

# **Production of English Vowels by Native Spanish Speakers: An Analysis**



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## Table of Contents

<b>1. Introduction</b> .....	1
<b>2. Background</b> .....	2
<b>2.1 L2/FL Acquisition</b> .....	2
<b>2.2 Factors</b> .....	4
<b>2.2.1. Age</b> .....	4
<b>2.2.2. Influence of the L1</b> .....	5
<b>2.2.3. Input and use</b> .....	6
<b>2.2.4. Acquisition Contexts</b> .....	6
<b>2.2.5. Other factors</b> .....	8
<b>2.3. FL Perception Models</b> .....	9
<b>2.3.1. Speech Learning Model (SLM)</b> .....	10
<b>2.3.2. Perceptual Assimilation Model (PAM)</b> .....	11
<b>2.3.3. The Ontogeny Phylogeny Model (OPM)</b> .....	12
<b>2.3.4. Native Language Magnet Model (NLM)</b> .....	13
<b>3. Analysis of EFL speech production data</b> .....	13
<b>3.1. Material and Participants</b> .....	14
<b>3.2. Method</b> .....	15
<b>3.3. Results and Discussion</b> .....	15
<b>3.3.1 Analysis of FL Speech Production according to SLM</b> .....	15
<b>3.3.2. Orthographic errors</b> .....	18
<b>3.3.2.1. The Spelling of the L1</b> .....	19
<b>3.3.2.2. Schwa</b> .....	20
<b>3.3.2.3. The Spelling of the FL</b> .....	22
<b>4. Conclusion</b> .....	23
<b>References</b> .....	25

## **Abstract**

The objective of achieving a proficient pronunciation in a language other than the individual's mother tongue is a great challenge that numerous speakers are willing to overcome. However, during language acquisition learners encounter many obstacles that prevent them from achieving this, and often result in an evident foreign accent in the speech. In order to provide insights into the previous research in this field, four main Foreign Language (FL) Perception Models were reviewed in this paper. One of these models is Flege's Speech Learning Model (SLM), which considers the lack of an adequate perception and the level of resemblance between the First Language (L1) and Second Language (L2) or FL sounds as the most important factors that will influence a FL learner's speech. Even though Flege (1995) admits that not all the errors are perceptually motivated he does not analyze the impact of other motives on the learner's speech. Considering this question, the possible influence of the spelling of the L1 and FL was selected as an additional object of analysis. Thus, with the aim of confirming the predictions of the SLM as well as solving the scope of influence of the L1 and FL orthography a brief study was carried out, on which some FL speech was examined. The analyzed conversations were part of the DiapixFL corpus, and the selected participants Spanish native speakers who had English as an FL. The analysis revealed a strong influence of the L1 and FL spelling in the FL production, and also restated the previously proved predictions of the SLM. However, further research is needed to determine the influence of other factors that were not covered in the present study.

**Keywords:** language acquisition, SLM, L1, FL, orthography

## **1. Introduction**

When learning a new language, mastering all its linguistic levels should be the main goal for every learner, and achieving a native-like pronunciation may be the most challenging aspect of the acquisition process, especially among adult learners. This matter has occupied an extensive part of the literature concerning linguistic studies over the last decades, even though many issues are still unsolved due to the continuous disagreements among researchers and arising theories that keep developing.

Many factors intervene during the acquisition process, facilitating or hampering the achievement of a native-like speech. Some of these will be analyzed in depth during the following sections of the paper, providing evidence that will prove their influence.

Foreign Language Perception Models have provided guidance in this area, developing hypotheses based on the need for an adequate perception to develop a proficient output. The four principal models suggest some explanations for the speech phenomena of the FL learner, either positive or negative, focusing primarily on the fundamental role that the L1 plays on this process. Besides perception, the orthography of either the L1 or the FL of the non-native speaker may condition his or her speech as well.

Thus, this paper aims to analyze and reveal the accuracy of one of these models' predictions and the level of influence of the L1 and FL spelling by focusing on the production of English vowels by native Spanish speakers.

In order to do so, the distribution of this paper will be the following: the first sections will be devoted to defining L2 and FL acquisition while the most influential factors in this area are presented. Afterwards, the four principal FL Perception Models will be reviewed. Once all the needed background is covered, the procedures of the analysis will be defined, and finally, the obtained results will be analyzed and discussed, which will lead to some conclusions.

## **2. Background**

### **2.1 L2/FL Acquisition**

When the acquisition of a Second Language or a Foreign Language begins, it is assumed the learner is already fluent in his or her mother tongue, also referred to as native language or first language. Only extraordinary situations such as a sudden interruption of exposure to the language or the loss of contact with it may provoke the non-completion of the native language acquisition (García Lecumberri et al., 2010). Those who only know and usually master a single language, the L1, are monolinguals, whereas non-monolinguals will be defined as those who know more than one language.

Non-monolinguals may acquire various languages before or after adolescence, which are traditionally classified into L2 or FL, and often referred to as target language

(TL) during the acquisition process. This is where the first misconception may come in; As Ellis (1997) states, the term L2 is generally applied to “any language that is learned subsequent to the mother tongue”, including an FL or even third or any following language. Other researchers prefer to make a clearer distinction between L2 and FL by pointing out the differences, which is needed in order to avoid confusion within the scope. This alternative proposal will classify these terms depending on “the geographical setting and amount of presence in the community” (García Lecumberri et al., 2010); in this way, if a language is widely spoken in the acquisition environment it will be considered a L2; otherwise, the TL will be identified as a FL.

Speakers who master two languages at all linguistic levels and equally will be categorized as bilinguals, even though there is usually an imbalance in the fluency of the two languages, recognizing one of them as the “dominant” one (García Lecumberri et al., 2010). Grosjean (1989) states that bilingual speakers make different and unequal use of their languages, employing them “for different purposes, in different domains of life, with different people.”.

