	*seeking*	1	4
	P	*corruption*	3	4
	P	*contemporary*	3	4
	P	*European*	4	4
	P	*firstly*	4	4
	P	*American*	4	4
	P	*language*	4	4
	P	*half-hour*	4	3
	P	*advertisements*	3	3
	P	*practice*	4	4
	P	*incomprehensibly*	2	3
	P	*favourites*	4	4
	P	*living*	4	4
	P	*original*	4	4
	P	*manner*	3	3
	P	*character*	3	4

	P	*stations*	4	4
	P	*presided*	3	3
P09	P	*other*	4	4
	P	*seeking*	2	2
	P	*corruption*	4	4
	P	*contemporary*	2	3
	P	*European*	4	4
	P	*firstly*	4	4
	P	*American*	4	4
	P	*language*	4	4
	P	*half-hour*	1	3
	P	*advertisements*	3	3
	P	*practice*	1	4
	P	*incomprehensibly*	3	4
	P	*favourites*	4	4
	P	*living*	4	4
	P	*original*	4	4
	P	*manner*	4	4
	P	*character*	4	4
	P	*stations*	3	4
	P	*presided*	4	2
P10	P	*other*	4	4
	P	*seeking*	3	3
	P	*corruption*	4	4
	P	*contemporary*	3	4
	P	*European*	1	4
	P	*firstly*	4	4
	P	*American*	4	4
	P	*language*	4	4
	P	*half-hour*	4	3
	P	*advertisements*	3	3
	P	*practice*	4	4
	P	*incomprehensibly*	2	4
	P	*favourites*	3	4
	P	*living*	4	4
	P	*original*	2	2
	P	*manner*	4	4
	P	*character*	2	4
	P	*stations*	4	4
	P	*presided*	2	2
P11	P	*other*	4	4
	P	*seeking*	1	1
	P	*corruption*	3	3
	P	*contemporary*	2	3
	P	*European*	1	4
	P	*firstly*	4	4
	P	*American*	4	4
	P	*language*	4	4
	P	*half-hour*	2	2
	P	*advertisements*	3	3
	P	*practice*	4	4

	P	*incomprehensibly*	2	4
	P	*favourites*	3	3
	P	*living*	2	4
	P	*original*	2	2
	P	*manner*	3	3
	P	*character*	3	3
	P	*stations*	3	3
	P	*presided*	2	4
P12	P	*other*	4	4
	P	*seeking*	2	4
	P	*corruption*	4	4
	P	*contemporary*	2	2
	P	*European*	4	4
	P	*firstly*	4	4
	P	*American*	3	4
	P	*language*	4	4
	P	*half-hour*	2	2
	P	*advertisements*	3	3
	P	*practice*	4	4
	P	*incomprehensibly*	2	3
	P	*favourites*	3	4
	P	*living*	4	4
	P	*original*	4	4
	P	*manner*	3	3
	P	*character*	3	4
	P	*stations*	3	4
	P	*presided*	2	4

Table 54. Detailed scores of the P-group in the cloze tests

Detailed scores of the C-group

C01	C	*other*	4	2
	C	*seeking*	4	4
	C	*corruption*	4	4
	C	*contemporary*	1	3
	C	*European*	4	4
	C	*firstly*	4	4
	C	*American*	4	4
	C	*language*	4	4
	C	*half-hour*	2	2
	C	*advertisements*	3	1
	C	*practice*	1	4
	C	*incomprehensibly*	1	2
	C	*favourites*	4	4
	C	*living*	1	4
	C	*original*	2	4
	C	*manner*	1	3
	C	*character*	4	4
	C	*stations*	3	3
	C	*presided*	4	4
C02	C	*other*	4	4
	C	*seeking*	2	4
	C	*corruption*	4	4
	C	*contemporary*	4	4
	C	*European*	4	4
	C	*firstly*	4	4
	C	*American*	4	4
	C	*language*	4	4
	C	*half-hour*	4	4
	C	*advertisements*	3	3
	C	*practice*	4	4
	C	*incomprehensibly*	2	2
	C	*favourites*	4	4
	C	*living*	4	4
	C	*original*	4	4
	C	*manner*	4	4
	C	*character*	2	2
	C	*stations*	3	4
	C	*presided*	4	4
C03	C	*other*	4	4
	C	*seeking*	1	2
	C	*corruption*	4	4
	C	*contemporary*	3	3
	C	*European*	4	4
	C	*firstly*	4	4
	C	*American*	4	4
	C	*language*	4	4
	C	*half-hour*	1	3
	C	*advertisements*	2	3

