AURAL PERCEPTION MISTAKES MADE BY NATIVE LISTENERS OF CHILEAN SPANISH IN DECODING AN ENGLISH SPOKEN TEXT

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Abstract: The following paper accounts for a study carried out in order to find out the most recurrent types of aural misperceptions made by native listeners of Chilean Spanish when they are faced with the task of properly decoding spoken English in its RP accent, now known by some as GB (General British), in an educated colloquial style. The importance of the study in question lies primarily in discovering which are the segmental, suprasegmental (phonetic boundaries, word stress placement), lexical and syntactical elements in spoken discourse which most commonly impede comprehension. The findings of the referred study may become of importance in order to device strategies to avoid decoding difficulties by teachers and trainers of EFL for learners who intend to achieve a high-level command of the English language.

Key words: misdecoding, listening, native listener, aural misperception, segmental, suprasegmental, phonetics, phonology.

Errores de percepción auditiva cometidos por oyentes nativos de español de Chile al decodificar un texto hablado en inglés

Resumen: El siguiente trabajo resume una investigación llevada a cabo con la finalidad de descubrir los errores de percepción auditiva más recurrentes cometidos por oyentes nativos del español chileno al momento de decodificar correctamente el inglés hablado en su acento RP, ahora llamado GB (General British), en un estilo coloquial educado. La importancia del estudio en cuestión radica principalmente en descubrir cuáles son los elementos segmentales, suprasegmentales (límites fonéticos, ubicación de acento de palabra), léxicos y sintácticos del discurso hablado que con mayor frecuencia impiden la comprensión del mismo. Los resultados del mencionado estudio pueden llegar a ser de importancia en el diseño de estrategias

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que eviten dificultades de decodificación auditiva por profesores y tutores de ILE
para aprendientes que pretenden alcanzar un comando superior del idioma inglés.

PALABRAS CLAVE: *error de percepción auditiva, comprensión auditiva, oyente nativo,*
segmental, suprasegmental, fonética, fonología.

1. INTRODUCTION

It is the opinion of linguists that aural perception errors constitute an important area of research, particularly in relation to the underlying nature of misdecodings and the type of mistakes and errors made by listeners of different native languages at the moment of listening to native speakers of English in a colloquial style. However, it is, the opinion of most researchers that the study of the processes of speech perception and decoding and the reasons underlying the erroneous identification or reconstruction of lexical items, accentual distribution and intonational patterns are still insufficient. The motivation to carry out this study lies in the importance of the correct decoding of the spoken discourse by students who are expected to be proficient users of the English language in order to achieve accurate comprehension of messages uttered by native speakers of English and, probably, most significantly, in the intention of highlighting the value of a permanent and systematic training of the ability of listening comprehension in the teaching of foreign languages. Misdecoded segmental, lexical and/or syntactic components will, undoubtedly, distort the comprehension of the spoken text with the subsequent missing of information which range from a mere easily solvable error to the complete misrepresentation of a message.

Most difficulties that impede an accurate decoding of the spoken text in English are related to the phonetic-phonological phenomena specific to connected speech. Additionally, speakers' speed of delivery, the style and register of the spoken text play a no less important role in the correct decoding of speech.

But not only will the natural phonetic-phonological characteristics of the English language pose difficulties to comprehension. In order to achieve accurate understanding requires that the non-native listeners master certain levels of knowledge of the language in question, ranging from the phonological component to the pragmatic use of the language.

It is then the focus of the present study to analyse decoding mistakes of segmental, lexical and syntactic units made by a group English linguistics learners, all of them native listeners of Chilean Spanish, who were asked a) to listen to a text pronounced by a native speaker of English in the accent known as RP or BBC English in a colloquial style and b) transcribe the text phonetically.

This study adopts the concepts of colloquial English style as explained by Brown (1990) in Listening to Spoken English and the phonological phenomena occurring in connected speech follows the definitions and descriptions as presented by Brown (ibíd.), Roach (2009) and Cruttenden (2008).

The type of decoding errors is based on Vivanco's (1979) study with Chilean listeners.

2. General objectives

The overall aims of this research are firstly, to carry out a revision of the available literature with special reference to the study of errors of speech perception or speech misdecoding involving EFL or L2 learners. Secondly, to identify the occurrences of decoding mistakes made by a group of learners of English as a foreign language.