Grosjean (2010) also challenges the traditional assumption of the mother tongue being necessarily the dominant language, since he sustains that not all the cases follow this pattern; in fact, the diverse experiences of the speakers will be the ones determining so, and it may change over time (as cited in Hammer, 2012)

The acquisition of a bilingual’s languages can happen either simultaneously or successively; being the former a process that will imply an early acquisition of both languages at the same time, speakers will show a clear tendency of becoming 2L1 bilinguals, and thus, obtaining more balanced bilingualism (Meisel, 2009). However, acquiring two languages at different ages will presumably involve developing notably differing language competences in the L1 and L2, considering the proficiency of the L2 difficult to obtain (Meisel, 2009).

According to Grosjean (1989) due to the continuous interaction of a bilingual’s languages any bilingual may leave traces of one of their languages in their speech, even when trying to deactivate the language they are not using; these interferences may be because of occasional confusions, but it is possible to develop permanent negative transfer in the form of foreign accent, for instance.

## **2.2 Factors**

As mentioned before, whether an L2 or FL learner can obtain a native-like competence in the TL is an important concern in this study area; in order to find out to which extent learners may be able to reach this objective, researchers have detected many factors that contribute to a favourable context that will facilitate a complete acquisition, some of which will be presented subsequently.

### **2.2.1. Age**

Age has been the prevailing factor in studies that are aimed at determining whether an adult learner can achieve a native-like use of a second or a foreign language. Many researchers have followed the Critical Period Hypothesis when conducting their investigations, which affirms that every learner who attempts to learn a language after a sensitive or Critical Period (CP) has passed, will not be able to master it as a native speaker. The phonological level and thus, pronunciation, has been proved to be the most affected area in this sense (Major, 2001), and numerous studies claim that the Age of Learning of the individual has a direct effect on his or her level of detectable pronunciation (Flege, et al.,1995); in other words, the later the exposure and learning of L2 or FL happens, the stronger the foreign accent will be, and the learner will show more difficulties in mastering the phonological system of the target language (Flege et al.,1995).

Despite the difficulties and controversies to determine an exact age for the end of the CP, many researchers agree the limit to be marked by the arrival of puberty, thereby following Lenneberg's work, who first proposed the CP hypothesis in FL acquisition area. Long (1990) establishes the age of 6 as the one from which "The ability to attain native-like phonological abilities in an SL decline", and he states that native-like acquisition will become almost impossible if the learner begins to acquire the language after the age of 12 (as cited in Bongaerts, 2005). Patkowski (1994) makes a similar proposal but delays the end of the critical period until the learner reaches the age of 15.

The main hypothesis justifying the age constraint is that which states that due to the brain maturation, there is a loss of neural plasticity, decreasing the acquiring abilities that the learners own from birth (Long, 1990, as cited in Bongaerts, 2005).

However, according to later research, age has been considered a not independently working variable; therefore, other factors complement its influence (Major, 2001), and are also taken into account when analyzing the acquisition.

### **2.2.2. Influence of the L1**

The influence of the L1 is considered one of the key factors conditioning the accuracy of the FL production, especially in terms of pronunciation.

The L1 can influence in different ways and at different levels the learner's FL speech; Major (2001) assures negative transfer from L1 to L2 to be a usual process, provoking speech errors when the transferred items differ in the two linguistic systems, an idea that had already been suggested by Stockwell & Bowen in 1965.

In addition, Kellerman (as cited in Ellis, 1997) assures that L2 learners are cautious with transferring elements from the L1, since they avoid transferring linguistic structures and features that they consider too different from the L2 and "unique to their own language" (Ellis, 1997); this would bring the conclusion that they have a notion of which features of their L1 may be "transferable".

However, if there is no difference between the features of L1 and L2, the interference may be positive, which will bring a native-like output and thus, facilitate the TL acquisition (Major, 2001).

The level of L1 influence relies partly on the amount of L1 use that the learner maintains during and after the L2 acquisition. Flege et al. (1996) proved the existence of a proportional relationship between the amount of its use and the level of detectable foreign accent in the L2 production.

Moreover, Major (2001) suggests that the level of the L1 influence may be modified by the acquisition phase on which the learner is, claiming that the influence will diminish as the learner's L2 level improves.

In view of this information, the influence of the L1 can be considered a major factor affecting the acquisition process, and it will be analyzed more in depth in the forthcoming section dealing with the perception models.

### **2.2.3. Input and use**

Extended exposure to an adequate native-like input is also one of the variables that interact with the effect of age and encourage an accurate pronunciation in the TL of the learner; Ellis (1997) considers this exposure indispensable in order to carry out the acquisition process successfully; in fact, the higher amount of native-like input, the more the learner's pronunciation skills will improve, being able to get closer to a proficient pronunciation of the FL (Flege et al., 2003). Thus, those speakers who start learning the FL at an earlier age will be able to receive a greater amount of input.

In an environment on which the speaker can receive input of the TL, there is a possibility of interaction between two or more speakers; both the amount of use of the target language (TL) and the interaction with other speakers are proven influential factors in the acquisition of a FL.

For instance, in a study conducted by Flege et al. (1999), native Korean speakers who arrived in the United States at different ages were selected to observe the level of foreign accent when speaking English, their FL; the factor of language use was analyzed together with the Age of Arrival (AOA) of the speakers, finding that those who used to speak English more often than their L1 had less level of foreign accent than those who kept using Korean more than English. This study took both the AOA and Age of Learning (AOL) into account, concluding that the earlier the learners arrived and learned the language, the more opportunities they will have to learn English earlier and have more interactions over the years.

The interaction hypothesis was confirmed in a study by Mackey (1999), which stated that some kind of interactions classified as "negotiations" between native speakers and non-native speakers helped the Second Language Acquisition. These interactions are characterized by the modifications during the conversation; for instance, inadequate outputs by the TL learner may be reformulated by the conversational partner; in this way, the learner identifies the errors instantly.

### **2.2.4. Acquisition Contexts**

As mentioned, the acquisition of a L2 and a FL is not identical, so it is essential to consider the acquisition context. In fact, factors are directly conditioned by the learner's environment at the moment of the acquisition.