	C	*practice*	1	1
	C	*incomprehensibly*	2	3
	C	*favourites*	4	4
	C	*living*	1	4
	C	*original*	4	4
	C	*manner*	4	3
	C	*character*	3	4
	C	*stations*	3	3
	C	*presided*	2	4
C04	C	*other*	4	4
	C	*seeking*	1	1
	C	*corruption*	4	4
	C	*contemporary*	1	3
	C	*European*	4	4
	C	*firstly*	4	4
	C	*American*	4	4
	C	*language*	4	4
	C	*half-hour*	1	2
	C	*advertisements*	3	3
	C	*practice*	4	2
	C	*incomprehensibly*	1	1
	C	*favourites*	4	4
	C	*living*	1	4
	C	*original*	4	4
	C	*manner*	1	4
	C	*character*	4	4
	C	*stations*	4	3
	C	*presided*	4	1
C05	C	*other*	4	4
	C	*seeking*	1	2
	C	*corruption*	4	1
	C	*contemporary*	1	2
	C	*European*	3	3
	C	*firstly*	2	4
	C	*American*	4	4
	C	*language*	4	4
	C	*half-hour*	1	2
	C	*advertisements*	3	3
	C	*practice*	4	4
	C	*incomprehensibly*	1	1
	C	*favourites*	4	4
	C	*living*	4	4
	C	*original*	4	4
	C	*manner*	3	4
	C	*character*	3	3
	C	*stations*	4	4
	C	*presided*	2	4
C06	C	*other*	4	4
	C	*seeking*	2	2
	C	*corruption*	4	4
	C	*contemporary*	3	3

	C	*European*	2	4
	C	*firstly*	4	4
	C	*American*	4	4
	C	*language*	4	4
	C	*half-hour*	2	2
	C	*advertisements*	3	3
	C	*practice*	4	4
	C	*incomprehensibly*	4	3
	C	*favourites*	4	4
	C	*living*	4	4
	C	*original*	4	4
	C	*manner*	2	2
	C	*character*	3	3
	C	*stations*	4	4
	C	*presided*	4	4
C07	C	*other*	4	4
	C	*seeking*	2	4
	C	*corruption*	4	4
	C	*contemporary*	3	3
	C	*European*	4	3
	C	*firstly*	2	4
	C	*American*	4	4
	C	*language*	4	4
	C	*half-hour*	4	3
	C	*advertisements*	3	3
	C	*practice*	4	4
	C	*incomprehensibly*	1	4
	C	*favourites*	3	4
	C	*living*	4	4
	C	*original*	4	4
	C	*manner*	3	4
	C	*character*	3	3
	C	*stations*	3	4
	C	*presided*	4	4
C08	C	*other*	4	3
	C	*seeking*	2	4
	C	*corruption*	4	4
	C	*contemporary*	1	3
	C	*European*	4	4
	C	*firstly*	4	4
	C	*American*	4	4
	C	*language*	4	4
	C	*half-hour*	2	2
	C	*advertisements*	3	2
	C	*practice*	4	4
	C	*incomprehensibly*	1	2
	C	*favourites*	4	4
	C	*living*	4	4
	C	*original*	2	4
	C	*manner*	4	4
	C	*character*	2	2