3. Specific objectives

Specifically, within the context of a phonetic-phonological analysis, the objectives of this research are to:

- Design an instrument demanding from the subjects the decoding of utterances, syntactic structures, lexical items, contrastive segments (phonemes) and articulatory variants of segments (allophones).
- Identify the instances of decoding errors.
- Analyse the decoding errors in order to classify them according to type and quantify them in order to discover patterns of frequency.

4. Hypotheses

Based on previous experiences with EFL learners ear discrimination tests at Universidad de Chile the hypotheses formulated are:

- Lexical competition , (i.e. two or more lexical items (and/or syntactic constructions) with a similar phonological structure, e.g.: 'come in' and 'coming'; 'explode', 'exploit', 'exploit it' and 'exploited') will arise when participants are confronted with unknown lexical items. In such scenario the participant will try to equate the actual lexical item uttered to a known one which is nearest in terms of distinctive features (even if the misdecoded word results in ungrammatical constructions). This will be the case of, especially, proper names.
- Failure to identify accentual distributional patterns will result in the misdecoding of strong and/or weak forms, as well as producing erroneous juncture identification.
- Word stress misplacement will mostly affect items of three or more syllables.

- Most misdecodings will correspond to mismatches in the point of articulation of segments, followed by manner of articulation and finally by differences in voicing.
- The use of unfamiliar syntactic forms by the native speaker will force the participants to add ellipsed constituents, thus reconstructing a more familiar syntagmatic construction.
- Replacement of segmental items will count as the most frequent instances of misdecoding. In the case of consonantal segments, mismatches in point of articulation will outnumber mismatches in manner of articulation or voicing, whereas length will predominate among the misdecodings of vowel segments.
- The pairs of vowels /iː/ and /ɪ/; /ɒ/ and /ɔː/; /ʊ/ and /uː/ and the trio /æ, ɑː, ʌ/ will count among the most misdecoded vowels. Schwa (/ə/), however, will appear with the highest number of misdecodings.
- The glottal stop will present a high frequency of omission (i.e. the segment will not be "heard").

5. Theoretical framework

5.1. What is a decoding mistake?

A decoding mistake (*lapsus auris*) is understood as the erroneous interpretation of the information contained in spoken message, not only at segmental, lexical or syntactical level, but also including semantic or pragmatic information. An erroneous or inaccurate decoding indicates that the listener reconstructs the message with some segment, word or syntactic relationship different to the one contained in the spoken text. These same mistakes will affect the overall comprehension of the message.

From a neuro-psychological approach a misdecoding is explained as a "phonetic illusion" when non-native listeners are challenged by non-native, unfamiliar words. These "phonetic illusions" distort the perceptions of the sound segments contained in the spoken text (Calbrese 2009).

In order to better understand how and why speech may be misdecoded by listeners, it is essential to understand how speech is decoded or perceived.

5.2. The perception of speech

According to Rost (2005) there are three simultaneous and parallel phases in the listening comprehension process, namely: decoding, comprehension and interpretation:

> *Decoding* involves attention, speech perception, word recognition, and grammatical parsing; *comprehension* includes activation of prior knowledge, representing *propositions* in short term memory, and logical inference; *interpretation* encompasses comparison of meanings with prior expectations, *activation participation frames*, and evaluation of discourse meanings. Each of

these phases contributes to the larger goal of finding what is relevant to the listener in the input, and what kind of response may be required. The goal of decoding is to feed recognized lexical items and parsed propositions for comprehension. The goal of comprehension is to connect the input with relevant knowledge sources for further interpretation. The goal of interpretation is to present a set of viable *listener response* options to the listener (Rost 2005: 504).

From an acoustic point of view McQueen et al. explain in this way the process of speech comprehension:

> The talker's message is encoded in the physical speech signal in complex patterns of acoustic energy, in the three dimensions of amplitude, frequency and time. The listener's task is to extract the underlying message from this code. The key to cracking the code is the listener's prior knowledge about the phonological form of words.
>
> <div align="right">(M. McQueen et al. 2003: 39)</div>

Out of the four skills involved in learning a second or foreign language listening comprehension has inappropriately been classified as a passive skill. However, this skill involves an active process of deciphering and constructing meaning from both verbal and non-verbal messages (Nunan 1998 in Gilakjani and Ahmadi (2011: 977). Along the same lines Rost (2011: 9) takes the position that listening comprehension is an inferential process which involves "overlapping types of processing: neurological processing, linguistic processing, semantic processing, and pragmatic processing".