Patkowski (1994) assures that the advantages of early age of acquisition are only applicable when the acquisition is carried out “under naturalistic conditions”, i.e. in an environment where the use of the TL is widespread and the individual is guaranteed a considerable amount of native input and interaction with other native speakers.

Given that acquisition in naturalistic conditions is not possible in all the settings, diverse approaches have been suggested to develop a competent level in second or foreign languages, providing varied results.

Numerous countries have committed to the application of immersion programmes so as to obtain a high number of bilingual students who will eventually reach a proficient level in the two languages that are offered, usually a majority and a minority language. The students in these programmes have either of them or both as their L1. The integration of the two languages in the educational programme will facilitate a native-like acquisition, since it assures interaction with fellow partners that are native in one or both languages and also with bilingual teachers conducting the lessons, which at the same time, ensures receiving a great amount of native input. Moreover, the languages that are included in the programme are spoken in the students’ environment, at least locally, encouraging the use of both languages outside the lessons in favourable conditions (Lasagabaster & Sierra, 2010).

In Content and Language Integrated Learning (CLIL), a non-language subject is taught “*with and through a foreign language*” (Coyle et al., 2010) offering a more natural approach to the language, instead of the system-focused approach proposed in the traditional language subjects of Formal Instruction (FI) (Roquet & Pérez-Vidal, 2017). A study conducted by Pérez-Vidal & Roquet in 2015 (as cited in Roquet & Pérez-Vidal, 2017) in a Catalan high school which had CLIL included in their programme offered results that confirmed its benefits.

Nonetheless, a key downside is detected in the CLIL, since the FL used in the classroom for the selected content subject is not present in the students’ environment (Lasagabaster & Sierra, 2010). Moreover, teachers in CLIL programmes are usually non-native (Lasagabaster & Sierra, 2010) which reduces the possibilities of improving the students’ pronunciation.

As for the Formal Instruction (FI), its effectiveness has often been questioned (Ellis, 1997) due to the lack of received input and interaction opportunities that this model provides. In spite of this, some studies have proved its positive effects on FI learners to

some extent, such a study by Trenchs-Parera (as cited in Pérez-Vidal et al., 2018), even though they did not obtain results overcoming the ones achieved in “more naturalistic environments”.

A study conducted by del Río, Juan-Garau & Pérez-Vidal (2018) obtained negative results for FI; learners showed a higher rate of detectable foreign accent than a Study Abroad (SA) programme, which affected, to some extent, comprehensibility, evidencing the weaknesses of this programme when fulfilling the objective of obtaining fluent speakers of the FL. The previously mentioned Immersion and CLIL programmes had better outcomes in fluency than FI (Pérez-Vidal et al., 2018), but not in pronunciation in the case of CLIL.

In addition, Ellis (1997) suggests that FI may be effective in a long-term period whenever “learners have subsequent opportunities to hear and use the target structure in communication” (p. 83). Likewise, Bongaerts et al. (1997) identified some learners who had attended FI and whose production was classified as native-like, but all of them had received additional perception and production-specific training and great amount of native input.

Hence, it may be concluded that FI contributes to the FL development of the learner to some extent on its own, but successful results in native-like competence will only be possible if combined with additional complementary practices that encourage the active participation of the learner.

#### **2.2.5. Other factors**

Other variables that are strictly focused on the individual's personal circumstances such as "motivation, cultural empathy, desire to sound like NS" (Major, 2001) have also been considered in the language acquisition area, as well as the subject's language aptitude.

The factor of motivation was investigated, among others, by Flege, Munro & MacKay (1995), who suggested that it could have a certain amount of influence that would favour a native-like pronunciation in the L2. They identified two types of motivation: on the one hand, "instrumental motivation", which included mainly job-related objectives, i.e., achieving a good level for professional purposes, or even educational ones (Ellis, 1997). On the other hand, "integrative motivation", which would explain a will to master a language to adapt or fit in on a certain environment "for social

and cultural reasons" (Ellis, 1997). Intrinsic and resultative motivations are also mentioned by Ellis (1997), who, at the same time, points out that the four aforementioned motivation types may be combined in a single learner.

It has also been suggested that some speakers may own an innate ability for languages named language aptitude, which will provide them an advantage in acquiring a language if compared with other learners. This ability may be helpful at different levels, providing the ability to easily identify FL sounds or grammatical functions of some words, among others (Ellis, 1997).

Nonetheless, the limited evidence obtained until the moment calls into question the range of influence that these factors may reach, which often provokes leaving them in the background when analyzing L2 and FL acquisition. Further research would be required to clarify these issues.

The factors mentioned in this paper are aimed at acknowledging which variables are likely to facilitate the acquisition process, but it is not intended to be a fixed list that must be followed in order to acquire a second or foreign language; each learner is unique, and the factors affecting the acquisition of each individual are changing and flexible, enabling many different combinations. Therefore, the results obtained for a certain learner cannot be generalized to all of them.

However, the influence of the mentioned factors is undeniable; this paper will be focused on the influence of the L1, for which several hypotheses have been developed, as it will be shown in the upcoming review of the perception models.

### **2.3. FL Perception Models**

FL perception models are recognized for focusing on the learners' perception of the TL sounds in order to explain the output, either successful or not. Based on this premise, each theoretical model suggests diverse predictions that will be summarised in the following sections. All of them highlight the L1 as one of the most influential factors determining the FL learner's speech.

### 2.3.1. Speech Learning Model (SLM)<sup>1</sup>

The Speech Learning Model (SLM) developed by Flege is aimed at predicting the difficulty level to produce L2 sounds like a native speaker, considering the age constraint and conditioned by the perception of the learner. Regarding this model, adequate perception of the L2 sounds is indispensable to attain an accurate production.

The model consists of seven hypotheses that allow making L2 output predictions including the perceptually motivated pronunciation errors, without assuming that all the existing production errors are due to an inappropriate perception. However, as mentioned before, the model does not consider other motives.