	C	*stations*	4	4
	C	*presided*	2	2
C09	C	*other*	4	4
	C	*seeking*	2	2
	C	*corruption*	4	4
	C	*contemporary*	1	3
	C	*European*	1	2
	C	*firstly*	4	4
	C	*American*	4	4
	C	*language*	4	4
	C	*half-hour*	2	2
	C	*advertisements*	3	3
	C	*practice*	4	4
	C	*incomprehensibly*	3	3
	C	*favourites*	4	4
	C	*living*	4	4
	C	*original*	1	2
	C	*manner*	1	3
	C	*character*	2	3
	C	*stations*	4	4
	C	*presided*	4	2
C10	C	*other*	4	4
	C	*seeking*	2	2
	C	*corruption*	4	4
	C	*contemporary*	3	2
	C	*European*	4	4
	C	*firstly*	4	4
	C	*American*	4	4
	C	*language*	4	4
	C	*half-hour*	4	4
	C	*advertisements*	3	3
	C	*practice*	4	4
	C	*incomprehensibly*	3	3
	C	*favourites*	4	4
	C	*living*	4	4
	C	*original*	4	4
	C	*manner*	3	3
	C	*character*	4	3
	C	*stations*	4	4
	C	*presided*	4	4
C11	C	*other*	4	4
	C	*seeking*	2	2
	C	*corruption*	4	4
	C	*contemporary*	3	3
	C	*European*	4	3
	C	*firstly*	4	4
	C	*American*	4	4
	C	*language*	4	4
	C	*half-hour*	1	2
	C	*advertisements*	3	3
	C	*practice*	4	4

	C	*incomprehensibly*	3	1
	C	*favourites*	4	4
	C	*living*	4	4
	C	*original*	1	2
	C	*manner*	1	3
	C	*character*	3	3
	C	*stations*	4	4
	C	*presided*	4	4
C12	C	*other*	4	4
	C	*seeking*	2	2
	C	*corruption*	2	2
	C	*contemporary*	4	3
	C	*European*	4	4
	C	*firstly*	4	4
	C	*American*	3	3
	C	*language*	4	4
	C	*half-hour*	1	1
	C	*advertisements*	3	3
	C	*practice*	3	3
	C	*incomprehensibly*	2	2
	C	*favourites*	4	3
	C	*living*	4	4
	C	*original*	4	4
	C	*manner*	2	2
	C	*character*	4	4
	C	*stations*	3	3
	C	*presided*	2	2

Table 55. Detailed scores of the C-group in the cloze tests

Sentence dictation test

General means

Pre means		*Post means*	
Mean S01	8	Mean S01	8
Mean S02	11.57	Mean S02	11.29
Mean S03	12	Mean S03	13.29
Mean S04	10	Mean S04	10.29
Mean S05	13	Mean S05	14.43
Mean S06	13.29	Mean S06	13.86
Mean S07	14	Mean S07	14.57
Mean S08	12.14	Mean S08	12.71
Mean S09	12.14	Mean S09	13.29
Mean S10	13	Mean S10	14
Mean S11	8.43	Mean S11	10.57
Mean S12	12.57	Mean S12	12.14
Mean	11.68	Mean	12.37

Table 56. Mean scores of the S-group in the dictation tests

Pre-means		*Post-means*	
Mean P01	12.29	Mean P01	13.43
Mean P02	12.43	Mean P02	12.43
Mean P03	13.57	Mean P03	13.43
Mean P04	14.57	Mean P04	14.57
Mean P05	11.86	Mean P05	12.71
Mean P06	13	Mean P06	13.43
Mean P07	11	Mean P07	13.14
Mean P08	11.71	Mean P08	12.29
Mean P09	10.29	Mean P09	13
Mean P10	12.43	Mean P10	13.71
Mean P11	10.29	Mean P11	10.86
Mean P12	12.14	Mean P12	13.71
Mean	12.13	Mean	13.06

Table 57. Mean scores of the P-group in the dictation tests

Pre-means		*Post-means*	
Mean C01	6.43	Mean C01	8.43
Mean C02	13	Mean C02	14
Mean C03	9.43	Mean C03	11.14
Mean C04	10.14	Mean C04	9.29
Mean C05	9.57	Mean C05	11.29
Mean C06	10.71	Mean C06	11.29
Mean C07	10	Mean C07	13.29
Mean C08	11.86	Mean C08	13.14
Mean C09	7	Mean C09	9.86
Mean C10	13.14	Mean C10	12.71
Mean C11	10.86	Mean C11	11
Mean C12	10.57	Mean C12	10.57
Mean	10.23	Mean	11.33