Purdy (1997 in Gilakjani and Ahmadi (2011: 978)) defined listening as "the active and dynamic process of attending, perceiving, interpreting, remembering, and responding to the expressed (verbal and nonverbal), needs, concerns, and information offered by other human beings" (ibíd. p. 8).

Cognitive science, has distinguished two ways to describe the effect of information in the perceiver in any given situation: bottom-up processing and top-down processing.

> Bottom-up processing (also called data-based processing) is processing that is based on incoming data. Incoming data always provide the starting point for perception because without incoming data, there is no perception. […] Top-down processing (also called knowledge-based processing) refers to processing that is based on knowledge.
> […] bottom-up and top-down processing often work together to create perception.
>
> <div align="right">(Goldstein 2013: 9, 10)</div>

The above described processes are, of course, applicable to the perception of speech:

> The bottom-up process assumes that the listener builds his/her comprehension of the acoustic message by starting with individual sound segments, which are in turn combined into words that build phrases, clauses and sentences. The constructed sentences are then combined to discover the ideas and concepts which constitute the message (Flowerdew and Miller, 2010: 158). Segments, words, phrases, clauses and sentences, in addition to suprasegmentals such as "stress, rhythm and intonation also substantially contribute to this data-driven processing"
>
> <div align="right">(van Duzer 1997 in Gilakjani and Ahmadi (2011: 977).</div>

An important fact about the development of the top-down model is that it appeared as a response to the inability of subjects under experimental conditions...

…to identify truncated words in isolation from the words of which they form a part, while, on the on the other hand, they are quite able to identify these same truncated words so long as they are presented with the surrounding context (ibíd.).

A third model: the interactive processing represents a synthesis of the bottom-up and top-down models working in parallel. Developed by Rumelhart and his associates, interactive processing highlights the fact that language is processed simultaneously at different levels: an interaction between the phonological, syntactic, semantic and pragmatic levels (ibíd.).

In order to accurately decode native English speech, learners of EFL or as an L2 should master at least four levels of knowledge according to Flowerdew and Miller (2005): the phonological level (the sound system of English), the syntactic one (the order of the grammatical elements in the spoken chain), the semantic level (knowledge of the meaning of lexical items and propositions) and the pragmatic level (knowledge of the utterances in specific situations. The mentioned authors include a fifth type or level of cognition: the kinetic knowledge, which is given by the facial expressions and the body gestures of the speaker. This last level of knowledge, of course, will only be evident if the listener can look at their interlocutor.

Unless a learner of EFL or as an L2 obtains a higher command of the types of knowledge above mentioned, the task of decoding a spoken message will present certain difficulties:

> In L2 situations, attending becomes part of the active learning process. The processes we use as L2 listeners may be technically somewhat similar to those of L1 situations, but barriers to comprehension and additional processes that L2 listeners must perform can make listening in a second language an arduous task.
>
> Flowerdew y Miller (2005: 27)

It must be added, to the types of knowledge above mentioned, the learner's knowledge about the world they live in; modules of knowledge which in cognitive psychology and linguistics are referred to as schemata:

> The [L2] listener needs to rely on *controlled processing*, which requires more attention before any decision on the message can be made. Then again, once the message gets into the long-term memory, the L1 listener has an array of schemata to match the message against. For the L2 listener, the schemata may not be so large or sophisticated, and even if the message is considered important, it may be difficult to retrieve the message once it is in the long-term memory, as the L2 listener may have filed the message in the "wrong" place.
>
> Flowerdew and Miller (2005:28)

5.3. Some non-native listeners' difficulties in decoding English spoken text

Based on our personal experience and on the years of work on ear-training with native listeners of Chilean Spanish, the most common difficulties encountered by listeners are the following:

- The speed of delivery of native English speakers in a colloquial style (as understood by Brown). Learners expectations are not fulfilled and so decoding might become an arduous cognitive exercise.

- Poor knowledge of phonological phenomena occurring in connected speech. Aspects such as elision, assimilation, vowel reduction, etc. represent a source of numerous misperceived phonetic forms.

- Misplacement of phonetic juncture. The nature of connected speech makes it difficult for listeners to accurately tell where a word ends and the next one begins, especially when the lexical items are unknown to them.

- Failure to recognise stress patterns (word stress and sentence stress). Listeners' failure to allocate the produced stress distribution has a direct effect in word recognition and in the identification of strong and weak forms.

- Unperceived or misperceived grammatical categories. It is very commonly found that listeners fail to hear or mishear inflectional suffixes, such as -ed in past and past participle forms, -ing forms, the pluralisation suffix -s/-es. Overlooking grammatical categories distorts the content of propositions, sometimes producing serious misunderstanding.