The model's central hypothesis claims that the level of difficulty for the acquisition of L2 sounds depends on the similarities that the sounds of L1 and L2 share, drawing from the assumption that the learner has the ability to relate L1 and L2 sounds and identifying the differences between them based on the perception, as claimed by the first hypothesis (H1). The optimal result of the sound discerning process is the formation of new phonetic categories, as the second hypothesis claims; regarding the model, this is more likely to happen when the perceived difference between “an L2 sound and the closest L1 sound” is high (Hypothesis 3). With the formation of new phonetic categories, the speaker will eventually attain a correct pronunciation of these “new” sounds. However, the sixth hypothesis (H6) of the SLM states that the established categories may not be identical between monolinguals and bilinguals, and it does not guarantee a completely native-like production; in fact, as the seventh hypothesis states, the sounds are produced following the features of the established phonetic categories.

In other instances the creation of new phonetic categories may fail for two main reasons: on the one hand, when the sounds of the L1 and L2 are similar the learner may not be able to detect the differences, and he or she will perceive it as an L2 sound instead; in these cases, the sound will be produced as the closest one from the L1, failing to pronounce it correctly. On the other hand, some sounds may be so similar that its differences are almost unnoticeable, and there's no need of creating a new category; this process is known as “equivalence classification”, mentioned in the hypothesis 5, and

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<sup>1</sup> The information in this section was retrieved from: Flege, J. E. (1995). Second language speech learning: Theory, findings, and problems. *Speech perception and linguistic experience: Issues in cross-language research*, 92, 233-277.

despite the blocking of a new category formation the learner will achieve an accurate pronunciation of the L2.

As for the conditions for these phenomena to happen, the fourth hypothesis of the model establishes an age constraint, claiming that the ability of discerning sounds “decreases as the AOL increases”.

### 2.3.2. Perceptual Assimilation Model (PAM)

Similar to the SLM, the Perceptual Assimilation Model (PAM) developed by Best claims that adult learners perceive L2 sounds based on the similarities they share with those of the L1 (Best, 1994). Nonetheless, unlike the SLM, this model will focus on the gestural similarities of the native and non-native phonemes, and claims that most of the non-native phonemes are assimilated to the native phonetic categories (Best, 1992 as cited in Best & Strange, 1992).

Regarding the model, assimilations are produced differently depending on the detected similarities. To start with, the non-native contrasts “may be gesturally similar to two different native phonemes” (Best, 1994), and will, therefore, be assimilated into two native phonetic categories, and the differentiation process is predicted to be easy (Best & Tyler, 2007); This process is referred to as “Two Category (TC) Assimilation” (Best & Tyler, 2007). On Single Category (SG) assimilations two non-native phonemes may be similar to a single category, and assimilate equally into it, making them difficult to discern (Best & Strange, 1992); however, sometimes these phonemes are assimilated unequally, being one of them more similar than the other, i.e. “showing a *category goodness difference*” (CG) (Best & Strange, 1992). In these cases, the learner will not find so many difficulties to discern the sounds. It may happen that some phonemes do not share sufficient similarities with the native ones and remain Uncategorized (Best & Tyler, 2007); If only one phoneme is Uncategorized, the learner will be facing an Uncategorized-Categorized assimilation., and the differentiation should be easy; however, the discerning process will be more complicated in an Uncategorized- Uncategorized assimilation (Best & Tyler, 2007).

Finally, some phonemes are so distinct from the native ones that are considered “non-assimilable”, and speakers must focus on the acoustic similarities to discern them (Best & Strange, 1992).

### 2.3.3. The Ontogeny Phylogeny Model (OPM)

The Ontogeny and Phylogeny model draws from the assumption that the L2 learner's system is the interlanguage, *i.e.* a linguistic system combining features from the individual's L1, L2, and Universals (U) "that are not already part of L1 and L2" (Major, 2001). This being so, the three linguistic systems will influence the learner's output, even though the parts of L1, L2, and U shaping and interfering the interlanguage will not be balanced nor the same at all the stages of the acquisition.

Major (2001) suggests that the interlanguage goes through different stages as the L2 is being acquired; initially, the learner is assumed to own and master the linguistic system of the L1, and there are no parts of L2 or U in it. As the learner begins to acquire the L2, the elements of the L1 will begin to decrease while the ones of L2 and U increase. In an ideal scenario where the learner attains the objective of mastering the L2, the L1 and U components will eventually disappear, leaving the ones of the L2 forming the interlanguage on their own, as if it was the linguistic system of a native speaker. As a consequence, the level of interference and transfer of each linguistic systems will be affected proportionally, increasing and decreasing depending on the acquisition stage; Typically, the inaccurate utterances of the L2 learner derive from negative transfer of the L1 to the L2, which happens whenever the transferred characteristics of both systems differ (Major, 2001).

Moreover, Major (2001) goes further asserting that some negative transfer instances are due to Universals that are activated and included in the learner's interlanguage; sometimes, when the learner is acquiring a new phenomenon of the L2 linguistic system, a process or element that does not occur in the L1 is transferred to the L2, resulting in an erroneous production; these instances of negative transfer are the ones happening due to a U process that is not part of the L1 or L2, and are instead a "set of properties of the human language capacity and the resulting universal characteristics" (Major, 2001). The activation of U components is often viewed at an intermediate stage process, when the elements of L1 have begun to disappear but the L2 components are not completely acquired yet, and instead, intermediate substitutions happen through the elements of U.

Nonetheless, some features of the L2 may be acquired without the activation of Universals; in some occasions, L1 elements will remain prevalent while L2 and U are at zero, presumably when the level of similarities between the L1 and L2 systems are high, and the learner has difficulties in identifying the differences (Major, 2001). Moreover, the learner may experience what is known as “similarity paradox”; the elements of the L1 and L2 are so similar that are not distinguishable, and thus, it is accurately produced and considered positive transfer from the L1, even the L2 component is not learned (Major, 2001)

#### **2.3.4. Native Language Magnet Model (NLM)**

Kuhl’s Native Language Magnet Model emphasizes the effects of an adequate perception as well as highlighting that the L1 has a significant influence, as in the previously summarised models.