Table 58. Mean scores of the C-group in the dictation tests

Detailed scores of the S-group

Participant	*Group*	*Item*	*Pre-score*	*Post-score*
S01	S	*Her knowledge...*	2	0
	S	*My political...*	9	9
	S	*They weren't...*	12	15
	S	*Has he...*	4	4
	S	*How many...*	14	13
	S	*Be careful...*	11	11
	S	*That was such...*	4	4
S02	S	*Her knowledge...*	6	6
	S	*My political...*	11	14
	S	*They weren't...*	22	20
	S	*Has he...*	12	12
	S	*How many...*	16	14
	S	*Be careful...*	12	11
	S	*That was such...*	2	2
S03	S	*Her knowledge...*	8	10
	S	*My political...*	15	15
	S	*They weren't...*	19	20
	S	*Has he...*	4	10
	S	*How many...*	14	14
	S	*Be careful...*	12	12
	S	*That was such...*	12	12
S04	S	*Her knowledge...*	4	2
	S	*My political...*	7	10
	S	*They weren't...*	20	21
	S	*Has he...*	11	11
	S	*How many...*	12	14
	S	*Be careful...*	12	12
	S	*That was such...*	4	2

S05	S	*Her knowledge...*	8	12
	S	*My political...*	15	16
	S	*They weren't...*	19	22
	S	*Has he...*	10	11
	S	*How many...*	16	16
	S	*Be careful...*	11	12
	S	*That was such...*	12	12
S06	S	*Her knowledge...*	8	8
	S	*My political...*	15	15
	S	*They weren't...*	22	22
	S	*Has he...*	10	12
	S	*How many...*	16	16
	S	*Be careful...*	12	12
	S	*That was such...*	10	12
S07	S	*Her knowledge...*	12	12
	S	*My political...*	16	16
	S	*They weren't...*	22	22
	S	*Has he...*	12	12
	S	*How many...*	16	16
	S	*Be careful...*	10	12
	S	*That was such...*	10	12
S08	S	*Her knowledge...*	6	4
	S	*My political...*	11	14
	S	*They weren't...*	22	21
	S	*Has he...*	9	12
	S	*How many...*	14	14
	S	*Be careful...*	11	12
	S	*That was such...*	12	12
S09	S	*Her knowledge...*	6	8
	S	*My political...*	13	13
	S	*They weren't...*	22	22
	S	*Has he...*	12	12
	S	*How many...*	16	16
	S	*Be careful...*	12	12
	S	*That was such...*	4	10
S10	S	*Her knowledge...*	12	12
	S	*My political...*	14	16
	S	*They weren't...*	19	20
	S	*Has he...*	8	10
	S	*How many...*	16	16
	S	*Be careful...*	10	12
	S	*That was such...*	12	12
S11	S	*Her knowledge...*	4	4
	S	*My political...*	8	13
	S	*They weren't...*	18	20
	S	*Has he...*	10	10
	S	*How many...*	6	14
	S	*Be careful...*	11	11
	S	*That was such...*	2	2
S12	S	*Her knowledge...*	2	0
	S	*My political...*	14	13

	S	*They weren't...*	22	22
	S	*Has he...*	10	12
	S	*How many...*	16	14
	S	*Be careful...*	12	12
	S	*That was such...*	12	12

Table 59. Detailed scores of the S-group in the dictation tests

Detailed scores of the P-group

P01	P	*Her knowledge...*	6	8
	P	*My political...*	14	14
	P	*They weren't...*	20	22
	P	*Has he...*	10	12
	P	*How many...*	14	16
	P	*Be careful...*	10	12
	P	*That was such...*	12	10
P02	P	*Her knowledge...*	4	4
	P	*My political...*	11	11
	P	*They weren't...*	20	22
	P	*Has he...*	12	12
	P	*How many...*	16	16
	P	*Be careful...*	12	12
	P	*That was such...*	12	10
P03	P	*Her knowledge...*	8	10
	P	*My political...*	14	14
	P	*They weren't...*	22	22
	P	*Has he...*	12	10
	P	*How many...*	16	14
	P	*Be careful...*	11	12
	P	*That was such...*	12	12
P04	P	*Her knowledge...*	12	12
	P	*My political...*	16	16
	P	*They weren't...*	22	22
	P	*Has he...*	12	12
	P	*How many...*	16	16
	P	*Be careful...*	12	12
	P	*That was such...*	12	12
P05	P	*Her knowledge...*	4	4
	P	*My political...*	7	13
	P	*They weren't...*	22	22
	P	*Has he...*	12	12
	P	*How many...*	14	14
	P	*Be careful...*	12	12
	P	*That was such...*	12	12
P06	P	*Her knowledge...*	6	6
	P	*My political...*	16	16
	P	*They weren't...*	22	22
	P	*Has he...*	9	12