6. A BRIEF ACCOUNT OF RESEARCH IN AURAL MISDECODING

Some findings obtained by Bond (2005) from the study of a large collection of mishearings by native listeners of American English, suggest that the so called *slips of the ear* or perception errors provide a kind of window which allows us to comprehend the way in which listeners use the linguistic knowledge to understand a spoken message. Bond concludes that the phonetic mistakes committed confirm that stressed or accented vowels are better perceived when compared to consonants. In relation to unstressed vowels, these resulted to be the most misperceived segments since they are commonly reduced by native speakers in rapid speech. Listeners tend to misperceive their quality, elide them or even add them.

According to Bond (2005: 292), in L1 speech decoding research, misdecodings involving vowels are uncommon if the segment is stressed. In these cases the misheard stressed vowel is commonly substituted, as in:

It's like a math problem →mouth problem

Though highly unusual, the misdecoded vowel is not in a phonetic environment which affects vowel quality and the phonetic distance between the actually uttered vowel and the misperception is considerable. More commonly misdecoded vowels which affect vowel quality occur between consonants, such as r, l and the nasals, as observed by (Labov 1994 in Bond 2005: 292). Bond (2005) concludes that among vowel features, it is vowel height the one most commonly affected.

Stressed vowels constitute a more reliable clue for accurate decoding. When misperceived there usually appears misplacement of phonetic juncture.

Weak form words are more often misperceived, due to their high frequency of occurrence, their unstressed position in the utterance and the quality of the vowel they contain ə, ɪ, ʊ or i and u.

Bond (2005: 293) points out that the addition or loss of unstressed vowels affects the phonological shape of the actually uttered form is modified in its number of syllables.

Consonants, especially in word-initial position, were subject of more misdecodings than consonants in word-final position "undoubtedly because they tend to receive weak and indistinct articulation […] Consonant misperceptions involving substitutions tend to be more common in word-initial position than elsewhere, in a ratio of two to one" (ibíd.).

More in line with the present research (in terms of the participation of native listeners of Spanish) in a series of experiments on the impact of allophony in word recognition carried out by Boomershine et al. (2008: 143-172) with native Spanish listeners and native English listeners, concluded that a pair of sounds which is contrastive at a phonemic level is more perceptually distinct to native listeners than to native listeners of a language in which the pair is not phonemically contrastive. The researchers used the segments d, ð, ɾ.

Boomershine et al. (2008: 143-172) based their research on Trubetzkoy's work *Principles of Phonology* (1969: 78), where he theorizes that constant contrastive oppositions between speech sounds in a language will be perceived more clearly than an opposition that is neutralizable in some context.

The assumptions underlying Trubetzkoy's premises can be summarised as follows:

Listeners' L1 influences their ability to perceive segments. The phonological status of segments (i.e. whether they are phonemes or allophones of the same phoneme) has an effect on listeners' decoding of those segments. And the perception of segments does not simply depend on the presence or absence of phonological contrast, but there supposedly are degrees of contrast and each of these may have caused different for listeners' decoding.

The researchers' findings revealed that:

…the English speakers found [d] /[ð], […] phonemically contrastive in English but allophonic in Spanish, to be more perceptually distinct than the Spanish speakers did. Similarly, the Spanish speakers found [d] /[ɾ], […] phonemically contrastive in Spanish but allophonic in English, to be more perceptually distinct than the English speakers did. The pair [ð] / [ɾ] had about the same level of perceptual distinctiveness in the two languages; recall that in each language one sound of the pair is in an allophonic relationship with a different sound that is also present in the inventory of the other language.

Spanish speakers found the pair [d] /[ɾ] (which is phonemically contrastive in Spanish but allophonic in English) more different than did the English speakers.

[Furthermore] English speakers found the pair [d] /[ð](which is phonemically contrastive in English but allophonic in Spanish) more different than did the Spanish speakers. The pair [ɾ] / [d], however, was rated the same by both Spanish and English speakers; this pair is composed of allophones of different phonemes in each language.

Boomershine et al. (2008)

The researchers could prove the powerful influence of allophonic relationships in segment decoding.