The learner establishes ideal instances of phonetic categories that will represent the sounds of the L1; these are called “prototypes”, and considered the “best exemplars” of each category, which will be taken as a reference when perceiving and discerning the L2 sounds (Lacerda, 1995). The establishment and classification of the prototypes is made perceptually at a very early age (Kuhl, 1993), and regarding the model, they work afterwards as “perceptual magnets” (Lacerda, 1995). This implies that, those sounds that are more similar or closer to the mentioned prototypes will be pushed and assimilated to them, which will provoke a difficult discerning process (Kuhl, 1993). On the contrary, when the perceived sounds differ substantially from the native language category prototypes, these phonemes will neither be attracted nor assimilated to them, and the discerning will become easier (Kuhl, 1993).

### **3. Analysis of EFL speech production data**

The aim of this section is to analyze the production of English vowels; firstly, the analysis will seek evidence confirming the aforementioned predictions of the model. Nevertheless, the analysis will not be limited to doing so; this paper aims to go further and focus on a gap in the model, i.e. finding errors that are not perceptually motivated nor predicted by the SLM; the analysis will be focused mainly in orthographic errors.

Before starting the analysis of the participants' speech, it is necessary to briefly describe the English and Spanish vowel systems and identify the main differences among them.

To start with, the English (RP) vowel system consists of twenty sounds, including monophthongs and diphthongs. The English monophthongs, which correspond to the letters 'a', 'e', 'i', 'o' and 'u' consist of twelve different sounds; the system draws a distinction between long and short vowels, the former being composed by the sounds /i: ɜ: ɑ: ɔ: u:/, and the latter by /ɪ e ʌ æ ə ɒ ʊ/ (Gómez & Sánchez, 2016), facing the only five pure vowels of the Spanish, /a e i o u/. Concerning the length of these sounds in Spanish, García Lecumberri and Elorduy (1994) claim that none of the English vowels coincide in length with the Spanish ones, being the latter generally shorter (as cited in Gómez & Sánchez, 2016).

However, Gómez & Sánchez (2016) have considered and suggested some closeness between the sounds of both systems; in their words, the sounds “/i: e ɔ: u:/ could be regarded as near equivalents of Spanish /i e o u/” respectively; Moreover, three sounds are corresponding to the letter 'a', /ɑ: æ ʌ/, which are considered close to the Spanish /a/. /ɒ/ is also considered near to /o/, even though it is a more opened vowel. Estebas Vilaplana (2009) states that the sound /ɪ/ is near to Spanish /e/ and /i/ (p.13); similarly, English /ʊ/ is placed between the Spanish /u/ and /e/ (p.24). As for the central vowels /ə ɜ:/, there are no close equivalents in Spanish, due to the lack of central vowels in this language.

However, it should be noted that no English vowel sound is completely identical to the ones in the Spanish phonemic system, since “None of the Spanish vowels exactly coincides with the area of articulation of English vowels” (Gómez & Sánchez, 2016).

### **3.1. Material and Participants**

The present analysis is based in the DiapixFL corpus, created by Martin Cooke, Maria Luisa García Lecumberri, and Mirjam Wester, consisting of several conversations in the participants' L1 and FL. The two languages included in this corpus were Spanish and English; speakers had either Spanish as the mother tongue and English as the foreign language or vice versa.

Every participant was recorded twice maintaining different conversations, one in their native language and the other one in their FL. The recordings of each participant



were made separately, so every conversation consists of two different audios in the corpus, one for each speaker.

The analysis in this paper is focused on the conversations and speech of five native Spanish pairs speaking in English. These conversations were carried out at the Language and Speech Laboratory (University of the Basque Country); each speaker received a similar picture with some differences, which they had to describe in order to spot the differences by speaking in their FL with each other, since neither of them could see the partner's picture.

### **3.2. Method**

In this analysis attention will be devoted to the English vowel sounds production by Spanish native speakers who have English as an FL; the analysis is aimed to detect mispronunciations and, when possible, accurate performances, as well as finding explanations for both phenomena.

For the present experimental work, the audios were carefully listened in order to detect, firstly, the speech predictions suggested by Flege's SLM in pursuit of evidence that would back the model's hypotheses, and secondly, mispronunciations provoked by the spelling of either the L1 or FL of the participants.

While listening to the selected audios, many words were picked as pieces of evidence that would prove the mentioned predictions. The software used to listen to the audios was PRAAT, that can be found in the following link: [https://www.fon.hum.uva.nl/praat/download\\_win.html](https://www.fon.hum.uva.nl/praat/download_win.html)

### **3.3. Results and Discussion**

The obtained results will be detailed and explained hereafter. Due to length restrictions and the nature of the data, the results and discussion will be presented simultaneously.

#### **3.3.1 Analysis of FL Speech Production according to SLM**

As mentioned before, the speaker may follow three different patterns when acquiring the sounds of a L2 or FL: establishment of new phonetic categories if the sounds

are highly different to the L1 ones, category assimilation if they are similar and positive transfer if they are almost identical (Flege, 1995).

The following table showcases the gathered speech instances from the DiapixFL corpus following the mentioned hypotheses of the SLM; each column contains words on which the phenomena was detected, with its corresponding transcription based on the participants' speech<sup>2</sup>.