	P	*How many...*	14	14
	P	*Be careful...*	12	12
	P	*That was such...*	12	12
P07	P	*Her knowledge...*	4	4
	P	*My political...*	10	14
	P	*They weren't...*	22	22
	P	*Has he...*	4	12
	P	*How many...*	16	16
	P	*Be careful...*	12	12
	P	*That was such...*	9	12
P08	P	*Her knowledge...*	4	4
	P	*My political...*	16	16
	P	*They weren't...*	13	17
	P	*Has he...*	12	12
	P	*How many...*	16	15
	P	*Be careful...*	11	11
	P	*That was such...*	10	11
P09	P	*Her knowledge...*	6	6
	P	*My political...*	12	14
	P	*They weren't...*	16	21
	P	*Has he...*	10	12
	P	*How many...*	14	14
	P	*Be careful...*	12	12
	P	*That was such...*	2	12
P10	P	*Her knowledge...*	6	10
	P	*My political...*	14	16
	P	*They weren't...*	22	22
	P	*Has he...*	10	12
	P	*How many...*	14	14
	P	*Be careful...*	9	10
	P	*That was such...*	12	12
P11	P	*Her knowledge...*	4	4
	P	*My political...*	11	9
	P	*They weren't...*	18	20
	P	*Has he...*	10	9
	P	*How many...*	11	13
	P	*Be careful...*	11	9
	P	*That was such...*	7	12
P12	P	*Her knowledge...*	8	10
	P	*My political...*	10	13
	P	*They weren't...*	22	22
	P	*Has he...*	10	12
	P	*How many...*	14	16
	P	*Be careful...*	11	11
	P	*That was such...*	10	12

Table 60. Detailed scores of the P-group in the dictation tests

Detailed scores of the C-group

C01	C	*Her knowledge...*	0	4
	C	*My political...*	7	11
	C	*They weren't...*	8	14
	C	*Has he...*	6	8
	C	*How many...*	8	10
	C	*Be careful...*	10	10
	C	*That was such...*	6	2
C02	C	*Her knowledge...*	6	10
	C	*My political...*	16	16
	C	*They weren't...*	22	22
	C	*Has he...*	8	12
	C	*How many...*	16	15
	C	*Be careful...*	12	12
	C	*That was such...*	11	11
C03	C	*Her knowledge...*	4	4
	C	*My political...*	9	7
	C	*They weren't...*	21	21
	C	*Has he...*	9	8
	C	*How many...*	4	14
	C	*Be careful...*	12	12
	C	*That was such...*	7	12
C04	C	*Her knowledge...*	8	0
	C	*My political...*	7	5
	C	*They weren't...*	20	21
	C	*Has he...*	8	11
	C	*How many...*	16	16
	C	*Be careful...*	12	12
	C	*That was such...*	0	0
C05	C	*Her knowledge...*	0	4
	C	*My political...*	10	12
	C	*They weren't...*	21	21
	C	*Has he...*	8	8
	C	*How many...*	12	16
	C	*Be careful...*	12	12
	C	*That was such...*	4	6
C06	C	*Her knowledge...*	4	4
	C	*My political...*	11	11
	C	*They weren't...*	18	16
	C	*Has he...*	8	8
	C	*How many...*	14	16
	C	*Be careful...*	10	12
	C	*That was such...*	10	12
C07	C	*Her knowledge...*	10	10
	C	*My political...*	5	11
	C	*They weren't...*	21	20
	C	*Has he...*	8	12
	C	*How many...*	14	16
	C	*Be careful...*	12	12
	C	*That was such...*	0	12