In his work with native Chilean Spanish listeners and regarding the actual perception mistakes, Vivanco (1979) concluded after his revision of the literature about listening comprehension of "native listeners of English", the following types of decoding mistakes:

> *Entre los tipos de error más comúnmente observados por quienes se han preocupado del problema se encuentran: omisión o inserción de un fonema en un punto dado; reemplazo de un fonema por otro; omisión o inserción de sílabas, frecuentemente debido a razones sintácticas; omisión, inserción o cambio de lugar de límites de palabras.*

<div align="right">Vivanco (1979: 73)</div>

The conclusions reached by Vivanco (1979) in his study with learners of English pedagogy in their fourth semester provide a point of departure to analyse the decoding mistakes made by native listeners of Chilean Spanish, namely:

- *Los alumnos parecen dar mayor importancia a la información fónica que a la gramatical o semántica.*
- *Predomina la elisión de sonidos sobre cualquier otro tipo de error.*
- *La alteración de uno o más rasgos fonéticos es otro tipo de error muy frecuente.*
- *Se dan también casos de adición de sonidos, mala ubicación del límite de palabra y ocasionalmente de metátesis.*
- *La elisión tiende a afectar a sonidos marginales de la palabra.*

<div align="right">Vivanco (1979: 78)</div>

7. The study

7.1. The instrument

A three-part test was designed for the study. Each of the three tests designed sought to obtain different types of information. The first test required the listeners to provide the script of the spoken text. The second test asked them to transcribe the text phonemically as produced by the speaker. This time the information required was identification of segments. The third test, a phonetic transcription, required the listeners to decode articulatory details produced by the speaker.

A recording of an interview to a native English speaker was employed. This material was divided in three parts for the purposes of the research. The recording was obtain ed from 'The Routes of English' http://www.bbc.co.uk/radio4/routesofenglish/ storysofar/programme3_6.shtml, a BBC radio 4 webpage.

An interview to the well-known phonetician Professor John Wells was chosen. The style is educated colloquial and spoken in RP accent. The topic of the interview is Estuary English and some of its characteristics.

The interview has a duration of 1 minute 23 seconds, but for the purpose of the experiment it was divided in three parts with a duration of 11, 13 and 17 seconds, so that the test could be comfortably completed in a 45-minute period.

The instrument was applied in the language laboratory of the faculty. The listeners used headphones and could listen to the texts as many times as they considered necessary.

7.2. The participants

The data was obtained from a group of 34 native listeners of Chilean Spanish. At the moment of the application of the tests they were all students of Lengua y Literatura Inglesas at Universidad de Chile in their 6th semester of instruction. Their study programme included two semesters of applied phonetics, two semesters of phonology, and practical sessions of oral production and ear training.

Previous to the application of the instrument the listeners completed an exercise, i.e., listening to a three-part recording whose first part they had to transliterate; the second, transcribe phonemically, and the third transcribe phonetically.

8. Analysis of the collected data

Once the data was obtained, the results were examined, quantified and classified according to the types of misdecoding specified in the hypotheses. The findings were then organized into charts. The most salient results are displayed in the next section.

9. Summary of findings

The following charts summarize the most recurrent types of misdecoding, including non-decoding[1] of segments in the three tests.

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[1]   Although the category 'non-perception' does not constitute a type of misperception, for the purposes of this study it has been considered an aural perception mistake.
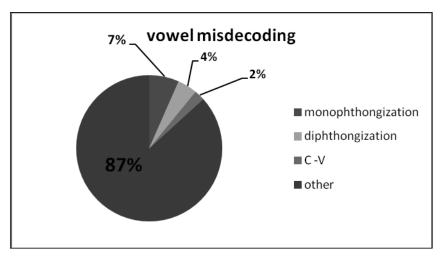
Chart 1. Summary of types of vowel misdecoding in test 2. C-V = consonant-vowel substitution
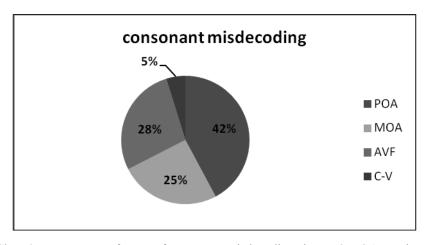