<b>New categories:</b> /ɜ:/ and /ə/		<b>Category Assimilation</b> /i: ɪ ɑ: æ ʌ ɒ ʊ u:/		<b>Identical sounds</b> /aɪ eɪ ɔɪ aʊ/	
Words	Speaker's pronunciation	Words	Speaker's pron.	Words	Speaker's pron.
Birds	/bɜ:ds/	Beach	/biʃ/	Shine	/ʃain/
Circle	/'sɜ:ɪkl/	Lip	/lip/	Mine	/main/
Learn	/lɜ:m/	Stars	/stɑ:s/	Grey	/greɪ /
Person	/'pɜ:ɪsɒn/	Black	/blæk/	Same	/seɪm/
Lobster	/'lɒbstə/	Couple	/'kʌpl/	Boy	/boɪ/
Colour	/'kɒlə/	Dog	/dɒg/	Point	/pɔɪnt/
Other	/'ʌðə/	Book	/bʊk/	Cloud	/klaʊd/
Centre	/'sentə/	Shooting	/'ʃu:tɪŋ/	Mouth	/maʊθ/

**Table 1: Participants' speech production according to SLM**

The data gathered on this table summarises and supports the SLM hypotheses. Firstly, Flege assures that those sounds differing the most from the L1 ones will be more easily discerned by the FL learners, and a new phonetic category will be established for

<sup>2</sup> For the transcriptions in the section "Identical sounds" Spanish sounds have been used to represent the analyzed output; it is necessary to note that the final element of the English diphthong is not completely identical to the equivalent Spanish phoneme, but due to the close resemblance of these diphthongs in both languages the differences are almost undetectable in the participants' speech and considered almost identical.

them, resulting in an accurate pronunciation. If we look at the obtained results in *Table 1*, there are some words including the mid-central English /ɜ:/ and /ə/ that were correctly pronounced by the analyzed speakers<sup>3</sup>, due to its characteristic dissimilarity with any other vowel sound of the Spanish, as the third hypothesis claims. Therefore, it may be assumed that some speakers were able to establish a new phonetic category for these sounds, resulting in an accurate output of the sounds /ɜ:/ and /ə/. However, in some cases, the same speaker pronounced them correctly in some words, and still made mistakes in others. Some of these mispronounced words were “turquoise” “curly” and “circle” as /'turkoiz/, /'kurli/ and /'sirkli/. This lack of consistency within the same speaker will evidence that the learner is still in an unfinished acquisition process and does not pronounce all the instances correctly. This phenomenon may be fixed with time and experience as the acquisition progresses, but there is a risk of fossilization, i.e. the speaker will continue to make the same errors without noticing the differences among the L1 and FL sounds.

Regarding the second column in *Table 1*, the sounds /i: ɪ/ of the FL were assimilated to Spanish /i/, English /ʌ α: æ/ to Spanish /a/, the sound /ɒ/ to Spanish /o/ and the back vowels /u: ʊ/ to /u/. This means that the speakers were not able to detect the differences between the mentioned vowel sounds, and many words including them were pronounced as the respective closest Spanish vowels<sup>4</sup>; thus, overall, no new category was established for these vowel sounds.

Finally, it was found that some diphthongs such as /ai ei əɪ/ are almost identical to the Spanish ones, so the speakers did not show any difficulty when pronouncing them. Many of the detected instances of the diphthongs /ai ei əɪ/ were accurately produced by all the analyzed speakers, as shown in the section “Identical sounds” of *Table 1*. Thus, it could be concluded that there is positive transfer from Spanish to English in the case of some diphthongs, facilitating the acquisition of these sounds and with no need of establishing new categories for them.

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<sup>3</sup> These words can be found in the column named “New Categories” in *Table 1*.

<sup>4</sup> Examples of the assimilation phenomenon can be found in the section “Category Assimilation” of *Table 1*.

### 3.3.2. Orthographic errors

Although some speech phenomena are predicted by the SLM, the model does not cover all the speech patterns followed by a second or foreign language learner. Some pronunciation errors are out of the model's reach, which includes those happening due to the orthography of either language.

These errors cover a great part of the mispronunciations detected in the analyzed corpus as will be explained in detail below. Sometimes, the spelling transfer from the L1 will be responsible for these errors; within this type of error, the words including a schwa present a special case that will also create confusion among the speakers. In other cases they will be provoked by incorrect overgeneralizations of the English spelling and pronunciation rules. Some of the selected words to analyze the orthographic errors also include instances of Category Assimilation, but in this section attention will be devoted to the influence of orthography on speech production.

The following table collects the mispronounced words detected during the listening as well as their corresponding transcriptions, that are classified according to the cause that provokes them.

Spelling of the L1				Spelling of the FL	
Stressed vowels		Schwa			
Words	Speaker's Pronunciation	Words	Speaker's Pronunciation	Words	Speaker's Pronunciation
Orange	/ˈo.ɪandʒ/	Different	/ˈdiferent/	Pear	/pi:ɪ/
Ball	/bal/	Crystals	/ˈkɪstals/	Second	/ˈsi: kond/
Was	/was/	Pharmacy	/ˈfa:masi/	Butcher	/ˈbatʃeɪ/
Also	/ˈalso/	Orchard	/ˈo:ɪʃɑ:d/	Bush	/bʌʃ/
Beard	/beard/	Instrument	/ˈɪnstrɪment/	Signal	/ˈsaɪnəl/
Pear	/peə/	Near	/ˈniə/	Signalling	/ˈsaɪnəlɪŋ/
Circles	/ˈsɪ:kolz/	Picture	/ˈpɪktʃə/	Hidden	/ˈhaɪdɪn/

Fruits	/'fruits/	Above	/a'boʊv/	Inclined	/in'klɪnd/
Cutting	/'kʊtɪn/	Painter	/'peɪntər/	Circles	/'saɪrklz/
Seagull	/'sigʊl/	Other	/'oðə.ɪ/	Bottle	/'bɒtl/
Smoothies	/'smuðɪs/	Tractor	/'træktər/	Bottom	/'bɒtəm/
Rounded	/'raʊndəd/	Balance	/'bæləns/	Blond	/blɒnd/
Sandals	/'sændəlz/	Error	/'erər/	Don't	/'dɒnt/
Seven	/'sevn/			Old	/ɒld/
Special	/'speʃəl/			Post	/pɒst/
				Local	/'ləkl/
				Open	/'əʊpən/
				Orange	/'ɒrɪndʒ/