C08	C	*Her knowledge...*	8	8
	C	*My political...*	13	12
	C	*They weren't...*	22	22
	C	*Has he...*	8	12
	C	*How many...*	16	14
	C	*Be careful...*	12	12
	C	*That was such...*	4	12
C09	C	*Her knowledge...*	4	4
	C	*My political...*	13	9
	C	*They weren't...*	3	18
	C	*Has he...*	6	7
	C	*How many...*	8	12
	C	*Be careful...*	9	12
	C	*That was such...*	6	7
C10	C	*Her knowledge...*	4	4
	C	*My political...*	16	15
	C	*They weren't...*	22	21
	C	*Has he...*	12	12
	C	*How many...*	14	14
	C	*Be careful...*	12	12
	C	*That was such...*	12	11
C11	C	*Her knowledge...*	4	4
	C	*My political...*	8	7
	C	*They weren't...*	21	19
	C	*Has he...*	12	12
	C	*How many...*	14	12
	C	*Be careful...*	11	12
	C	*That was such...*	6	11
C12	C	*Her knowledge...*	6	6
	C	*My political...*	14	12
	C	*They weren't...*	18	18
	C	*Has he...*	10	12
	C	*How many...*	14	14
	C	*Be careful...*	12	12
	C	*That was such...*	0	0

Table 61. Detailed scores of the C-group in the dictation tests

Acquisition et apprentissage de la phonologie anglaise par les francophones – Le rôle des segments et suprasegments

Résumé

De plus en plus de chercheurs s'accordent à dire que la prosodie a un rôle crucial dans la communication, la compréhensibilité du discours et la détection d'un accent étranger. L'apprentissage et l'enseignement de l'anglais langue étrangère bénéficieraient ainsi à mettre au premier plan les traits suprasegmentaux, ou prosodiques (accent, rythme et intonation), plutôt que les traits segmentaux (consonnes et voyelles) comme le font beaucoup d'enseignants, d'autant que les erreurs prosodiques ont souvent un effet plus néfaste que les erreurs segmentales.

Cette thèse de doctorat part de l'hypothèse que les francophones apprenant l'anglais pourraient davantage améliorer leurs capacités à l'oral (production et perception) si on leur enseignait avant tout les caractéristiques prosodiques de la langue cible, plutôt que de mettre en avant les segments. Notre étude expérimentale compare ainsi l'impact d'une approche « prosodique » avec l'impact d'une approche « segmentale » sur des apprenants français non-débutants. Bien que les deux méthodes d'enseignement aient permis aux participants de s'améliorer en production et perception L2, en comparaison avec un groupe de contrôle n'ayant pas reçu de cours, aucune des deux méthodes ne leur a permis d'améliorer leurs capacités à l'oral davantage que l'autre, ce qui montre l'importance tout aussi forte d'inclure les aspects segmentaux que suprasegmentaux dans l'enseignement de l'anglais langue étrangère.

Mots clés : acquisition, anglais langue étrangère, enseignement, francophones, prosodie, segments.

Acquisition and learning of English phonology by French speakers – On the roles of segments and suprasegments

Abstract

Researchers increasingly highlight the crucial role of prosody in communication, speech comprehensibility, and the detection of a foreign accent. Thus, the learning and teaching of English as a foreign language would benefit from prioritising the suprasegmental, or prosodic, features (i.e., stress, rhythm, and intonation), rather than the segmental features (i.e., consonants and vowels) as many teachers tend to do, all the more so as prosodic errors often have a more detrimental effect than segmental errors.

The present doctoral thesis starts from the hypothesis that French-speaking learners of English could improve their oral skills (production and perception) more if they were primarily taught the prosodic characteristics of the target language, rather than putting the segments in the foreground. Our experimental study compares the impact of a "prosody-based" teaching approach with that of a "segment-based" approach on non-beginner French learners of English. Although the two teaching methods enabled the participants to improve their L2 production and perception skills, compared with a non-treated control group, neither of the two methods enabled them to improve their oral skills more than the other, suggesting that it is important to include segmental and suprasegmental aspects alike in the teaching of English as a foreign language.

Key-words: acquisition, English as a foreign language, French speakers, prosody, segments, teaching.