Chart 2. Percentages of types of consonant misdecodings in test 2. POA = point of articulation; MOA= manner of articulation; AVF= action of the vocal folds; C-V = consonant - vowel substitution
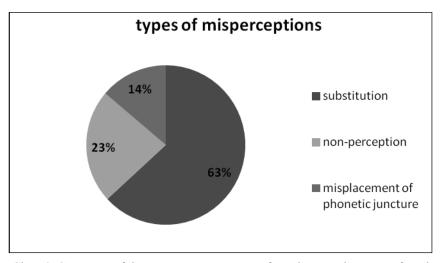
Chart 3. Summary of the most recurrent types of aural perception errors found
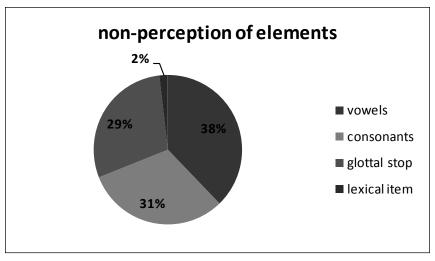in tests 1, 2 and 3

Chart 4. Percentages and types of segments which were not decoded
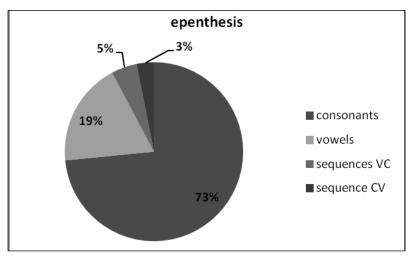by the participants in test 3

epenthesis

- consonants
- vowels
- sequences VC
- sequence CV

5%   3%   19%   73%

Chart 5. Percentages of epenthetic types of segments and segment sequences found in test 3

stress misplacement

- monosyllabic words
- disyllabic words
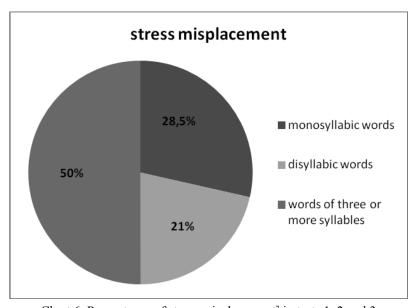- words of three or more syllables

28,5%   50%   21%

Chart 6. Percentages of stress misplacement[2] in tests 1, 2 and 3

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[2]   Placement of "illusory" stress is included in the results.

10. Conclusions

The results of the experiment carried out for this study agreed in most cases with previous experiences. Even though this study was mostly based on the misdecoding of segments, word stress and sentence stress played an important role in mishearing, not only the distribution of stress patterns, but the effect of these on the segments in question. A direct consequence of misplacing sentence stress is the misperception of weak and/or strong forms.

Words of three or more syllables (e.g. pronunciation, associate) suffered the most frequent stress misplacements.

As hypothesised, lexical completion was evident in the case of either spelling or transcribing unknown words, especially the cases of proper names.

Contrary to what was hypothesised the prevailing feature misdecoded in consonant sounds corresponded to mismatching in the action of the vocal folds rather than in the point of articulation of the consonantal segments. Misdecodings of the manner of articulation remained in third place. However there were cases in which participants misdecoded not only one feature of a consonantal sound but two; point and manner of articulation were misperceived, whereas vocal fold state was accurately perceived, e.g., the initial sound [v] in the word 'vocalized' ['vəʊkəlaizd̪] was misperceived as [d] and [ð]: [dɑːkən laɪt̪ˀ] and [ðeɪ kɒlaɪd]. Both examples accompanied by misplacement of phonetic juncture.

In terms of vowel sounds the pairs iː and ɪ was the most regularly confused, in the case of the other typical minimal pairs taught to Spanish EFL learners (ɒ and ɔː; ʊ and uː and the trio æ, ɑː and ʌ) the replacements were not as frequent. Possible reasons for this may have been the effect of stress patterns and even an "orthographic way of listening" (e.g. 'equally' iːkʊalɪ). Schwa was the most misdecoded vowel.

The glottal stop ([ʔ]) did prove to be a "troublesome" segment to decode, especially in initial position, even in cases of T-glottaling the participants seemed not to hear it.

Not perceiving sounds was very common. Both vowels and consonants segments not "heard" by the participants resulted in grammatical category change and lexical class change.

The phenomenon of non-perception of segments arises as an interesting focus for future study.

Grammatically speaking, there were a number of attempts to reconstruct syntactic constructions in which one or more elements had been elided. Epenthetic pro-forms, articles, verbs and misdecoded wh-words as part of interrogative constructions testify in favour of the phonology-grammar interface.

As teachers and reflecting on the outcome and results obtained during this research, it is our thought that in order to improve spoken text decoding, EFL listeners should be exposed to real English from the beginning of their learning process and get acquainted with the different aspects of connected speech, and probably most important of all make them aware of the stress patterns as well as the intonation patterns of the English language.

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