*Table 2: Participants' pronunciation errors due to L1 and FL orthography*

### 3.3.2.1. The Spelling of the L1

The main characteristic of the Spanish spelling system is the almost perfect agreement between the letters and sounds (Hualde, 2005). In the case of the vowels, the letters “a”, “e”, “i”, “o” and “u” will always be pronounced as /a e i o u/ respectively, except for the words including the sequences “que”, “qui”, “gue” and “gui”, where “u” will be silent unless a dieresis marks its pronunciation (Hualde, 2005). This is not the case in the English spelling system; in fact, the only five vowel letters correspond to twelve different sounds, so that each vowel letter and their combinations have more than one interpretation. This distinguishing feature of Spanish is often transferred to English in the analyzed conversations; the participants tend to apply the one letter-one sound agreement when speaking English, which often prevents them from a successful performance in the pronunciation. Some of the words that were mispronounced due to this reason are found in the first column of *Table 2*.

For a more detailed explanation of this phenomenon, some examples will be consecutively analyzed and discussed.

To start with, “orange” is a word that was repeatedly mispronounced among the selected participants. The letter “a” in this word should be pronounced as /ɪ/, /'ɒrɪndʒ/. However, most of the times it was produced as /'o.rændʒ/ by the native Spanish speakers; this is precisely because of the Spanish spelling rules; as mentioned before, due to the existing agreement between sounds and letters in this language, the letter “a” has a single interpretation and is always pronounced as /a/. Therefore, it is thought that when finding the letter “a” in the word “orange” speakers resorted to the L1 rule and made a wrong interpretation. Following the same process, words like “ball”, “was” and “also” were pronounced as /bal/, /was/ and /'also/ respectively. As for the words “beard” and “pear”, there were wrongly pronounced as /beard/ and /pear/ instead of producing the diphthongs /ɪə/ and /eə/, since the letters “e” and “a” were produced following the letter-sound correspondence of the Spanish.

Some participants also associated the letters “i” and “u” in the words “circles”, “fruits”, “cutting” and “seagull” to their native sounds, producing them as /'si:kolz/, /'fɹuits/, /'kutin/ and /'sigul/, without considering the corresponding correct interpretations of the English for these letters, that would be /ɜ:/, /u:/ and lastly /ʌ/ for both “cutting” and “seagull”.

The analyzed data also provided evidence to prove this phenomenon with the vowel “o”, which was pronounced like the Spanish phoneme /o/ in “smoothies”, “also” and “rounded” as /'smoðis/ /'also/ and /'.rounded/. It must be mentioned that in the case of “rounded” the letters “u” and “e” were also associated with the Spanish /u/ and /e/, resulting in mispronunciations of the three vowels appearing in the word.

### **3.3.2.2. Schwa**

Within the errors produced due to the L1 spelling, we find some special cases involving the mid-central sound /ə/ appearing in the unstressed syllables, which is the result of a vowel reduction or weakening (Hualde, 2005) that happens due to the English rhythm. This may bring a double error in the pronunciation. On the one hand, since this sound does not exist in the Spanish vowel system and there is not a similar equivalent, speakers tend to replace it with a Spanish vowel sound, which is selected depending on the spelling of the word (Estebas Vilaplana, 2009). On the other hand, since vowel qualities do not vary much in stressed and unstressed syllables in Spanish (Quilis and

Esgueva 1983, as cited in Hualde, 2005), the speaker tends to maintain the same quality in the unstressed syllables when speaking English as well.

For instance, in the word “different”, /ə/ was replaced by /e/ in the second unstressed syllable, pronouncing it as /'diferent/ instead of /'dɪfrənt/. In this case, the vowel “i” was also pronounced like the Spanish /i/, even though the phenomenon that explains this conduct belongs to the category assimilation mentioned in the previous section.

Among the observed speech, this kind of replacement also happened with other vowels: in the words “crystals”, “pharmacy”, “near”, “balance”, “orchard” schwa is replaced by the Spanish phoneme /a/ in the unstressed syllables, since they recognize the letter “a” in the words and associate it to the L1 phoneme; as a result, the mentioned words were pronounced as /'kɪstals/, /'fɑ:məsi/ /niɑ:/ /'balans/ and /'ɔ:tfɑ:d/ instead of /'kɪstəl/, /'fɑ:məsi/ /nɪə/ /'bæləns/ and /'ɔ:tfəd/.

The words “painter” and “other” on which the vowel “e” should have been pronounced as /ə/, the participants replaced it with the Spanish sound /e/ as it is shown in *Table 2*. In the same way, the schwa was replaced by the sound /o/ in the words “tractor” and “error”, due to the presence of the letter “o” in the spelling of the word.

This kind of replacement also happened with the vowel “u” in the word “picture”, that was produced by more than one participant as /'pɪktʃʊr/ and not /'pɪktʃə/. A mispronunciation was also detected replacing the schwa twice with different vowel sounds within the same word in “instrument”. One of the participants pronounced it as /'ɪnstrəmənt/ and not as /'ɪnstrəmənt/, due to the presence of the letters “u” and “e”, which are always pronounced as /u/ and /e/ in Spanish.

Even in some words in which the vowels in the unstressed syllables are not pronounced such as “sandals” /'sændlz/, “seven” /'sevɪn/ or “special” /'speʃl/, the influence of the L1 spelling was visible; in fact, the participants produced the corresponding Spanish phonemes based on the spelling of the words. Therefore, the word “sandals” which included the letter “a” was pronounced as /'sændals/, “seven” as /'seven/ and “special” as /'spesial/.

### 3.3.2.3. The Spelling of the FL

Negative transfer of the L1 is not the only way of making spelling-motivated errors. Incorrect overgeneralizations of the FL rules may also happen during the learners' speech, and many instances were detected in the corpus.

As mentioned before, since not all the letters agree with the same sound in English, a learner of this language cannot predict the pronunciation by the spelling, but he or she needs to know how to interpret it by learning the rules (Estebas Vilaplana, 2009). Nonetheless, it is difficult to master all of the interpretations and exceptions, and sometimes English learners may confuse interpretations or letter-sound relationships and produce words incorrectly.

For instance, even though one of the usual interpretation for “ea” is the English vowel sound /i:/ (Estebas Vilaplana, 2009), there are some exceptions on which other interpretations are accepted and may lead to confusion; the present analysis detected confusion with these letters in the word “pear” more than once among different speakers, who failed to pronounce this word as /peə/, and applied the general interpretation producing it as /pi:ɪ/. Another common spelling of this front vowel also generated confusion among the analyzed learners; when a word includes the single letter “e”, is often produced it as /i:/, as in “me” or “theme” (Estebas Vilaplana, 2009), but not always. One of the selected speakers overgeneralized this rule and failed to produce the word “second” appropriately, pronouncing /'si: kond/ instead of /'sekənd/.

The spelling for the open-mid back vowel /ʌ/ is often through the letter “u”, which in other occasions is interpreted as /ʊ/ or /u:/. Consequently, some speakers pronounced the word “butcher” as /'bʌtʃeɪ/ instead of /'bʊtʃə/, and “bush” as /bʌʃ/ and not /bʊʃ/. Even if they did not attain an accurate pronunciation of /ʌ/, it can be concluded that the speakers were aware of the fact that some words including “u” are pronounced as /ʌ/ since it was replaced by /a/, the closest sound to /ʌ/ in their L1.

In the case of “i”, some of them were not able to discern when to pronounce it as the diphthong /aɪ/ or as the monophthong /i/. Thus, they failed to pronounce words such as “signal” “signalling”, “hidden” or “inclined” producing them as /'saɪnəl/, /'saɪnəlɪn/, /'haɪdɪn/, and /ɪn'klaɪnd/ respectively, and not as /'hɪdn/ /'sɪgnl/ /'sɪgnəlɪŋ/ and /ɪn'klaɪnd/. The vowel “i” was mistakenly diphthongized in the word “circles” as well, when a speaker pronounced it as /'saɪrklz/ instead of applying the sound /ɜ:/.



Regarding the vowel “o” that is often produced as the diphthong /oʊ/ or /əʊ/ (Hualde, 2005) was wrongly applied to the words “bottle”, “bottom” and “blond” performing them as /'boul/, /'boutom/ and /blound/ instead of using the open back vowel /ɒ/. Reversely, the words “don’t”, “old”, “post”, “local” or “open” on which the diphthongization of the vowel should be applied were mispronounced as /dont/, /old/, /post/, /'lokl/ and /'open/.

Also, as mentioned, the word “orange” was pronounced wrongly due to an erroneous interpretation of the vowel “a”; in fact, several speakers produced it with the diphthong /eɪ/, as /'oreɪndʒ/ which is a possible pronunciation of this vowel in other words.

#### **4. Conclusion**

This paper aimed to analyze the production of vowels by native Spanish speakers that had English as an FL in order to find evidence supporting Flege’s SLM but also to prove the influence of the L1 and FL orthography in the FL learner’s speech.

In light of the results that were obtained through the analysis, the hypotheses conforming the SLM were confirmed; those sounds of the FL that shared more similarities with the L1 such as /i: ɪ ɑ: æ ʌ ɒ ʊ u:/ were harder to perceive and discern for the participants, and were assimilated to the closest L1 categories. However, some doubts arose among the new categories; even though some speakers were thought to have discerned the sounds /ɜ:/ and /ə/, the same speakers who achieved an accurate pronunciation not always did so; this may be because some of the participants were still in the process of establishing a new category for these sounds. Also, it was shown that sometimes positive transfer happens from the L1 to the FL; in the case of English, the diphthongs /aɪ eɪ oɪ aʊ/ were so similar to the Spanish ones that it facilitated the acquisition of these sounds, and even if no new categories were established, the differences were imperceptible on the participants’ speech.

Moreover, many pronunciation errors were proved to be caused by the spelling of either the L1 or FL of the participants, and thus, beyond the scope of Flege’s predictions. In the present case, the almost infallible letter-sound accordance of the Spanish spelling system was the main cause that provoked the errors, since the participants tended to transfer it to their FL in the analyzed conversations.

It is noteworthy that /ə/ was one of the sounds provoking major confusion among the participants pushing them to replace it with sounds from the L1. These repeated confusions do not coincide with one of the mentioned hypotheses suggested by Flege's model. Being a "new" sound it should be quite possible to acquire it according to the SLM, but the numerous detected mispronunciations do not indicate so, going against the hypothesis proposed by the SLM. The vowels in unstressed syllables are weakened to /ə/ due to the English rhythm; since this is a suprasegmental matter, it causes more problems among the speakers, and they tend to resort to the L1. An alternative interpretation may be that, since English is the participants' FL, the acquisition environment prevented them from receiving enough accurate input.

It was also proved that the spelling of the speakers' FL provoked many incorrect overgeneralizations, which leads to the conclusion that the participants who performed these errors were still on a developmental stage of the acquisition and have not mastered all of the pronunciation rules of the FL, that, in the studied case, due to the lack of agreement between letters and sounds in English, are more difficult to internalize.

All this data brings some main conclusions: On the one hand, As Flege (1995) already stated, an inadequate perception is not the only cause for the pronunciation errors. On the other hand, spelling is a determinant factor that must be considered when analyzing the FL speaker's speech. Furthermore, all of these results restated the undeniable influence of the L1, and also evidenced that the FL plays an important role in the field of orthographic errors.

Therefore, this paper contributed to understanding the obstacles that some Spanish native speakers learning English as an FL face when pronouncing the vowel sounds of this language, and shed light on the influence of the spelling, that was not covered by the SLM nor by the other principal perception models. However, this essay does not cover all the possible errors that may be produced by FL speakers. Further research in this area would be convenient so as to define the level of influence of other kinds of errors, such as phonotactic ones.

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